Bassinet Use and Sudden Unexpected Death in Infancy

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Objective To analyze risk factors in infants who die suddenly and unexpectedly in bassinets.

Study design A retrospective review of all deaths of infants involving bassinets reported to the Consumer Product Safety Commission (CPSC) between 1990 and 2004.

Results For the 53 deaths analyzed, the mean age at death was 84 days. The cause of death was recorded as anoxia, asphyxiation, or suffocation in 85% and sudden infant death syndrome (SIDS) in 9.4%. In terms of position, 37% were placed prone for sleep, and 50% were prone when found dead. Additional items in the bassinet, including soft bedding, were noted in 74% of cases. Specific mechanical problems with the bassinets were noted in 17% of cases.

Conclusions The risk of sudden unexpected death in infants who sleep in bassinets can be reduced by following American Academy of Pediatrics guidelines, including positioning infants supine and avoiding soft bedding in bassinets. In addition, parents must ensure that the bassinet is mechanically sound and that no objects that can lead to suffocation are in or near the bassinet. ***(J Pediatr 2008;153:509-12)***

In its 2005 policy statement, the American Academy of Pediatrics (AAP) expanded its recommendations for a safe infant sleep environment to further reduce the risk of sudden infant death syndrome (SIDS) and other causes of sudden unexpected death in infancy (SUDI), such as accidental suffocation and asphyxiation. These recommendations include supine positioning for every sleep, a firm sleep surface, avoidance of soft objects and loose bedding, and "a separate but proximate sleeping environment . . . a crib, bassinet or cradle that conforms to the safety standards of the Consumer Product Safety Commission [CSPC]."[1]

Young infants' limited developmental skills and physical strength puts them at increased risk for hypoxia or hypercarbia from the face becoming obscured by blankets or stuffed animals or getting wedged between the mattress and the crib side, or from becoming trapped face down in the bedding.[2,3] Little is known about the safety of bassinets, particularly with regard to SIDS risk. This is somewhat surprising, because 90% of SIDS cases occur before age 6 months, the period during which bassinets are most likely to be used. The percentage of infants sleeping in bassinets doubled, to almost 20%, between 1992 and 2006. Bassinet use is highest in the first 2 months of life, when > 45% of infants routinely sleep in bassinets. Use declines with age; by age 5 to 6 months, < 10% of infants are in bassinets (National Infant Sleep Position Study, unpublished data, 2007). Despite the high frequency of bassinet use, there are no government safety standards for bassinets or cradles. However, the CPSC guidelines stipulate (1) a sturdy bottom and wide base; (2) smooth surfaces with no protruding hardware; (3) legs with locks to prevent folding while in use; (4) a firm, snugly fitting mattress; and (5) adherence to the manufacturer's guidelines regarding maximum infant weight and length.[4]

In the present study, we reviewed data collected by the CPSC on individual infant deaths while in bassinets to elucidate risks involved in placing young infants in bassinets, and to determine strategies for minimizing those risks.

METHODS

We performed a retrospective review and analysis of infant deaths occurring in bassinets between June 1990 and November 2004 that were reported to the CPSC. Reporting to the CPSC is voluntary and can be done by police, fire, and insurance

AAP	American Academy of Pediatrics	SIDS	Sudden infant death syndrome
CPSC	Consumer Product Safety Commission	SUDI	Sudden unexpected death in infancy

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investigators; coroners, medical examiners; health care personnel; manufacturers; retailers; and consumers. Cases were obtained through a search of 3 CPSC databases: Death Certificate, Injury and Potential Injury Incidents, and In-Depth Investigations. These databases contain information on deaths and duplicate reports of cases that may provide more details about the deaths. Information was obtained from death certificates from the 50 states, the District of Columbia, and New York City; medical examiner and coroner reports; police and fire department reports; and media accounts.[5] In addition, the CPSC conducts its own investigations into specific cases, which includes interviews with family members and other witnesses.

After duplicate cases were deleted, searches of the 3 databases provided 53 cases of deaths involving bassinets. From those records, demographic information, medical history, location of death, cause of death, and details about the death scene, including the position of the infant when placed to sleep and when discovered and the presence of soft bedding, were abstracted. This study received exemption from review by the Institutional Review Board of the Children's National Medical Center.

RESULTS

Demographic Information

For the 53 cases studied, the mean age at death was 84 days (range, 9 to 277 days), with 90% of deaths occurring between age 30 and 180 days. The 53 infants included 32 males (60.3%) and 21 females (39.6%), with 34 Caucasian (64.2%), 11 African-American (20.8%), 3 Hispanic (5.7%), and 5 unspecified (9.4%). Twenty-one (39.6%) infants had recent illness (15 with upper respiratory symptoms, 4 with vomiting or diarrhea, 1 with thrush, and 1 with recent varicella). Eight infants had documented previous medical problems (6 born preterm, 1 with congenital syphilis, and 1 with congenital myotonic dystrophy). Parental tobacco use was noted for 7 infants (13.2%), including maternal tobacco use in 4, paternal use in 1, both maternal and paternal use in 1, and unspecified in 1. Two of the infants who had maternal tobacco exposure had prenatal exposure as well.

The cause of death was recorded as anoxia, asphyxiation, or suffocation in 45 cases (84.9%) and SIDS in 5 cases (9.4%). In the 3 remaining infants, the cause of death was recorded as "thermal burns," "anoxia and heat stress," and unspecified. Forty-four infants (83.0%) died in their home, 6 (11.3%) died in a child care setting (child care center or babysitter's home), and 3 died in a homeless shelter.

Sleep Position

Of the 53 infants, 20 (37.7%) were placed for sleep in the prone position, 5 (9.4%) were placed on the side, and 9 (17%) were placed supine. No information on positioning was available for 18 (34%) of the infants, and contradictory information was found for 1 infant. At death, 30 (56.6%) infants were found prone, 3 (5.7%) on the side, and 2 (3.8%) supine. No information on positioning found was available for 13 (24.5%) of the infants, and contradictory information was found for 1 infant. Four infants were found in other specific positions resulting from a mechanical problem with the bassinet, including face down in a blanket on the floor, in a bassinet lying on its side, hanging from the bassinet, and partially out of a tipped-over bassinet.

Information regarding both the position placed and the position found was available in 26 cases. Of the 14 infants who had been placed prone, 13 were found prone and 1 was found on the side. All 5 of the infants placed on the side were found prone. Of the 7 infants placed supine, 5 were found prone, 1 was found supine, and 1 was found on the side.

In 30 (56.6%) of the cases, a specific mode of asphyxiation was noted, for example, "child's face wedged into depression formed by mattress and the edge of the bassinet wall," or "child's head became entangled in plastic garbage bag." Six infants were found with their face wedged against the side of the bassinet.

Only 2 infants were found in the supine position. In both of these cases, additional safety concerns were noted. In 1 case, a broken bassinet leg caused the bassinet to collapse, and the infant slid into the corner. In addition, that child and bassinet had been placed in a bedroom closet with a closed door because the child was crying. In another case, the infant was found with his face covered by a small beanbag pillow that had fallen from a shelf located above the bassinet.

Of the 31 infants found in a nonsupine position, 27 had other identifiable risk factors, including additional items in the bassinet, parental smoking, or a mechanical problem with the bassinet. However, 4 of the infants had no identifiable risk factor except being found in the prone position.

Additional Items in Bassinet

In 39 (73.6%) of the deaths, additional items (anything other than the mattress, fitted sheet, pacifier, or rattle) were found in the bassinet. These additional items included blankets, stuffed animals, bottles, plastic bags, and adult-sized pillows. In 35 (66%) cases, soft bedding was found in the bassinet; in 2 cases, a plastic bag was found in the bassinet; and in 3 cases, both soft bedding and additional items were found. In most cases, these items were intentionally left in the bassinet with the infants, but, as noted earlier, in 1 case a beanbag pillow fell from a shelf above the bassinet and covered the infant's face.

Additional Information About the Bassinet

Four (7.6%) infants were in bassinets that had mechanical swings or pendulums, perhaps to promote infant movement after placement for sleep. Specific mechanical problems with the bassinet, including broken legs, broken wooden slats, and shifting of mattress due to bending of metal clips meant to stabilize the bassinet's frame, were noted in 9 (17%) cases.

DISCUSSION

The demographics of the infants in this case series are similar to those seen in SIDS as a whole. There was a male predominance (60.3%), the mean age at death was almost 3 months, and a relatively large (11.3%) proportion of children died while in child care. But the cause of death was determined to be SIDS in only 5 of these cases; most of the deaths were due to other causes of SUDI, including anoxia, suffocation, and asphyxia. In recent years (including the period in which these deaths occurred), there has been a trend among medical examiners toward decreased recording of SIDS as the cause of death in favor of asphyxia, suffocation, or undetermined cause.[6] Indeed, many of the cases in this cohort in which the cause of death was recorded as anoxia, asphyxia, or suffocation had no obvious mechanism of death other than prone position and perhaps the presence of soft bedding, and the death scene descriptions in these cases were indistinguishable from those in the SIDS cases.

More than half (52.8%) of all of the infants in this cohort, and 73.7% of those in which the position found was recorded, were found in the prone position. Infants placed prone generally were found in the prone position; notably, however, all of the infants placed on the side and many of those placed supine also were found in the prone position. Infants who roll into the prone position are at exceedingly high risk for SIDS.[7] The side-lying position is unstable, and a high proportion of infants placed on the side will roll into the prone position. For this reason, the AAP no longer recommends side-lying as an acceptable sleep position for healthy term infants.[1]

Soft or loose bedding, such as pillows and loose blankets, was a contributing factor in > 70% of the deaths in this series. Soft or loose bedding is an established risk factor for asphyxiation and SUDI.[3,8,9] It is important that bassinet mattresses be properly fitted and that pillows, cushions, or loose blankets be avoided.

Several of the deaths were associated with risks unique to bassinets: bassinet collapse, broken wooden slats, and malfunctioning stabilizing clips. Such mechanical problems could allow movement of the infant either within or outside of the bassinet, possibly leading to a more vulnerable sleeping position. In addition, 6 infants were found with the face wedged against the side of the bassinet. All bassinets must be in good repair and conform to CPSC guidelines.[4] Bassinets with sides made of mesh or similar material that allows access to free air may prevent death from wedging of the face against the side. Furthermore, in 4 cases, the bassinet had a mechanical swing or pendulum. Such a device can allow for significant movement of the sleeping infant, perhaps allowing migration to a corner of the bassinet, where suffocation is more likely.

We acknowledge the limitations of this study, largely due to the data source. CPSC investigations are conducted in response to specific complaints by consumers, which immediately biases the data under review. The CPSC does not provide definitions or guidance for defining a bassinet as compared with a cradle, portable crib, or other infant sleep area; rather, the individual filing a CPSC report defines the item involved as a bassinet. Therefore, it is likely that these data encompass a variety of bassinet designs and models. In addition, the reviewed cases do not represent a complete accounting of bassinet-related deaths in infants, nor do they represent a specific sample of such deaths, because reporting to the CPSC is voluntary. Furthermore, because there is no way to determine the actual number of infants placed for sleep in bassinets, and this database represents an unknown percentage of bassinet-related deaths, these data cannot be used to calculate the relative risk of SUDI and bassinet use. These data should be considered an underestimation of the number of deaths occurring in bassinets. Finally, there is much variability in the amount of information available on each specific infant, with some reports being completed from documents alone and some with contributions from witnesses and/or law enforcement officers. This is largely due to the lack of standardization of death scene investigation and autopsy protocols in the United States. There is also inconsistency in how coroners and medical examiners may define the cause of death. Similar cases may be coded differently by different authorities;[6] in this series, recorded causes of death included asphyxia, anoxia, suffocation, undetermined, and SIDS. More uniform and comprehensive data collection is needed to confirm these findings. The Center for Disease Control and Prevention has established new guidelines for standardized data collection and reporting protocols for the investigation of SUDI cases.[10] Although how universally these guidelines will be adopted is unclear, it is hoped that they will provide more uniformity in the data collected and allow for better study design and analysis.

Despite the limitations of this study, we can draw some preliminary conclusions regarding infant safety in bassinets. First, it is important to adhere to the AAP guidelines regarding infant sleep, including supine positioning, a firm sleep surface, and elimination of soft objects and loose bedding,[1] when using a bassinet. The small size of the bassinet may in fact make it easier for parents to maintain a "separate but proximate" sleep environment as recommended by the AAP;[1] that is, room sharing, with the infant on a separate sleep surface from the parents. Indeed, the new AAP recommendations may be a factor in the increasing popularity of bassinets. Second, as with any products used for infants and small children, parents need to be vigilant with regard to the mechanical safety and stability of the bassinet. A bassinet with vertical sides of air-permeable material, such as mesh, may be preferable to one with air-impermeable sides. Likewise, the bassinet should be used only for an infant meeting the manufacturers' recommendations for length and weight. Care also should be taken to keep any items that could cause accidental suffocation or asphyxia out of the bassinet and away from where they could fall into the bassinet. Finally, health care professionals and other caregivers working with families of young infants must be aware of the need for guidance regarding the unique risks of bassinets.

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50 Years Ago in *The Journal of Pediatrics*

Visiting policies for children's hospitals

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In 1954, the Citizens Committee for Children in New York City conducted a survey of visiting policies in local children's hospitals. Four years later, they resurveyed and reported on the changes that had occurred in the intervening years. Most striking was the doubling in the number of hospitals (from 32% to 64.5%) permitting parents to visit daily. Although visiting hours were usually predefined and limited, they could be extended for sicker children and stretched around-the-clock if the child was gravely ill. Contrary to the skepticism surrounding the liberalization of visiting hours, the Committee found no increase in "cross-infection." However, to deter wholesale adoption of this practice, the reader was cautioned: Beware "the viewpoint of some extremists—probably the necessary evil in every movement—urging unrestricted unlimited visiting for psychological reasons," as "it ignores the fact that children are hospitalized for physical illness, and the primary purpose of the hospital is to treat those illnesses."

Fast-forward 50 years. Daily visiting is now the norm, and in most major pediatric academic health sciences centers, parents are welcome 24 hours a day. Following the logic of last century, are we to infer that the primary mission of pediatric hospitals has changed? Absolutely not, for what was once considered radical policy can now be supported by evidence from, among others, the sciences of healthcare epidemiology and patient safety.

It is currently accepted that the vast majority of healthcare-associated infections, including colonization with multidrug resistant bacteria, are directly or indirectly related to healthcare workers' poor hand hygiene practices. Although parents visit one child, healthcare workers visit many, potentially amplifying the burden of communicable disease when moving from patient to patient. To break the cycle of infection, the Joint Commission expects hand hygiene to be integrated into routine patient care.

Our patients and their families expect the same. Parents are partners in their child's care and provide much more than psychological support. They are guardians of their child's past medical history, and an important defense against medical error. They are entitled to the opportunity to inquire about and participate in their child's care. Is the child not more vulnerable without them?

The notion of "extremism" is contextual and changes over time; 24/7 visiting hours, hand hygiene, and family-centered care are now mainstream. It is hard to imagine what will displace them from center stage.

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