The Role of Bathtub Seats and Rings in Infant Drowning Deaths

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ABSTRACT. Objective. To describe deaths due to drowning that involve the use of an infant bathtub seat or ring.

Design. Case series, cases reported to the US Consumer Product Safety Commission data systems.


Main Outcome Measures. Death in which an infant bathtub seat or ring was in use at the time of death and the primary cause of death was drowning.

Results. Thirty-two drowning deaths involving bath seats/rings were identified and investigated by the Consumer Product Safety Commission over a 13-year period. The majority of deaths (84%) occurred from 1991–1995, with more than 50% occurring in the 2 most recent years. The victims’ ages at the time of the incident ranged from 5 to 15 months with a mean and median age of 8 months. In more than 90% of incidents there was a reported lapse in adult supervision, with a mean reported lapse of 6 minutes and a median lapse of 4 minutes. Focus groups with parents found that while making bathing somewhat easier, bath seats/rings are useful for a relatively short time period, as the child rapidly outgrows the product. They also suggested that care givers are more likely to leave a child unattended in the tub if one of these products is in use.

Conclusion. Bath seats/rings are associated with an increasing number of reported infant drowning deaths. The use of such products may increase the risk of drowning among infants by increasing the likelihood that an infant will be left alone in the tub. However, in the absence of exposure data in a suitable comparison group it is difficult to assess the overall risk inherent in their use. Educational efforts reinforcing the need for continuous adult supervision of infants and children around all bodies of water should now also include a reminder that bath seats/rings are not safety items and are not a substitute for adult supervision. Infants and toddlers should never be left in the bathtub unsupervised, even for brief moments. Pediatrics 1997;100(4). URL: http://www.pediatrics.org/cgi/content/full/100/4/e1; drowning, submersion, infant, bathtub.

ABBREVIATIONS. US, United States; CPSC, Consumer Product Safety Commission; CPR, cardiopulmonary resuscitation.

Drowning is the third leading cause of unintentional-injury death among children in the United States.4 Young children under the age of 5 are at particularly increased risk of drowning, with drowning rates peaking among children ages 1 to 2 years.2,3 Since the 1970s drowning rates have decreased markedly in most age groups with the exception of toddlers, where rates have remained fairly stable, and infants, where rates may have actually increased.5 For the 12-year period from 1983–1994, 1219 infants drowned (2.60/100 000 infants), of which 1036 (85%) were coded as unintentional intent.6 In contrast to toddlers, who are likely to drown in residential swimming pools,5,7–9 more than 50% of unintentional infant drowning deaths occur in the bathtub.6 As part of our ongoing investigation of infant and toddler drownings, we became aware of a number of incidents in which a bath seat or a bath ring was in use at the time of the drowning event.

According to the first major US manufacturer, bath rings were developed by a pharmaceutical company in Johannesburg, South Africa, where they sold for 7 years before introduction into the US market in 1981 (Consumer Product Safety Commission [CPSC], unpublished report, 1983). The intended use of these products is as a bathing aid, supporting the infant in the sitting position while in the bath. The bath ring typically consists of a plastic ring and three or four attached legs, 6 to 8 inches in length. The infant sits directly on the tub surface or on a rubber mat attached to the legs. There is usually a discernible front and the infant’s legs are meant to straddle a particular bath ring leg. In 1991 a modification, the bath seat, was introduced (Fig 1). Similar to the bath ring, the seat contains the infant within a plastic ring and has plastic legs for straddling, but the bath seat also provides a molded plastic seat for the infant to sit on. Both the bath seat and the bath ring are attached to the bathtub surface via suction cups during use.

Currently, there are four major manufacturers with bath seats/rings on the US market. With a price range of about $8 to $16 dollars, these products are affordable for most families. Although precise data are not available on the total number of seats/rings sold per year, estimates from leading manufacturers indicate sales, since 1991, to be about 1 million units per year, or about 1 unit for every 4 live births. In addition, as with other child products that are developmentally appropriate for only a short time period in the child’s life, these seats/rings may be passed down to younger friends or relatives, or resold.

Review of the medical literature found no previous reports of drownings involving the use of bath-
tub seats or rings. Because of the increasing number of drowning deaths associated with these relatively new products, we reviewed all deaths, reported to the US CPSC, which involved the use of a bathtub seat or ring (hereafter referred to collectively as bath seats).

MATERIALS AND METHODS

Data were obtained from the US CPSC on drownings involving bath seats. To obtain reports of product-related injuries or deaths, the CPSC has multiple surveillance systems including: contracts with newspaper clipping services; a toll-free 800 line for consumer complaints and reports of hazardous products (1-800-638-CPSC); an emergency room-based injury surveillance system (National Electronic Injury Surveillance System or NEISS); both a voluntary and paid Medical Examiner’s and Coroner’s Alert Program that solicits reports of product-related deaths; and agreements with each of the 50 states, New York City, and Washington, DC for obtaining copies of death certificates for certain types of unintentional injury deaths, including drownings. Once a drowning involving a bathtub seat is identified through one of the above mentioned sources, CPSC staff complete an in-depth investigation. These investigations may include reviews of medical and police records as well as interviews with care givers, medical professionals, social workers, and/or police officials.

In this case series, information from in-depth investigations was abstracted for incidents that occurred on or before December 31, 1995. To be eligible for inclusion, a bath seat had to be in use at the time of death or injury and the underlying cause of death had to be due to drowning. Details are provided only on those cases occurring in the United States. Independent variables ascertained from the in-depth investigations included age, sex and race of the victim, date of incident, position of the incident, and position of the product at the time of discovery, initiation of resuscitation by the care giver, person responsible for the victim at the time of the incident, the reason for leaving the child unattended, and the duration of the lapse in supervision. In instances where a range was reported (eg, lapse in supervision) the midpoint of the range was used in calculations.

To investigate further the utility and limitations of bath seats, the CPSC contracted with a private research group to conduct three focus groups with a planned size of 8 to 10 participants per group. The focus groups were conducted by a private contractor (Shugoll Research, Bethesda, MD) and were held at a neutral location. To qualify for participation, respondents were required to have at least one child living at home who was between the ages of 6 and 16 months and the respondent had to be primarily responsible or share equally in the responsibility for bathing the child. In addition, several respondents were required to have a second child between 17 months and 4½ years old. At least 8 of 12 potential participants per panel had to currently use, or have previously used, a bath seat.

RESULTS

Thirty-six deaths involving bath seats were identified by the CPSC over a 13-year period. Of these 36 incidents, 2 drowning deaths occurred in Canada and 1 in Sweden; these are excluded from further analysis. Also excluded is 1 death involving thermal burns from scalding water, turned on by the child while using the bath seat. The findings from the remaining 32 in-depth investigations of US drownings are summarized in this report.

The age at the time of the incident ranged from 5 to 15 months, with a mean and median age of 8 months (Fig 2). Females accounted for nineteen (60%) deaths. Twenty-five (78%) of the victims were white, 6 of whom were of Hispanic ethnicity, 6 (19%) were black, and 1 (3%) was Asian. The majority of reported deaths (84%) occurred from 1991 through 1995 with more than 50% occurring in the 2 most recent years (Fig 3).

The care giver at the time of the incident was most often the mother of the child. There was a reported lapse in adult supervision in 29 (91%) of the incidents. For cases in which an estimate of the duration of the lapse was available (n = 24), the reported range was 1 to 35 minutes with a mean and median lapse of 6 and 4 minutes, respectively. Eleven infants were left in the tub with an older sibling, 1 was left with a child of the same age, and 17 were left alone. Common reasons for leaving included answering the phone or making a phone call (24%), attending to other children (24%), retrieving something such as a towel or clothes for the child (17%), and attending to household chores (17%). In 2 drowning deaths there was no reported lapse in adult supervision and in 1 incident there was not enough detail provided in the investigative report to make a determination. For both of the witnessed fatal incidents, the care giver reported difficulty removing the infant from the device after submersion. In one case, the seat tipped sideways with a 6-month-old infant in it, and in the other, a 15-month-old infant slid down and became wedged between two legs of the ring. Apparently, in these incidents, the care giver was neither able to
remove the infant from the seat nor to remove the device, with the infant in it, from the bathtub in a timely fashion.

Although most (90%) of the events were unwitnessed, the probable sequence of events that led to the submersion could be inferred from the position of the product and the position of the infant at the time of discovery. This information was available for 23 (72%) of the cases. Presumably, infants found submerged and trapped under the rim of an upright product slid under the rim, those found separated from an upright product climbed out, and those found either within or separated from a tipped product became submerged when the product tipped over. Based on these assumptions, 9 infants climbed out of the product, 9 tipped over, and 2 slid under the rim of an upright product. In two incidents the water in the tub was left running and the infant was found slumped over in an upright seat with his/her face in the water and in one case a latching T-bar was found in the open position, apparently allowing the infant to fall forward out of the upright product.

A warning label advising against leaving the child unattended in the tub was present on 28 (88%) of the bath seats. In the remaining four cases it could not be determined whether or not a warning statement was present. One or more suction cups were missing or defective in 10 (31%) of the incidents and in one case the front leg of the seat was broken.

It was not possible to evaluate fully the quality of resuscitative efforts of bystanders from the information provided in the in-depth investigations. However, it was apparent that at least 6 victims (19%) were not resuscitated until emergency personnel arrived and several other victims received attention only after the care giver ran to get help from neighbors. Furthermore, even when resuscitative efforts were initiated immediately, it was often evident that the care giver had no training in cardiopulmonary resuscitation (CPR). A death certificate or report from the coroner or medical examiner with a ruling on intent was available for 25 of the incidents. Of these 25 incidents, 3 were classified as undetermined intent while the rest were unintentional. Of note, neither of the witnessed events was among the 3 events classified as undetermined intent.

Parents' perceptions of the advantages and disadvantages of bath seats were evaluated qualitatively through analyses of focus group data. A total of 25 respondents, 22 female and 3 male, participated in three focus groups held in November of 1993. Due to the screening qualifications for the focus group, most participants were familiar with bath seats and identified them as the primary bath aid they used for supporting their young children in the tub. Nineteen respondents currently used a bath seat when bathing their child(ren). In addition, 2 of the participants had used 1 in the past but were not using one at the time.
that the focus group was conducted. A major stated advantage for using a bath seat was that, by supporting the infant, it frees the bathers hands so that the infant can be bathed more easily. Other advantages included safety issues (eg, “to make sure that she wouldn’t fall over accidentally and hit her head on the tub. . . ”) or to give the child greater freedom in the water. Stated disadvantages included the following: the suction cups do not attach firmly to all tub surfaces, it is difficult to thoroughly clean the infant while in the bath seat, and the seat has an extremely limited lifespan, as the child rapidly outgrows the product. Participants reported that they would feel more comfortable leaving a child unattended for a moment in the bath if the infant was contained within a bath seat, if the child was in viewing and hearing range, or if there was an older child present. Respondents were generally aware that warning labels are present on bath seats but stated that these labels have become so common on childhood products that they are often ignored.

**DISCUSSION**

In the United States, drowning continues to be an important cause of injury death in early childhood. Although much attention has focused on risk factors and strategies to prevent drowning deaths in residential swimming pools (eg, mandatory four-sided fencing), research addressing risk factors and prevention strategies for infant bathtub drownings has been limited. The bath seat, in particular, has not been reported as a potential risk factor for unintentional bathtub drownings among infants. Previous studies indicate that there is usually a history of leaving the infant unattended or in the care of another child. In most cases, the adult reports leaving the child, for a short time, to answer the phone or attend to household chores. In some instances, the drowning appears to be due to homicide or abuse. Although no deaths in this case series were classified as homicide and only 3 were classified as undetermined intent, it is possible that 1 or more of the cases may have been intentional. It is often difficult to determine intent for drowning deaths, particularly in this young age group.

The infant bath seat is apparently intended to aid the adult bathing the infant by containing and supporting the infant in a sitting position within the product, thus freeing both of the adult’s hands. Based on comments made by care givers, both in focus groups and in postevent investigations, there is little doubt that these products give a false sense of security that an infant can be left in the tub alone for short periods of time. In the past, use of words such as safe, safety, or sitter in product advertisements may have amplified this perception by leading parents to believe that the ring or seat was a safety device rather than a convenience product. (Recently, manufacturers have begun to limit use of these words.) Although most of the products contained warning labels advising not to leave the infant unattended, these labels appear to be ineffective in changing behavior. As stated by focus group participants, these labels have become so common on childhood products that they are often ignored.

Limitations on use of infant bath seats may be based on the developmental stage of the infant. Manufacturers have correctly identified the lower limit of the age range as 6 months, the age at which, on average, infants can sit unsupported. The upper limit may be based on the age at which children begin to pull themselves to a stand (about 8 to 9 months), giving only a 2- to 3-month period during which the product could be appropriately used. In most of the incidents involving infants more than 8 months old, the victim was found separated from the seat, indicating that he/she probably climbed out of the product. With the rapid, and often variable, development that occurs during the first year of life, parents may underestimate their infant’s motor skills, although further research is needed in this area.

It is important to put these deaths involving bathtub seats in perspective. Since 1991 (when sales of bath seats began to increase dramatically) an average of 5 deaths have been reported each year and, the number appears to be increasing with more than 50% of deaths occurring in the 2 most recent years. However, the passive reporting mechanisms used in this study to identify these incidents likely lead to an underestimate of the true number of events. Figures from the National Center for Health Statistics indicate that about 90 unintentional drowning deaths occur annually among those under age 1, of which approximately 52% are coded as occurring in the bathtub. Additional details, such as the use of a bath seat, are not available in national datasets. Although it appears that the number of bath seat related incidents is increasing, the reliance on a passive reporting system for case identification makes it difficult to interpret temporal trends.

Although bath seats are involved in drowning deaths it is not certain that use of these products increases the risk of drowning. Some may even argue that the products are protective, ie, given that a child is left alone in the tub, the seat may make it less likely that the infant will become submerged. However, infants should never be left alone in the tub and, based on statements made by care givers during in-depth investigations as well as statements from care givers who participated in focus groups, these products appear to increase the likelihood of this occurring. In addition, in those cases where the infant tips over while contained in the seat, the seat may actually contribute to the drowning both by encumbering the infant and by making it difficult for the care giver to remove the submerged child from the water. Likewise, in those cases where the infant slips under the rim of an upright seat, the child may become entrapped underwater by the ring. We report 2 deaths where the care giver indicated that he/she witnessed the event but was unable to free the child from the bath seat. To assess the risk that these products present, future research should compare the proportion of bath drownings involving a bath seat to the proportion of infants using a bath.
chair in a noninjured but otherwise comparable control group.

Since 1987 the CPSC has requested that manufacturers make several modifications, including: placement of permanent warnings on both the product and packaging with illustrations showing an adult in attendance with the infant, elimination of the word “safety” from product packaging and names, inclusion of an upper age limit or weight/height limit for users, and modification of the product to provide quick-release tabs for suction cups. In June 1994, CPSC staff recommended the initiation of formal rulemaking proceedings for infant bath seats. These proceedings are generally initiated when the Commission considers a product ban or regulation. However, in this case, the Commissioners voted 2 to 1 against initiating formal rulemaking. The majority opinion was that the design and manufacture of bath seats does not present a mechanical hazard or an unreasonable risk of injury to consumers. Industry representatives are currently working on a voluntary standard for bath seats. Although this voluntary standard may address some product design issues (eg, problems noted with detachable or defective suction cups), safety experts from the CPSC were unable to offer a design change that would effectively address all incidents associated with these products. The use of an occupant restraint system (a feature included on one brand) may prevent the infant from slipping or climbing out of the product; however, it does not prevent incidents where the product tips over. Also, care givers must actively use the restraint system every time they use the product for it to be effective. Finally, no design modification can address the major issue that leads to most of the drowning deaths, namely that the child was left unattended, apparently because the care giver thought that it was safe to do so. If anything, making the product more robust may only increase the perception that the child will be safe if left alone for a few moments.

In an effort to educate the public about the potential hazards of leaving children unattended in bath seats, the CPSC has issued both press releases and safety alerts. Still, primary prevention efforts fall largely on the shoulders of care givers and those who can inform them. Educational efforts must reinforce the need for continuous adult supervision of infants and children around all bodies of water.17,19 If possible, the telephone should be brought into the bathroom and all necessary bathing items (soap, washcloths, towels, etc) should be assembled before placing the infant in the tub. Parents and care givers should be trained in basic CPR techniques, as the sooner that CPR is initiated, the greater the chance of intact survival.24,25 In addition, health care professionals should remind parents and care givers that bath seats/rings are not safety items and are not a substitute for adult supervision. Infants and toddlers should never be left in the bathtub unsupervised, even for brief moments.

ACKNOWLEDGMENTS

This research was supported in part by a First Award from the National Institute of Alcohol Abuse and Alcoholism (R29AA07700) to G.S.S., and a grant from the Division of Injury Epidemiology Control, Centers for Disease Control (R49/CCTR04286–01), to the Johns Hopkins Injury Prevention Center. We thank Robert E. Mittleman, MD, Medical Examiner, for providing photographs on which the line drawings were based.

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Pediatrics 1997;100;e1
DOI: 10.1542/peds.100.4.e1

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