

Racial Disparity and Modifiable Risk Factors Among Infants Dying Suddenly and Unexpectedly

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ABSTRACT. *Background.* Racial disparity in rates of death attributable to sudden infant death syndrome (SIDS) has been observed for many years. Despite decreased SIDS death rates following the “Back to Sleep” intervention in 1994, this disparity in death rates has increased. The prone sleep position, unsafe sleep surfaces, and sharing a sleep surface with others (bedsharing) increase the risk of sudden infant death. The race-specific prevalence of these modifiable risk factors in sudden unexpected infant deaths—including SIDS, accidental suffocation (AS), and cause of death undetermined (UD)—has not been investigated in a population-based study. Death rates attributable to AS and UD are also higher in African Americans (AAs) than in other races (non-AA). The potential contribution of unsafe sleep practices to this overall disparity in death rates is uncertain.

Objective. The objective of this study was to compare death rates attributable to SIDS and related causes of death (AS and UD) in AA and non-AA infants and the prevalence of unsafe sleep practices at time of death. Our hypothesis was that there is a large racial disparity in these modifiable risk factors at the time of death, and that public awareness of this could lead to improved intervention strategies to reduce the disparity in death rates.

Methods. In this population-based study, we retrospectively reviewed death-scene information and medical examiners’ investigations of deaths in St Louis City and County between January 1, 1994, and December 31, 1997. The deaths of all infants <2 years old with the diagnoses of SIDS, AS, or UD were included. Sleep surfaces other than those specifically designed and approved for infant use were termed nonstandard (adult beds, sofas, etc). Denominators for our rate estimates were the number of births (AA and non-AA) in St Louis City and County during the study period.

Results. The deaths of 119 infants were studied (81 AA and 38 non-AA). SIDS rates were much higher in AA than non-AA infants (2.08 vs 0.65 per 1000 live births), as was the rate of AS (0.47 vs 0.06). There was a trend for increased deaths diagnosed as UD in AA infants (0.36 vs 0.06). Bedsharing deaths were nearly twice as common in AAs (67.1% vs 35.1% of deaths), as were deaths on non-

standard sleep surfaces (79.0% vs 46.0%). Forty-nine percent (49.1%) of all infants who died while bedsharing were found on their backs or sides compared with 20.4% of infants who were not bedsharing. Overall, the fraction of infants found in these nonprone positions was not different for AA infants and non-AA infants (43.3% vs 38.5%). In AA and non-AA infants, factors that greatly increase the risk of bedsharing, such as sofa sharing or all-night bedsharing, were present in all or many bedsharing deaths.

Conclusion. Among AA infants dying suddenly and unexpectedly, the high prevalence of nonstandard bed use and bedsharing may underlie, in part, their increased death rates. Public health messages tailored for the AA community have stressed first and foremost using nonprone sleep positions. The observation that there was no difference between AA and non-AA infants in position found at death suggests that racial disparity in sleep position is not the most important contributor to racial disparity in death rates. The finding that more infants died on their back or side while bedsharing than otherwise suggests that these sleep positions are less protective when associated with bedsharing. We conclude that public health information tailored for the AA community should give equal emphasis to risks and alternatives to bedsharing as to avoidance of the prone position. *Pediatrics* 2003;111:e127–e131. URL: <http://www.pediatrics.org/cgi/content/full/111/2/e127>; *sudden infant death syndrome, accidental suffocation, cause of death undetermined.*

ABBREVIATIONS. SIDS, sudden infant death syndrome; AA, African American; AS, accidental suffocation; UD, cause of death undetermined.

In a previous study, we evaluated death scene data to determine presence of risk factors for sudden infant death syndrome (SIDS) and related diagnoses in the sleep environment.¹ Recently, however, efforts to reduce racial disparity in sudden unexpected infant deaths attributable to SIDS have been given increased emphasis. Accordingly, we have used this death scene data set to determine the degree of racial disparity in such deaths and to assess the potential contribution of modifiable risk factors in contributing to this disparity in SIDS and related causes of death. This study was not designed to determine degree of risk as in a case-control study, but rather to compare known risk factors present at death in a case comparison study of African American (AA) and non-AA infants.

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METHODS

The methods for investigating infant deaths in this study have been described previously.¹ We determined death rates for SIDS, accidental suffocation (AS), and "cause of death undetermined" (UD) in AA and non-AA infants under 2 years of age. The deaths occurred during a 4-year period (1994–1997) in a socioeconomically diverse population (St Louis City and County). Race-specific rates were computed from the number of SIDS, AS, and UD and number of births (Missouri information for Community Assessment, Department of Vital Statistics) in the St Louis City and County for each year of the study. We used data from standardized death scene investigations.¹ All cases were reviewed by a Missouri State Child Fatality Review Program panel before final diagnosis. For each of these 3 types of death we also recorded: position of body when found; whether the infant shared a sleep surface with another person at death, termed "bedsharing"; and type of sleep surface where death occurred.

A sleep surface was termed "standard" if designed for infants (ie, crib, playpen, bassinet) or "nonstandard" if not (ie, adult bed, sofa, chair, or makeshift bedding).

All descriptive statistics are mean \pm standard error of the mean. Data are compared by using χ^2 analysis, analysis of variance, and unpaired *t* test, where appropriate. *P* values $\leq .05$ were considered significant.

RESULTS

There were 58 AA and 32 non-AA deaths with the diagnosis of SIDS. The racial distributions for AS (13 vs 3) and UD (10 vs 3) were similar. Non-AA deaths included 1 Asian infant and 1 Hispanic infant.

For both groups combined, age at death in days for SIDS, AS, and UD were 102.7 ± 6.1 , 135.6 ± 19.8 , and 123.3 ± 23.9 , respectively (analysis of variance, *P* = .219). Among infants dying of SIDS, there was a trend for more deaths in males than females (55.6 vs 44.4%), as was the case for UD (58.3 vs 41.7%). There were significantly more males than females dying from accidental suffocation (82.4 vs 17.6%; *P* = .01).

Death rates for SIDS were substantially higher in AA than non-AA infants (4 year average: 2.08 vs .65 per 1000 live births; *P* = .001). This disparity was present in each year of the study (Fig 1). Average death rates attributable to accidental suffocation (0.47 vs 0.06, per 1000 live births; *P* = .02) indicated similar racial disparity. A similar trend was also present in cause of death undetermined (0.36 vs 0.06 per 1000 live births; *P* = .15; Fig 1). Death rates in AA infants attributable to AS and UD combined (0.84 per 1000 live births) were substantial and were greater than those attributable to SIDS in non-AA infants.

In all cases, scene description was available to determine whether bedding was standard or not. Deaths on nonstandard beds were far greater among AA infants (79.0 vs 46.0%; *P* = .001), a disparity that seemed to be present during each year of the study (Fig 2). In contrast, the percentage of infants found prone as compared with those found in nonprone positions were similar in both groups (AA = 59.5%, non-AA = 62.5%; *P* = .684; Fig 3). These calculations were based on the 71 AA and 37 non-AA cases in which exact position at time of death was well documented.

Infant deaths occurring on a sleeping surface shared with 1 or more other individuals was far more common in AA than non-AA infants (67.1 vs 35.1%; *P* = .005; Fig 4). For both AAs and non-AAs, bedsharing deaths were no more likely to be diagnosed AS or UD than SIDS (χ^2 , *P* = .700). In both AA

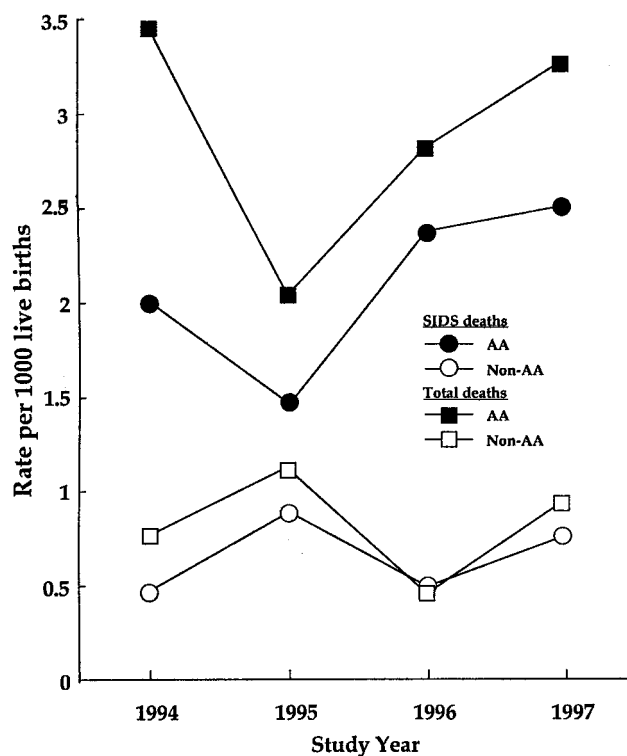


Fig 1. Death rates, by race, for SIDS in St Louis City and County, 1994–1997. Total deaths refer to those diagnosed as SIDS, AS, and UD combined.

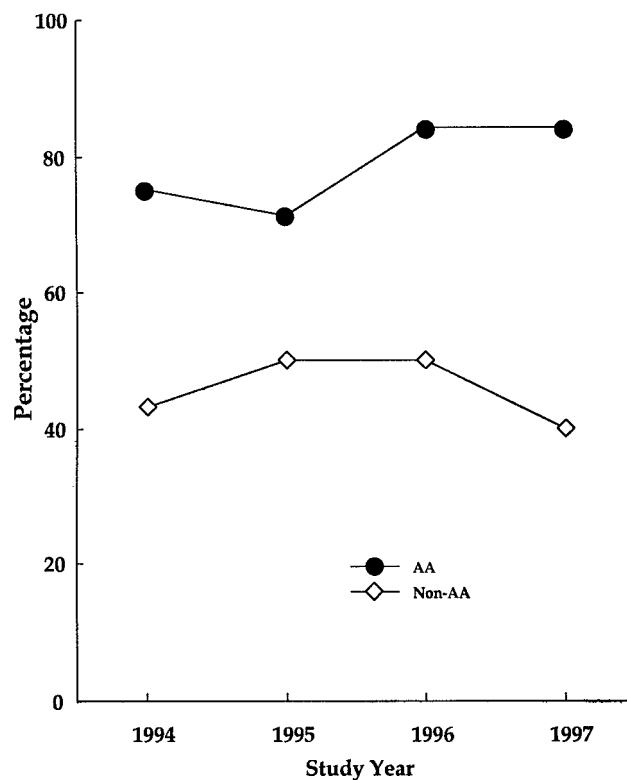


Fig 2. Percentage of all infant deaths occurring on nonstandard bedding in AA and non-AA infants, 1994–1997.

and non-AA groups situations that greatly increase the risk of bedsharing, such as bedsharing at time of death, infant age <100 days, and bedsharing with 1

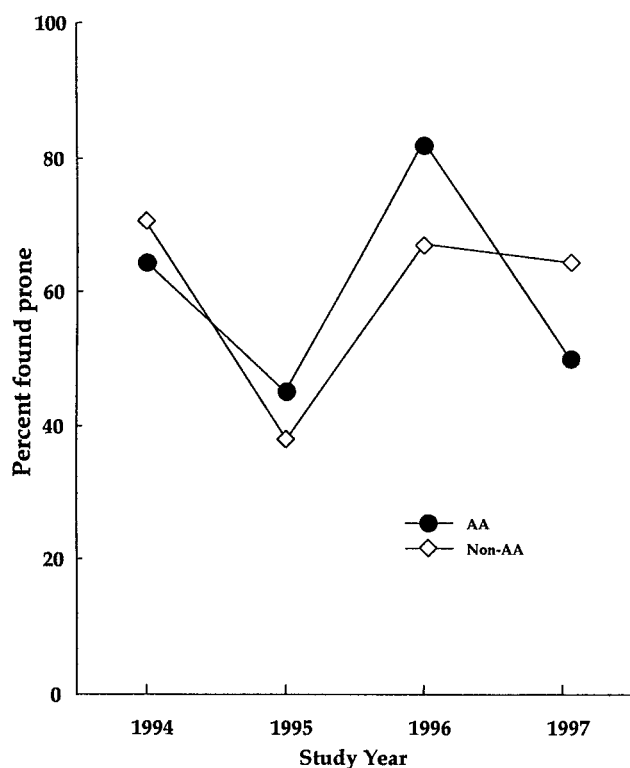


Fig 3. Percentage of all cases found prone at death, in AA and non-AA infants, 1994–1997.

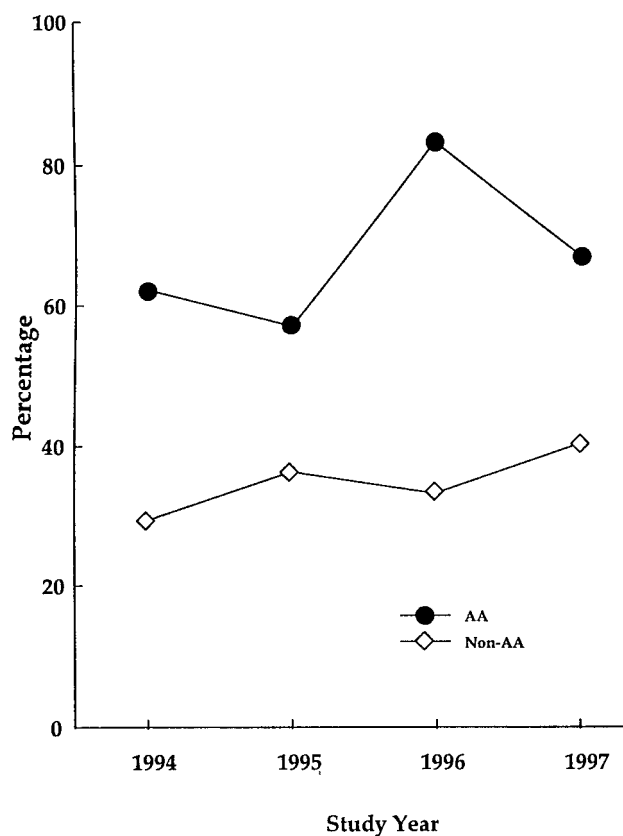


Fig 4. Percentage of infants dying while bedsharing in AA and non-AA infants, 1994–1997.

or more siblings, were present in all or many cases (Table 1). In addition, deaths on shared “makeshift bedding” consisting of pillows, cushions, or other soft bedding placed on the floor occurred in 12.5% of AA infant deaths but in none of the non-AA deaths.

In a minority of cases, the infant was sleeping on an adult bed with his or her mother alone (AA = 23.4%, non-AA = 10.0%). This calculation was based on 51 of 54 AA and 10 of 11 non-AA cases in which the persons sharing the bed with the infant were clearly identified. In most of these deaths (84.6%), additional factors were present that increase risk of SIDS or AS such as adult pillows, loose comforters or multiple blankets, maternal intoxication, or infant age younger than 100 days.

Overall, more infants were found in nonprone positions in bedsharing deaths compared with nonbedsharing deaths (49.1% vs 20.4%; $P = .003$). This difference was also significant for AA and non-AA infants considered individually (Fig 5).

DISCUSSION

In some situations it may be difficult to distinguish SIDS from AS or UD.² Moreover, there are similarities in the population at risk, including age of peak risk and male predominance, found both in our study and reported by others.³ This suggests an interaction of related causal factors. Several reports have indicated that nonstandard beds, which include makeshift bedding comprised of pillows or other soft bedding, sofas, sofa chairs, or adult beds, increase the risk for SIDS, AS, or both.^{2,4–8} Because the diagnosis of UD often represents the inability to distin-

guish between these other 2 diagnoses, we have included all 3 in this study.

Racial disparity in SIDS seems to be increasing since the national “Back to Sleep” campaign.⁹ Recent reports have suggested similar racial disparity for deaths diagnosed as AS and UD.^{3,10} Our rates for these diagnoses are comparable to those previously reported, except that we found death rates attributable to AS in AAs to be twofold higher than reported national rates in this racial group.^{9,10}

It was surprising to find that the ratio of prone to nonprone deaths among AA and non-AA infants was nearly identical, because placing infants prone for sleep is reportedly more prevalent among AAs.⁹ If a higher percentage of AA infants are placed prone for sleep, it seems reasonable that one might expect to find a higher percentage of AA infants found prone at death. Recent data from Norway support this logic. There, use of the prone position has de-

TABLE 1. Percentage of Bedsharing Infants With Additional Risk-Modifying Factors With Sources Cited

	AA	Non-AA	Adjusted Risk for SIDS While Bedsharing
Bedsharing at time of death	100.0	100.0	9.78 (4.02–23.83) ⁸
Infant age <100 d	56.6	58.3	4.65 (2.7–7.99) ⁸
Shared sofa*	22.9	9.1	48.99 (5.04–475.60) ⁸
Shared with sibling(s)	32.8	18.1	4.5 (2.4–8.5) ¹⁶

* Includes sofa chairs.

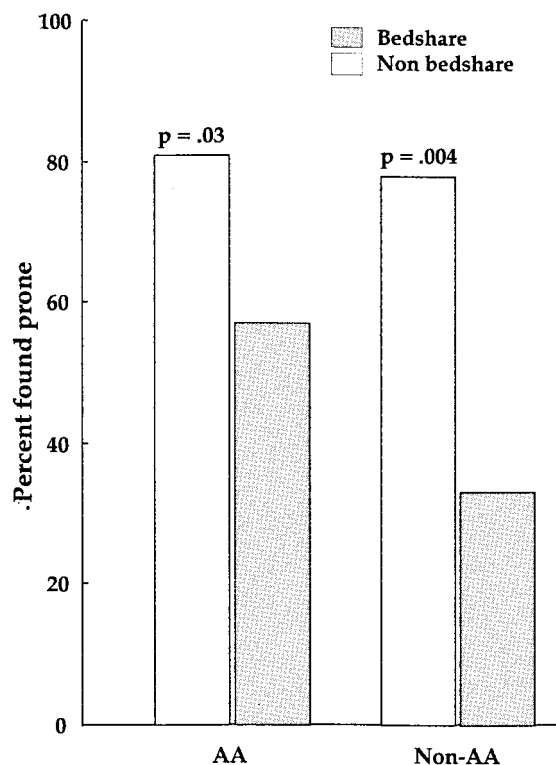


Fig 5. Percentage of infants found prone while bedsharing and while sleeping alone, in AA and non-AA groups. Note that significantly fewer infants were found prone in the bedsharing groups. Differences between AA and non-AA infants for position found were not statistically significant.

clined rapidly in recent years and subsequently, the ratio of infants found nonprone to those found prone has increased.¹¹ One possible explanation for the similar overall ratios of infants found prone to nonprone in the AA and non-AA groups may be attributable to the increased deaths occurring during bedsharing in AA infants. This follows from the observation that bedsharing infants were more likely to be found nonprone than prone as compared with infants who did not bedshare. In a study of SIDS in British infants, Blair and colleagues⁸ found a high incidence (85.9%) of SIDS infants found on their backs or sides in bedsharing deaths, a prevalence that exceeds our own bedsharing deaths diagnosed as SIDS, AS, and UD. In our study, the increased number of AA infants dying during bedsharing would have had the effect of evening the ratio of prone to nonprone deaths in the 2 racial groups. Taken together, our findings and those reported by Blair and associates suggest that nonprone positions are less protective during bedsharing than sleeping alone.

Studies from the United States suggest an increased risk for accidental suffocation for infants bedsharing on adult beds.^{2,6} Most of these deaths involve either overlaying or infants found wedged. The increased risk for SIDS among bedsharing infants including AA infants is well documented.^{8,12,13} Recent findings confirm that bedsharing is a risk factor for SIDS in US urban, predominately AA populations.^{5,16} A number of studies have reported a

positive interaction between maternal smoking and bedsharing.^{8,12,13,16} We do not have accurate data on smoking in this study. However, smoking was likely a less important contributing factor in our study because the incidence of smoking among AA mothers who routinely bedshare is low in the St Louis area (14%) as compared with that reported from other countries (44%).^{14,15} The high prevalence of smoking among mothers who bedshare in other countries has made it impossible in some studies to establish precise odds ratios for SIDS when mothers bedshare and do not smoke.⁸ Other studies have shown that the bedsharing risk is still present when mothers do not smoke.^{12,15}

Recent studies from the United States and abroad have documented a number of factors that substantially increase the risk for SIDS in infants who bedshare. These include: infant found dead in bed while sleeping with others and particularly when sleeping with siblings, infant <100 days of age, infant sharing a sofa, sleeping with siblings, or the use of pillows or quilts.^{8,16} These studies distinguish between bedsharing for only part of the last sleep and bedsharing at presumed time of death. In all bedsharing deaths in the present study, we found 1 or more of these factors that greatly increase bedsharing risk (Table 1). For example, the adjusted odds ratio for bedsharing at time of death, present in all of our cases, is 9.78 and is much higher than that when an infant shares the bed for a short time.⁸ Together, these findings indicate that high-risk bedsharing in the AA community may explain much of the racial disparity in deaths attributable to SIDS and other sudden unexpected infant deaths. A more recent study of AA mothers and infants in St Louis indicate an ongoing high prevalence of bedsharing (41.2%).¹⁷ Furthermore, the majority of these infants (69.0%) did not have access to a safe crib. These data indicate that our findings from 1994 to 1997 continue to be relevant.

Recently, a consortium of US agencies and private sector groups have initiated a campaign specifically for AAs that is designed to reduce the racial disparity in deaths attributable to SIDS.¹⁸ Five primary child-care practices are stressed. These include back sleeping, use of a firm mattress, avoidance of loose bedding, parental smoking, and overheating. Bedsharing is addressed secondarily, but the major message is that bedsharing is not known to reduce the risk of SIDS. Furthermore, the brochure states that if bedsharing is undertaken, back sleeping position for the infant is advisable. However, our findings suggest that the back or side sleeping positions are not as protective during bedsharing as might previously have been expected. We are not, of course, discouraging the promotion of back sleeping. Rather, our finding of an equal incidence of infants found prone in both racial groups suggests that disparity in the use of prone position may not be as important a factor in the racial disparity in death rates as has been suggested.¹⁸

The American Academy of Pediatrics Task Force on Infant Positioning and SIDS has provided more detailed information regarding bedsharing risks, and the US Consumer Product Safety Commission has

advised against bedsharing by an infant and adult under any circumstances.^{7,19} Whether or not bedsharing in the United States can be made safe using detailed guidelines is uncertain.⁷ Clearly, making sure that low-income families have access to approved infant cribs is one prerequisite for a policy discouraging of bedsharing.²⁰ In the meantime, it would seem advisable that more specific information on risks of bedsharing be made available in public health messages, particularly those tailored for the AA community. Such a statement could serve as a stimulus to charitable organizations or public health agencies to make cribs available to high-risk groups.

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