Thirty-five years of paediatric scalds: are lessons being learned?

P. A. Eadie, R. Williams and W. A. Dickson

The Welsh Centre for Burns & Plastic Surgery, St. Lawrence Hospital, Chepstow, and School of Postgraduate Studies in Medical & Health Care, University of Swansea, Swansea, Wales, UK

SUMMARY. All paediatric scalds admitted in 1991 to the Welsh Centre for Burns and Plastic Surgery have been analysed retrospectively and the results compared with similar studies from this centre reported in 1956 and 1984. This data was compared with similar reports from 6 other world-wide centres. Despite a modest population increase in Wales, the number of admissions has increased almost 50% in 35 years. Boys are more commonly affected and up to 67% of scalds occur in children under 2 years of age. The number of scalds from teapots has fallen from 20.8% to 2.7%, in contrast to scalds from cups of hot liquid which have increased from 8.9% to 42.5% over the 35-year period. Scalds from hot baths are rare in Holland and Denmark, in contrast to a 15.8% incidence in our centre. Hot kettles are a common cause of scalds, accounting for up to 28% of scalds in all the series reviewed. The incidence of this injury has not decreased over the last 35 years. Recommendations are made about improved health and safety education for parents, the use of coiled kettle flexes, the temperature of stored water which should not exceed 60 °C, and the fitting of thermostatic mixer taps to new houses and institutions, in an effort to decrease the incidence of paediatric scalds.

The medical literature, in particular the plastic surgical and burns literature, contains numerous reports of the aetiology and incidence of paediatric scalds and it would be thought that from this myriad of reports a serious attempt would be made to combat some or all of the causative agents. Tempest in 1956 concluded that paediatric burns are largely preventable and if that is so what has happened in the last 35 years? With the advent of computerised medical audit, retrieval of data on this injury has been facilitated. It is now possible to monitor closely any changing trends and to ascertain whether alterations in Health and Safety regulations and differences in legislation governing household appliances affect patterns of injury. With this aim in mind, this study was undertaken to assess the incidence and aetiology of scalds treated in our unit over a 35-year period.

Results

Despite a fall in the overall number of admissions from 1956 to 1984, the number of admissions of paediatric scalds to this unit has risen again from 101 in 1956 to 146 in 1991, which is an increase from 1:24,800 to 1:21,900 paediatric scalds per population in Wales, a 12% increase (Table 1).

The age distribution of this injury has changed little, with 85% of cases being under 5 years of age in 1956, 85% in 1984 and 91% in 1991 (Table 1). Comparing these figures with the other reported series, a pattern is set with 60–67% of scalds in most series occurring in those less than 2 years old (Table 2). Boys appear to be at greater risk of sustaining this injury, as a persistent

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of admissions</th>
<th>Admissions per population</th>
<th>Under 5 years old (% of total)</th>
<th>Under 2 years old (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>101</td>
<td>1:24,800</td>
<td>86 (85%)</td>
<td>N/A*</td>
</tr>
<tr>
<td>1984</td>
<td>87</td>
<td>1:32,190</td>
<td>74 (85%)</td>
<td>50 (57%)</td>
</tr>
<tr>
<td>1991</td>
<td>146</td>
<td>1:21,900</td>
<td>133 (91%)</td>
<td>98 (67%)</td>
</tr>
</tbody>
</table>

* N/A = not available.
male predominance is seen with 62% in Wales in 1984 and 58% in 1991. This compared with the other series reviewed where the male predominance ranged from 55–60%. Data from 1984 and 1991 reveals an evening peak corresponding to meal times for these injuries, and an even yearly distribution persists for scalds in all 3 periods analysed.

In 1956, scalds from teapots accounted for 20.8% of the injuries, in contrast to only 2.7% in 1991. However, the number of scalds sustained from cups of hot liquids increased from 8.9% to 42.5% over the same time period (Table 3).

Comparison of the aetiology of scalds in Wales in 1991 with the other series reveals some striking differences. Bath injuries accounted for only 2.7% in the report from the Netherlands.3*4 The number of children seen with scalds in our unit has increased relative to the population rise in Wales. The admission policy of seeing and treating all burns referred has remained the same and, while 100% of burn injuries sustained in the region may not be seen, the data is probably representative of the general pattern of burns in Wales.

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Consumption of tea and coffee and the way in which they are prepared appear to influence the pattern of scalds in children. The introduction of instant coffee to the United Kingdom in 1939 revived the country’s taste for coffee, with a marked rise in popularity seen after World War II. Tea bags were introduced into the United Kingdom in 1953 and both of these changes have resulted in a rise in the incidence of scalds sustained from hot beverages in cups, from 9% in 1956 to 42.5% in 1991 in our unit. As a corollary to this, there has been a decrease in the number of scalds caused by teapots. Kettles full of boiling water accounted for 24.7% of the scalds in our 1991 series. The usual mechanism of injury in these cases is the small child pulling the flex, resulting in the kettle toppling over. Data was not available on the type of flex on these kettles. Cason in 1990 noted in her survey of homes in which scalds had occurred that 49 had electric kettles, of which only 3 had coiled flexes.7 It would seem logical to assume that coiled flexes are safer and, if this is so, coiled flexes should be a standard fitting and controlled by legislation.

Scalds due to hot beverages in cups and hot water in kettles are both commonly caused by children pulling these objects onto themselves. Coffee filter funnels on top of coffee pots are also dangerous.8 In Holland, the number of coffee scalds decreased markedly over the period 1972–1985 probably as a result of the increasing use of electric coffee machines.5 Klasen and ten Duis noted that in 84% of cases one or both parents were close to the child at the time of the accident.9 Adults must be constantly vigilant while supervising a child in the presence of hot liquids and improved adult health and safety education may help to reinforce this message.

There were no bath injuries in the Danish series and only 2.7% in the report from the Netherlands.3*4 The temperature of the hot water supply was lowered following a recommendation by the Council of Prevention in Denmark and mixing taps are very commonly used in the Netherlands. In a household survey performed in the UK in 1986, the hot water temperature ranged from 42°C to 82°C, with a mean of 58°C.10 The Electricity Council, British Gas and Building Research Establishment recommend a temperature of 60°C for stored water. This figure is regularly exceeded, and the vertical entry immersion heater and a single thermostat on both the heating and domestic hot water system in gas central heating systems has been blamed. From Lawrences Bull’s work in 1976,11 a temperature of 60°C will cause a partial thickness burn in approximately 10 seconds, a shorter time than a small child can get out of a bath. If the water is to be stored at 60°C then to reduce the...
incidence of bathroom scalds it must be delivered at a lower temperature by the use of thermostatic mixing taps. So, for example, the UK Health Departments recommend that, in health care and personal social services premises, mechanical mixers or thermostatic mixers are used to ensure that the nominal maximum temperature for hot water outlets accessible to patients, residents and visitors does not exceed 43 °C.12 In Denmark, thermostats on all taps used by mentally impaired patients were recommended.13 A year later, there had been no scalds where the thermostats had been installed. There was also a considerable reduction in fuel oil consumption. The cost of installation of the thermostats was almost exactly the same as treating the average annual number of scalded mentally impaired patients.

Twenty three children sustained scalds from baths in our series in 1991. While Tempest in 1956 stated that paediatric burns are largely preventable, the facts would appear to point that not enough is being done to achieve this.

From our figures on the aetiology and incidence of childhood scalds in Wales and from our review of similar series elsewhere, we recommend that more emphasis should be put on the prevention of this injury in health and safety education; kettle flexes should be coiled; the temperature of stored water should not exceed 60 °C; new homes and all institutions providing health care should be fitted with thermostatic mixer taps preset at 43 °C.

References