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

Benjamin Unger, MD*; James S. Kemp, MD†; Davida Wilkins*; Rose Psara, RN‡; Terrance Ledbetter, AD§; Michael Graham, MD¶; Mary Case, MD∥; and Bradley T. Thach, MD*

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 non-prone 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.
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 ± standard error of the mean. Data are compared by using χ² analysis, analysis of variance, and unpaired t test, where appropriate. P values ≤.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 more likely to be diagnosed AS or UD than SIDS (χ², P = .700). In both AA 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
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 nonbed-sharing 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. 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. 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. Because the diagnosis of UD often represents the inability to distinguish 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. Recent reports have suggested similar racial disparity for deaths diagnosed as AS and UD. 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.

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. 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 decreased significantly since the national “Back to Sleep” campaign. The proportion of infants found prone at death is now similar to that in our study (Fig 3).

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


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

<table>
<thead>
<tr>
<th></th>
<th>AA</th>
<th>Non-AA</th>
<th>Adjusted Risk for SIDS While Bedsharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedsharing at time of death</td>
<td></td>
<td></td>
<td>9.78 (4.02–23.83)</td>
</tr>
<tr>
<td>Infant age &lt;100 d</td>
<td>56.6</td>
<td>58.3</td>
<td>4.65 (2.7–7.99)</td>
</tr>
<tr>
<td>Shared sofa*</td>
<td>22.9</td>
<td>9.1</td>
<td>48.99 (5.04–475.60)</td>
</tr>
<tr>
<td>Shared with sibling(s)</td>
<td>32.8</td>
<td>18.1</td>
<td>4.5 (2.4–8.5)</td>
</tr>
</tbody>
</table>

* Includes sofa chairs.
British infants, Blair and colleagues found a high
infants who did not bedshare. In a study of SIDS in
to be found nonprone than prone as compared with
observation that bedsharing infants were more likely
sharing in AA infants. This follows from the
utable to the increased deaths occurring during bed-
prone in the AA and non-AA groups may be attrib-
similar overall ratios of infants found prone to non-
involve either overlaying or infants found wedged.
ate on Adult Beds.2,6 Most of these deaths
creased risk for accidental suffocation for infants
sharing for only part of the last sleep and bedsharing
back or sides in bedsharing deaths, a prevalence
sages 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 sug-
that the back or side sleeping positions are not as
protective during bedsharing as might previously
have been expected. We are not, of course, discour-
aging 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
Recent studies from the United States and abroad
have documented a number of factors that substan-
tially increase the risk for SIDS in infants who bed-
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 bed-
sharing 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 bedshar-
ning 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.9 Together, these findings
indicate that high-risk bedsharing in the AA commu-
nity may explain much of the racial disparity in
deaths attributable to SIDS and other sudden unex-
pected infant deaths. A more recent study of AA
mothers and infants in St Louis indicate an ongoing
high prevalence of bedsharing (41.2%).17 Furth-
more, 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. Bed-
sharing is addressed secondarily, but the major mes-
 sage 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 sug-
gest that the back or side sleeping positions are not as
protective during bedsharing as might previously
have been expected. We are not, of course, discour-
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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. Whether or not bedsharing in the United States can be made safe using detailed guidelines is uncertain. Clearly, making sure that low-income families have access to approved infant cribs is one prerequisite for a policy discouraging of bedsharing. 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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REFERENCES

5. Hauck F, Herman SM, Donovan JM, et al. The Chicago Infant Mortality Study: infant sleep environment and the risk for SIDS. Presented at: Fifth SIDS International Conference; April 19, 1998; Rouen, France
11. Arnestad M, Anderson M, Bege A, Rognum TO. Changes in the epide-
miological pattern of sudden infant death syndrome in southeast Nor-

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