

Investigating the incidence and severity of post-burns complications amongst different Fitzpatrick Skin Types and first aid administrations

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Introduction

Current literature demonstrates a potential disparity in burns outcomes in darker-skinned patients in the US,^{1,2} however this has not been studied formally in the UK.

Furthermore, current best practice indicates ideal first aid for burns injuries is ≥ 20 minutes of cool running water, however this is not always done.³

Aims

1. To explore the variance in first aid administration in the North-East and its impact on burns outcomes (including hypertrophic scarring, prolonged hospital stay, confirmed and treated wound infections and failed skin grafts)
2. To observe any relationship between Fitzpatrick Skin Type (FST) and adverse burns outcomes

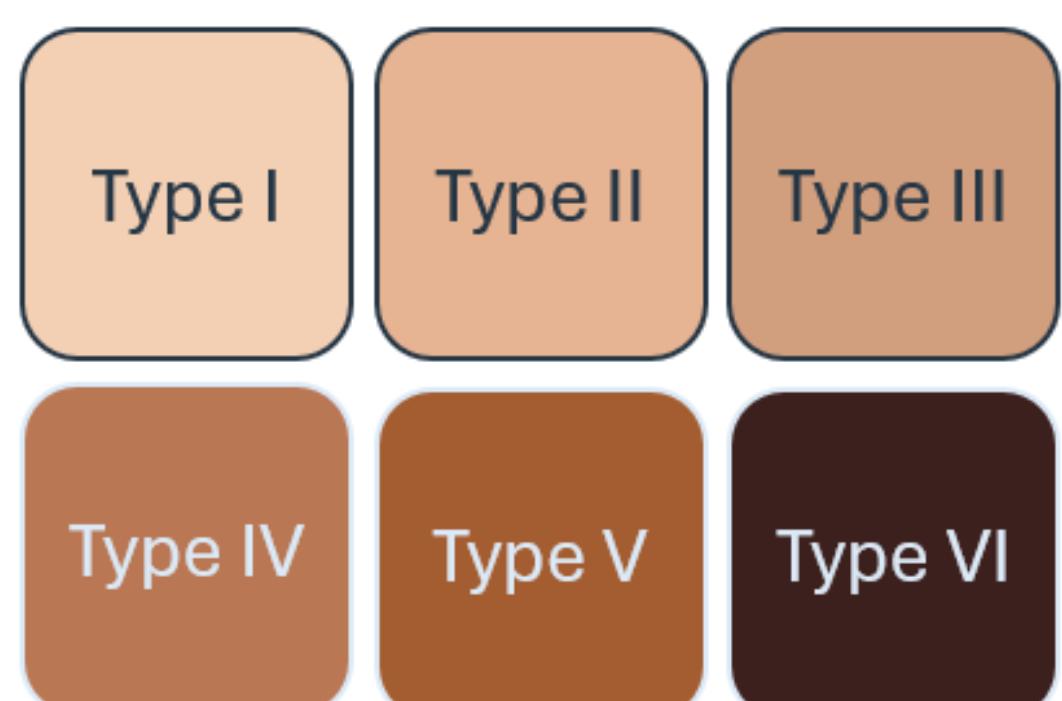


Figure 1
Visual of the categories of skin in the Fitzpatrick Skin Types

1. Peters, Jasmine et al. "The Impact of Race/Ethnicity on the Outcomes of Burn Patients: A Systematic Review of the Literature." *Journal of burn care & research: official publication of the American Burn Association* vol. 43,2 (2022): 323-335. doi:10.1093/jbcr/irab174
2. DiPaolo, Nicola et al. "Race and Ethnicity Influences Outcomes of Adult Burn Patients." *Journal of burn care & research: official publication of the American Burn Association* vol. 44,5 (2023): 1223-1230. doi:10.1093/jbcr/irad033
3. Holbert, Maleea D et al. "Cool Running Water as a First Aid Treatment for Burn Injuries." *Annals of emergency medicine*, S0196-0644(25)01138-2. 22 Sep. 2025, doi:10.1016/j.annemergmed.2025.08.003

Methods

Data was collected from 308 medical records of burns inpatients aged 18 and above between 2020-2022. 43 records were excluded from the study for insufficient data. Data collected included: age; sex; ethnicity; FST; dates of burn injury; presentation to healthcare and hospital admission; days in ICU; depth and site of burn; %TBSA of burn; first aid provision; positive burn wound cultures; clinical burn wound infections; site and successes of skin grafts; healing time $>$ or ≤ 21 days; evidence of hypertrophic scarring; diabetes status; and need for scar intervention procedure.

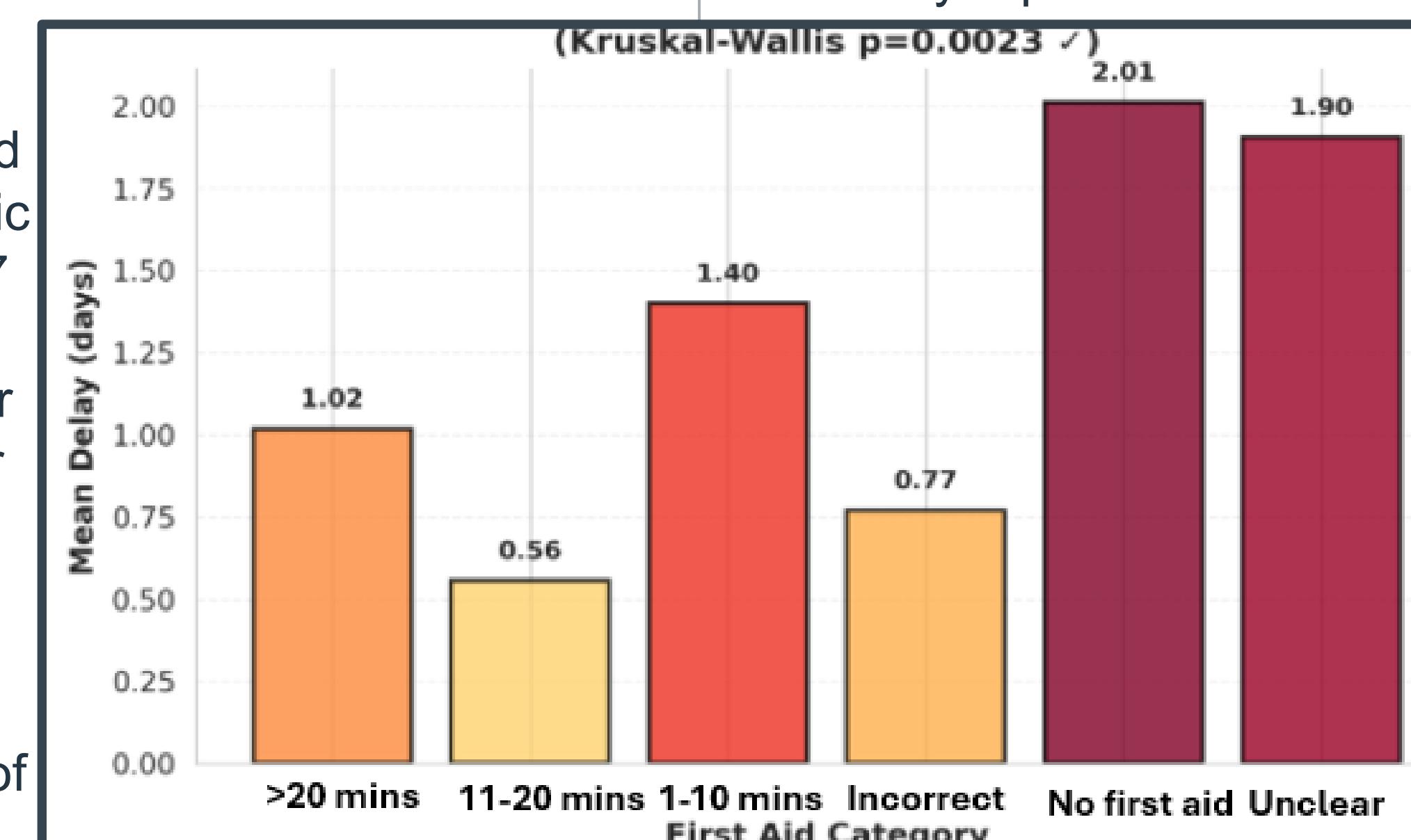
Data was stored securely on RVI servers in excel format and analyzed using statistical analysis tools including Kruskall-Wallis score, Pearson correlation, Chi-Square analysis and multivariate regression.

Results

First Aid

89 of 265 patients (33.6%) performed no first aid at all within the first 3 hours of their injury. 49 (18.5%) patients administered 1-20 minutes of cold running water, and 42 (15.8%) did not have accurate first aid records in their notes. Anecdotally, recurrent reasons for first aid not being performed included not noticing the burn, frail patients being stuck against a radiator and patient miseducation. For example, 17 of the 30 patients (56.7%) with diabetes did not perform any first aid, 10 of which had a neuropathy which prevented them from noticing their injury promptly.

There was no significant relationship between first aid provision and length of hospital stay ($p=0.46$, $H=1.53$), or a direct link to infection ($p=0.75$), however patients with worse first aid were more likely to have delayed presentations to healthcare ($p=0.0023$) as shown in Figure 2, and those with longer delays were more likely to experience a burn wound infection ($p=0.012$), with logistic regression showing each day of delay increased the total inpatient infection risk by 5%. There is no significant relationship between first aid and hypertrophic scars. Of the 17 patients who underwent laser therapy for scar revision, only 4 (23.5%) had completed adequate first aid at the time of their injury.



Conclusions

- First aid administration is inconsistent in the North East for burns, with variance by patients and in ED. Furthermore, this could be having some effect on patient outcomes, particularly in wound infections. Despite this, there is no clear link between poor first aid and hypertrophic scarring, prolonged hospital stays, prolonged ICU stays or delayed wound healing.
- A significant obstacle to first aid is noticing the burn – diabetic patients are less likely to administer the correct first aid, particularly in the context of neuropathy.
- To investigate FST, a prospective study encompassing all outpatients may be better suited to provide a broader view and ensure relevant data is collected

However, this may be attributable to the fact their injuries tended to be some of the most severe.

Fitzpatrick Skin Tone

Unfortunately, 105 patients did not have medical photography to record FST, and only two patients had a FST of IV-VI, as well as 5 with a FST of III. This number does not lend itself to meaningful statistical analysis. From a demographic perspective, 218 (82.3%) of the patients are recorded as white ethnicity, which is broadly representative of the North-East.

Figure 2
Relationship between first aid administration and delay in presentation to healthcare