Reduced Hospitalisation of burns patients following a multi-media campaign that increased adequacy of first aid treatment

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Abstract

Context: Concern engendered by a previous study that showed inadequate first aid for burn injuries was prevalent in the community led to a novel multi-media public health campaign ensued to address the issue. Objective: To determine whether this public health campaign influenced behaviour by altering first aid treatment for burn injuries (BFAT). Design, setting and population: Prospective intervention study. Consecutive patients with acute burn injuries over two 4-month intervals, presenting to a regional burn service, Auckland, New Zealand. This research was ethically approved by the Local Research Ethics Committee. Main outcome measures: Demographics, burn size, adequacy of burn first aid, outpatient/inpatient wound care and operative intervention requirement. Results: Adequacy of BFAT improved following the campaign (59% versus 40%, P = 0.004). Fewer inpatient admissions (64.4% versus 35.8%, P < 0.001) and surgical procedures (25.6% versus 11.4%, P < 0.001) were undertaken following the campaign with a corresponding increase in outpatient care. Greatest decreases were observed in Maori and Pacific Islanders, and in children <10 years old. Conclusions: Adequacy of BFAT together with a reduction in the numbers of patients requiring inpatient surgical care was improved by a multi-media public awareness campaign. © 2003 Elsevier Ltd and ISBI. All rights reserved.

Keywords: Hospitalisation; Burns first aid treatment; Burn size

1. Introduction

Immediate cooling of burns as a first aid measure significantly determines burn outcome, and decreases morbidity and healthcare costs by limiting the degree of tissue damage [1–5]. Consequently, the need for surgery and subsequent reconstruction is reduced [5]. Immediate, continuous application of cool running water (10–15 °C/50–60 °F) for 10–30 min, if available, is recommended as adequate burn first aid treatment (BFAT), although this may need to be tempered to suit circumstance in preventing hypothermia, particularly in children [6–10]. Awareness of appropriate burns first aid was unclear to many of the burn-injured population of Auckland, New Zealand, especially Maori and Pacific Island people and parents of children <10 years when studied [1]. Inappropriate and sometimes deleterious first aid was also commonplace. In addressing this problem, a multi-media public education campaign was undertaken.

This study examines the effect of that campaign, and highlights the beneficial effect for burn patients of adequate BFAT.

2. Methods

All patients, with an acute burn injury, treated at a regional burn centre over two 4-month study intervals (November 1997–March 1998 and November 2001–March 2002) separated by an intervening publicity campaign were considered for enrolment. Those who were unable to be interviewed due to death or mechanical ventilation were excluded. Patients/caregivers were interviewed in the emergency department or subsequently during inpatient care (Box 1). Patients were followed for 6 months post-injury. Ethics committee approval for this study was granted (A02/02/00/218).

Adequacy of initial first aid treatment was defined as cold water treatment involving immersion of the burn in either running or stationary water for at least 10 min. This was chosen as it was in accordance with a 1997 New Zealand government education campaign [11].

Other data collected included patient demographics, burn size as a proportion of the total body surface area and cause
of burn. Low socio-economic status was defined by household income less than NZS 30,000 (approx. US$ 14,000) per annum and socio-economic index (SEI) ≤ 45 [12]. Patients were directly questioned regarding the source of their first aid knowledge. Subsequent inpatient or outpatient care including any surgical intervention was documented.

Extensive multi-media coverage included advertisements on television and radio, billboards, articles in local newspapers and popular magazines. Maori and some Pacific Island language versions were used in addition to English. The campaign message specifically highlighted common causes of burn injury in the home and their avoidance, and also enunciated what appropriate first aid measures should be taken in the event of an accident.

Comparison of data was by Student’s t-test and Mann–Whitney U-test for small sample size, with significance set at $P < 0.05$. For ethnicity comparisons, a Chi-square test was used [13].

### 3. Results

One hundred and twenty-one patients (of a total 165) were included pre-campaign, and one hundred twenty-three patients (of a total 153) following the campaign. Comparison of patient demographics demonstrated no significant differences between populations studied in the pre- and post-campaign (Table 1).

Seventy-three percent of inpatients resided in areas of lower economic status. In all age groups, hot liquid was the predominant cause of injury (46%). Fire (18%), flash (15%) and other causes such as electrical, hot oil and hot metal (21%) accounted for the remaining injuries. However, in children less than 10 years old, scalds predominated in both pre (66%) and post-campaign (54%) groups. Eighty-one percent of burns occurred in the home. Of the participants interviewed following the campaign, 76% were aware of the burn first aid campaign.

Pre-campaign, 40% of patients were given adequate BFAT compared to 59% post-campaign ($P = 0.004$) with the greatest improvement occurring in children from 30.4 to 62.5% post-campaign ($P < 0.001$), Pacific Island patients from 33 to 61% ($P = 0.02$) and Maori 25 to 48.2% ($P = 0.08$) (Fig. 1).

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Gender (m/f)</th>
<th>Age</th>
<th>Ethnicity (C/M/P/O)</th>
<th>Low SEI (%)</th>
<th>TBSA (%)^d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-campaign</td>
<td>121</td>
<td>83/38</td>
<td>3 months–77 years</td>
<td>50/24/33/14</td>
<td>73</td>
<td>25/50/25/21/2</td>
</tr>
<tr>
<td>Post-campaign</td>
<td>123</td>
<td>84/39</td>
<td>3 months–83 years</td>
<td>49/27/36/11</td>
<td>75</td>
<td>27/57/28/14/2</td>
</tr>
</tbody>
</table>

P value: NS NS NS NS NS NS

P ≤ 0.05.

* Male/female.

† Caucasian/Maori/Pacific Islander/other ethnicity.

‡ Population with low socio-economic index (SEI) [27].

§ Total body surface area burned.
Inpatient wound care or operations were reduced post-compared with pre-campaign ($P < 0.001$), with a corresponding increase in number of outpatients (35.6% versus 64.2%) (Figs. 2–4).

4. Comment

Adequate first aid for burn injury is application of cool water over the injury for at least 20 min. Whilst this advice may need to be tempered in very large burns or in small children, the publicity campaign did not address these issues. It was considered that by complicating the message with riders and addendums, more burn injuries were likely to be under treated initially. It was for these reasons, now supported by the following study, that no aspect of the campaign highlighted the possibility of developing hypothermia as a result of first aid. A German study of 212 adult patients found that unless a patient was either anaesthetised or artificially ventilated, hypothermia did not result from cold-water treatment [14]. Whilst this may not be the case for paediatric patients, during both study periods no cases of hypothermia were seen, which we believe justifies the approach taken.

Interesting BFAT practices, such as application of toothpaste, exist in the community, which do not cool the wound and may even contribute to tissue destruction [1]. Factors not unique to any group in this study, such as culture, educational status and health service accessibility, influence such practices [2,3]. Folk-remedies are often self perpetuating and generational unless education is provided from an authoritative source. We have no way of knowing whether the campaign influenced the prevalence of these practices (which may be harmful), and what contribution that reduction may have made to the improvement seen in the study.

We previously demonstrated the prevalence of these issues within our community and the need for re-education. No study has previously reported an effect of a public health campaign on appropriate burn first aid. Moreover, the subsequent effect on the spectrum of wound severity presenting to the burn service is unique to this study.

Unfavourable health outcomes are more common within minority groups and the financially disadvantaged [15,16]. In New Zealand, the standard of health amongst Maori and Pacific Island people is recognised to be below that of European New Zealanders. It is not surprising therefore that Maori and Pacific Island people were over represented in the burn injured population compared to regional data from published census information both in 1998, and in the most recent census of 2001 [17]. Whilst we have no explanation for this inequality, it is pleasing to note that the most frequently injured received greatest benefit as a result of the first aid campaign. We are unable to fully explain this result, although an element of the campaign was delivered in the languages of Maori and Pacific Island peoples. Any conclusion is in part speculative, as effects may be due to surrogate variables including cultural practice, socio-economic status and educational level, rather than ethnicity alone [10,18].

Television and radio were found to be the most effective communication media in the campaign. It is likely therefore that the caregiver of younger children is exposed to the campaign via radio and television as they are, by necessity, more often based in the home. Frequent exposure to the multi-media message in this way is conceivably an explanation for the dramatic increase in BFAT in the under 10-year-old age group. Burn injuries are more common in children with a proportion, reportedly as high as 20%, inflicted non-accidentally [19,20]. We suggest that these
who are injured non-accidentally are unlikely to ever receive adequate BFAT, regardless of any educational efforts [3–5]. We fear therefore that there will always be some individuals unlikely to receive adequate BFAT.

It is curious that the adult group has not reflected the improvements in BFAT seen in the paediatric group. We suggest that perhaps adults with children were more responsive to the campaign message than those without children. In addition, our impression is that burns in adults often occur during periods of intoxication, rendering the victim incapable of appropriate self-care and sometimes oblivious to the injury that they have sustained.

Improved BFAT adequacy was associated with reduced inpatient admission and requirement for operative procedures. We postulate that these outcomes are a surrogate for decreased burn severity, although the present study did not specifically examine this aspect.

Mass media are leading sources of health information and can influence health professional and patient behaviour [21–27]. A simple, positive, behaviour-specific message targeted towards at-risk groups, is known to optimise behavioural change, especially if delivered through television and newspapers [28]. Cyclical repetition is important to maintain this improvement [29]. Due to its proven success, the burn first aid awareness campaign has been repeated and plans are afoot to continue repeating its message in a cyclical fashion every 2 years. However, both the advertising company and Burn Service personnel are aware of the possibility of ‘tolerance’ to the campaign, and novel strategies will be required for delivering the same message repeatedly to keep it fresh and in the public consciousness.

5. Conclusions

We have reported a multi-media publicity campaign directed towards first aid treatment of burn injury that impacted significantly on health behaviour. In addition, the injuries seen by the burn service subsequent to the campaign required significantly less inpatient and operative treatment, implying a reduction in their severity. In view of our success, we would encourage others involved in both burn care and public health to undertake similar campaigns.

References