

# Accidents and child abuse in bathtub submersions

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## Abstract

**Non-accidental bath drowning is an infrequently reported form of child abuse. Details of 44 children who suffered from drowning or near drowning in the bath were analysed from a two year (1988-9) UK study to investigate factors that might point to abuse. Cases of near drowning were notified through the British Paediatric Surveillance Unit inquiry system and drowning cases from the Office of Population Censuses and Surveys, the Scottish Government Record Office, and the Northern Ireland Office.**

**In 28 cases the story was of accidental submersion with a baby of modal age 9 months being left unsupervised in a bath. Two other neonates briefly slipped from the parents arms while having a bath. Four bathtub drownings were related to epilepsy. In contrast 10 cases (six drowning and four near drowning) had stories very suggestive of abuse with inconsistent histories, previous history of abuse, and late presentation for medical care. A diagnosis of abuse should be considered in the differential diagnosis of atypical bathtub immersions in the absence of epilepsy and developmental delay.**

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In a two year study of drowning and near drowning in children we have recognised and briefly described accidental bathtub submersion associated with a specific description as a problem in the infant and toddler age group.<sup>1</sup> In a number of cases, however, the description was different and was considered to be highly suggestive of child abuse.

Physical abuse in the bath causing hot water scalds has previously been recognised as a form of child abuse,<sup>2</sup> however reports of non-accidental bathtub submersions are few. Nixon and Pearn in Brisbane, describe three cases of bathtub immersion,<sup>3-6</sup> which were attempted drownings by carers. They suggest that up to 10% of bathtub submersions may be non-accidental in origin. Quan *et al* from King County, Washington, USA, in their study of the under 20 year old population confirm this finding by describing 24 bathtub immersions three of which had signs of child abuse.<sup>7</sup>

Since our study<sup>1</sup> we have become aware of several other cases of non-accidental bath drowning in Britain including the twin of a girl presenting to our child protection service with a forced immersion scald due to physical abuse. The mother was single, with learning difficulties, and a history of mental illness. We have therefore analysed in further detail information from 44 bathtub submersions in

children to illustrate the differences between accidental and non-accidental bath drowning incidents.

## Methods

We studied the descriptions of 44 bathtub submersions in detail from a two year (1988-9) UK study of drowning and near drowning of children under the age of 15 years. Cases of near drowning were notified through the British Paediatric Surveillance Unit inquiry system. Details of each case were obtained from a questionnaire completed by the admitting paediatrician and from retrospective analysis of hospital case records. Drowning deaths were ascertained from the Royal Society for the Prevention of Accident's press cutting survey; the final statistics were received from the Office of Population Censuses and Surveys, the Scottish Government Record Office, and the Northern Ireland Office (*International Classification of Diseases* (ninth revision) E910). Case details were extracted from coroners' and procurator fiscal reports, police statements, and inquest findings. Methodology is fully outlined in a previous publication.<sup>1</sup>

## Results

There were 44 domestic bath submersion incidents in the two years of our study. The ratio of male to female victims was 8:7. One in three cases were from single parent families. Twenty five of these children died and one child sustained profound neurological deficit. Inquests were held in 15 of the fatal cases, in six cases of suspected homicide the inquests were adjourned for criminal proceedings. There were full police investigations in 19 cases.

In 28 cases the story was of accidental submersion. The accident description was consistent in all cases and involved a baby or toddler who was left in the family bathtub alone (eight cases) or with an older sibling. The children were left unsupervised only briefly while the caring adult fetched towels, answered the door or telephone. All submersion incidents occurred in the family home and all the children were the youngest in the family. In 90% of the cases the attendant adult was the mother, in the remainder father or grandmother were in charge of the child. The mortality rate in these cases was 54%. The age distribution of the children involved in these cases has a modal peak of 9 months with a range of 8 to 24 months (figure).

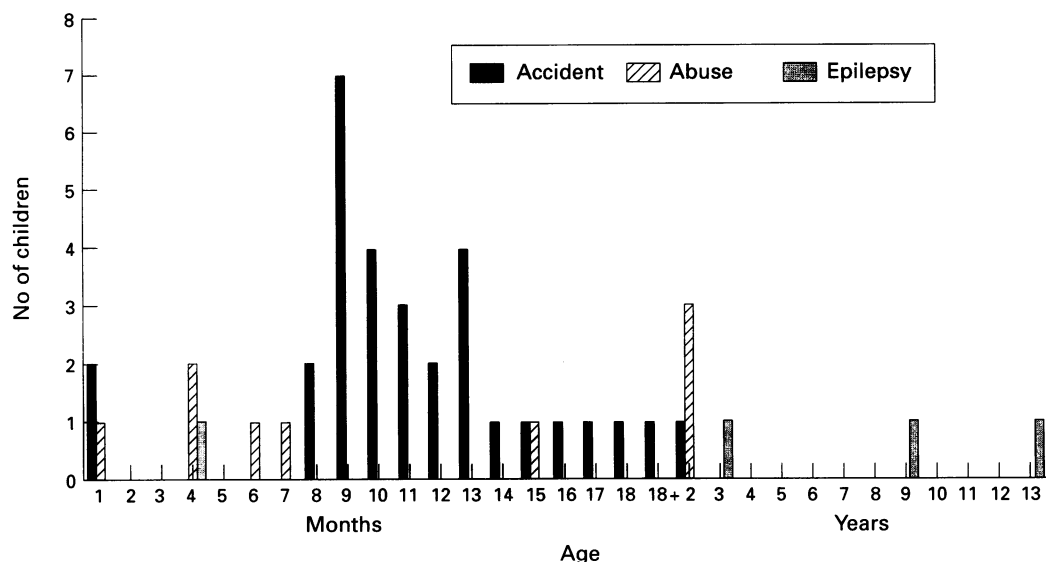
Two babies of 4 and 6 weeks of age respectively nearly drowned when they slipped briefly from parents arms while having a bath.

Four bathtub submersions were related to epilepsy. Three children, aged 3, 9, and 13 years

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Age distribution of 44 cases of bathtub submersion.

suffered epileptic fits in the bath and drowned. The 9 year old also suffered from cerebral palsy. A four month old baby drowned when her mother had an epileptic seizure. Case details are fully described in a previous publication.<sup>8</sup>

In six cases of drowning (14% of total cases) the verdict of the coroner in England and Wales or procurator fiscal in Scotland was one of unlawful killing or culpable homicide. Twin boys, aged 5 months, were drowned in the bath by their mother who was a single parent, she was convicted of manslaughter on grounds of diminished responsibility. A 6 month old girl was drowned by her mother in the family home, no further details were available. A 24 month old girl with cerebral palsy who was on the child protection register was drowned in the bath by her father on an access visit. The child was admitted to intensive care as a severe case of near drowning and died after two days in hospital. Father admitted attempting to drown his daughter while bathing his two children. A 31 month old boy, known by social services to be living in squalid circumstances with his single parent mother was found by neighbours to have drowned in the bath. Mother attempted suicide by slitting her wrists, she was convicted of manslaughter on grounds of diminished responsibility. A 32 month old girl was drowned by her mother in the family home, no further details were available.

In four submersion cases there were features highly suggestive of child abuse. A 6 week old baby girl was being bathed by her father, there were inconsistent descriptions of the event. The baby was put to bed and not brought to the hospital until some time later that evening when breathing problems were noted. The child was admitted to hospital with a metabolic acidosis and hyponatraemia. One month later she was readmitted with a spiral fracture of the femur. A girl of 7 months of age was left in the care of a babysitter of 10 years old and was left alone in the bath for up to an hour. She was admitted to hospital with a core temperature of 23°C; after a period of intensive care she made a full recovery. A boy of 15 months of age was

left in the care of a 12 year old babysitter and was left in the bath for up to an hour. A 23 month old girl was said to have been left in the bath for a short spell, when the parent returned the child was cyanosed under water. The child was removed from the bath and left while a neighbour was summoned, the child came around without resuscitation and was admitted to hospital. There had been considerable concern after a death of a sibling six months previously. The child was discharged after two days' observation and social service inquiry and died at home on the eve of discharge.

## Discussion

We have identified three distinct groups of domestic bath submersions. The majority (64%) have a typical description consistent with accidental submersion. Three older children had epileptic seizures while bathing. The third and most worrying group of children had atypical submersions and features consistent with child abuse or homicide.

The typical description of the majority of child bathtub submersion can be summarised as an infant who is left with a sibling or alone in the bath without adult supervision, albeit

### Features which differentiate between accidental, non-accidental, and homicidal submersion injuries to children

Accidental submersion	<ul style="list-style-type: none"> <li>Typically a baby momentarily left alone or with a sibling in the bath</li> <li>Majority of children 8–15 months of age</li> <li>Child the youngest in the family</li> <li>No features suggesting child abuse</li> </ul>
Epilepsy related submersion	<ul style="list-style-type: none"> <li>Child with history of epilepsy</li> <li>Bathing alone</li> <li>A child older than 24 months</li> </ul>
Non-accidental submersion	<ul style="list-style-type: none"> <li>Atypical submersion description, with inconsistent details</li> <li>Late referral to hospital</li> <li>Associated history of child abuse</li> <li>Child outside 8–24 month age span</li> <li>Child left with unsuitable carer</li> </ul>
Homicidal drownings	<ul style="list-style-type: none"> <li>Maternal history of mental illness</li> <li>Child outside the 8–24 month age range</li> <li>Previous history of child abuse or social needs</li> </ul>

briefly. The child is found submerged in the bath when the adult returns. In the absence of any features in the history suggestive of child abuse and in the light of the consistency of the accident description in such a high number of cases we labelled these cases as accidental submersions. Although the parent's level of care for the child is inappropriate at the time of submersion, the brief lack of supervision arises through ignorance of the dangers to the child rather than wilful neglect. Eighty seven per cent of all childhood drownings are related to lack of adult supervision.<sup>1</sup>

In their five year study Nixon and Pearn confirm this typical description in the majority of the 19 accidental bath submersions reported in children. These cases had the same age distribution as our cases. The consistency of this pattern is emphasised by workers in Utah who looked at submersion injuries in preschool children where bathtub drownings are two to three times higher than the national average. They confirm a typical accident description in all cases.<sup>9</sup>

The majority of accidental bathtub submersion victims are aged between 8 and 15 months of age, which we believe to be related to the motor developmental stage of the child. Prevention of these accidents relies on educating parents about the dangers of leaving babies alone in the bath. Health professionals need to explain the developmental limitations of infants and toddlers who although able to sit have great difficulties righting themselves quickly or successfully once they have slipped over in the bath. Similarly preschool siblings, often in the bath at the same time, do not realise the implications for their younger brother or sister who has submerged in the bath. Preventative advice can be built into the child surveillance programme.<sup>10</sup> Such advice should stress that children under the age of 3 should never be left in the bath without adult supervision.<sup>1</sup>

The non-accidental drowning case presenting to our child protection service together with the 10 (23%) children from the overall study with atypical submersion descriptions have distinctly different case scenarios which strongly suggest child abuse. All these cases have a number of features commonly associated with the diagnosis of child abuse, which include inconsistent stories, previous or subsequent history of child abuse, late presentation for medical care, inappropriate child care. Most of the children involved were outside or at the limits of the age span for typical accidental bathtub immersions. Nixon and Pearn describe three cases of non-accidental immersions in the bath with similar features.

There are often no positive physical findings in this type of child abuse, it is therefore helpful to identify features in the history that suggest non-accidental bath submersion. This diagnosis should be considered in the differential diagnosis of bathtub immersions without a typical accident description and in children outside the age range of 8 to 24 months in the absence of epilepsy or developmental delay.

The non-accidental near drowning cases seem to have two difference aetiologies. The cases where infants were left in the care of young schoolgirls amount to neglect on the part of the parent. Neglect is one of the four categories of abuse recognised in the Children Act 1989.<sup>11</sup> Within the definition of 'failure to provide reasonable care' or 'a child left unsupervised or with an unsuitable carer' these cases amount to neglect. There was, however, no supportive evidence that either of these children had been previously significantly neglected, it is therefore likely that these cases amount to a passive form of abuse arising from parental inertia.

The remaining cases of non-accidental submersion together with the homicides suggest a more active form of physical abuse in the form of attempted submersion or failure to rescue the child appropriately. Infanticide by drowning with or without parental suicide is recognised,<sup>12</sup> it is therefore not surprising that we and workers in Australia now describe cases of probable attempted drowning.

In six of the fatal cases there was an association with maternal mental illness. Non-accidental bathtub drowning in these cases serves as an illustration that young children of mothers with mental illness are likely to be at a high risk of abuse. Scott<sup>13</sup> points out that although a link has been identified between maternal and postpartum depression and disturbed parent-child interaction<sup>14-17</sup> the relationship between maternal mental illness and the risks of child maltreatment has been underestimated. He urges practitioners to be alert to the potential risks to the child of a depressed mother.

In the light of these findings all those caring for mothers and children need to be aware of the risks faced by children at bath time. These cases demonstrate that non-accidental immersion in the bath is a real entity. Paediatricians should consider the diagnosis in atypical bath submersions especially when other pointers to child abuse are present.

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### Transient hyperglycaemia

Paediatricians will be familiar with the phenomenon of transient hyperglycaemia in children with acute illnesses, especially episodes of asthma. Usually it is thought of as a physiological reaction to stress and no investigation or follow up is arranged but there have been suggestions that a significant proportion of these children might develop diabetes. How great is this risk? Should children with transient hyperglycaemia be investigated further, and if so, how?

Work at the Joslin Diabetes Center in Boston, Massachusetts, is reported in the *Journal of Pediatrics* (Raymonde Herskowitz-Dumont and colleagues, 1993; **123**: 347-54). Sixty three children were studied and seven (11%) of them developed diabetes within one to 18 months of the episode of transient hyperglycaemia but diabetes was much more likely to develop after transient hyperglycaemia found on routine checking of a well child (six of 19, 32%) than after an episode of hyperglycaemia during an acute illness (one of 44, 2.3%). Transient hyperglycaemia was found in 0.46% of nearly 64 thousand children seen either on the wards or in the emergency department of the Boston Children's Hospital.

Two immunological markers and two measures derived from an intravenous glucose tolerance test were found to predict the development of diabetes. These were: islet cell antibodies, insulin autoantibodies, stimulated insulin release, and rate of glucose disposal (K rate). All of these tests had a positive predictive value of 100% for the development of diabetes. Negative predictive values were 96, 98, 98, and 94% respectively.

Children who are found to have transient hyperglycaemia during an acute illness have a low risk of diabetes over the next year or two but those whose hyperglycaemia is unprovoked may have a risk of 30% or more. Available investigations detect those who will develop diabetes with a high degree of accuracy. The authors imply that investigations could usually be confined to the high risk group.

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