A Focused Look On The State Of Burn Injury: Case Study of a Tertiary Institution in Nigeria.
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Citation

Abstract
CONTEXT AND AIM: Burn injury is common. Measures that reduce morbidity and mortality have been the gold standard of treatment. There is a need for a regular review to assess the impact of such measures and their availability.METHODS: We retrospectively analyzed 138 consecutive patients that presented to the burn unit of our hospital with acute burns over a five-year period.RESULTS: Ninety-two patients (66.7%) were males and 46 (33.3%) females with an age range of 2 months to 86 years. Flame was the most common cause of the injury. Fifty-five percent of the burn injuries occurred indoor. Late presentation was a usual occurrence. Artisans, students and traders constitute the majority of patients. The mortality rate was 45.8%
CONCLUSION: Burn remained a serious issue with high mortality in our environment. There is need for critical appraisal of the preventive measures and management principles currently being practised.

INTRODUCTION
Burn injury is common. It is the most devastating injury anyone can sustain and still remain alive. No group of the society is exempt from the onslaught. Mortality from burn injury has remained critically high in our environment. This is quite different from what obtains in the developed world where mortality in burns has reduced significantly to a unit value. This improvement has been largely attributed to the introduction of early excision and skin grafting, in addition to the earlier reduction resulting from management of patients within burns units. In most parts of our country, burn units are not available; treatments are offered mainly by non burn specialists who do not have access to the facilities for early excision and skin grafting. Prevention therefore is the most important step in controlling the menace of burn in our environment. That the knowledge of the epidemiology and outcome of the burns in various communities is necessary in instituting appropriate preventive measure and planning management has been well alluded to. Studies of the pattern of burn have been performed in various parts of the country. These studies should have positive impact on the prevention and outcome of burns in our environment. To what extent this has been so needs to be reviewed continually. We hereby present the state of burn care in a tertiary institution located in Lagos Nigeria, reflecting on what has been gained and lessons that could be learnt.

METHOD AND PATIENTS
A retrospective analysis was conducted based on the case reports of 138 consecutive patients that presented to the burn unit with acute burns over a period of five years (1st January 2001 to 30th December 2005). The case files were retrieved from the record department. Where case files were not available or the data insufficient, the admission and discharge records kept by the nurses on the ward were examined. The sex, age, occupation, cause and place of burn were extracted. The injury-arrival time, month and year of burn, percentage of burnt surface area (BSA) and depth, length of hospital stay, and disposition were also determined for each patient.

Though the hospital now has a standard burn unit, there was no one during the years under review. Adult patients reviewed in the emergency were admitted into two 4-bed lobbies in the plastic surgery wards while children were admitted to the children ward. The percentages of burnt surface were calculated using the Wallace rule of nines. The data were entered into a database created with the Microsoft Access Software. Descriptive analyses of the data were invoked and the results presented in tables and charts.

RESULTS
Records of 138 patients who had acute burns were retrieved. Ninety-two patients (66.7%) were males and 46 (33.3%) females giving a male to female ratio of 2:1. The age ranged
from 2 months to 86 years, with a mean age of 27.8 years (SD = 14.9 years). The female population tended to be younger than their male counterpart (mean (SD) ages for males and females: 29.8 (15.8) years and 23.9 (12.3) years, respectively) (Figure 1).

**Figure 1**
Figure 1: Age Distribution of Patients

![Age Distribution of Patients](image)

**CAUSE OF BURN:**

Of the 106 patients with known cause of burn, 70 (66.0%), 12 (11.3%), 10 (9.4%), 7 (6.6%), 6 (5.6%), and 1 (0.9%) patients had flame burns, scald, electric, friction, chemical, and chemothermal injuries, respectively. Figures 2a, 2b and 2c show the distribution of the various causes in three age groups: Children (<15 years), adults (15-55 years), and the elderly (>55 years), respectively. Scald and flame were equally responsible for burn injury in 18 of 22 children, while the adults and the elderly suffered flame burn injury more commonly. The cause of burn in five patients whose ages were not known is shown in Figure 2D.

**Figure 2**
Figure 2a: Causes of burn in patients

![Causes of burn in patients](image)

**Figure 3**
Figure 2c: Causes of burn in patients >55 years

![Causes of burn in patients >55 years](image)
The 32 patients whose cause of burn was not indicated represented the effect of poor documentation and record keeping common in our practice.

Males suffered every cause of burn more frequently than females except for scald injuries which occurred with equal frequency (Figure 3).

Fifty-five percent of the burn injuries occurred indoor and 45% outdoor (Table 1).

**PRESENTATION:**
Most patients presented late to the hospital with only 46.7% presenting within 8 hours of burn, 37.3% between 8 and 96 hours of injury, and others later than 96 hours. This data was not available for 63 patients again demonstrating the poor documentation and record keeping. This is noteworthy because 35 of those patients died and the extent to which the injury-arrival time contributed to the mortality could not be ascertained.

**OCCUPATION:**
Of the 64 patients with known occupation, 19, 18, 12, and 12 were students, artisans, pupils, and traders, respectively, constituting the main victims of burn (Table 2). For the purpose of this study, artisan refers to any skilled craftsperson other than a driver and a civil or public servant.
PERCENTAGE OF BURNT SURFACE AREA AND DEPTH:

Twenty-six (18.8%), 17 (12.3%), 15 (10.9%), 14 (10.1%), 14 (10.1%), 16 (11.6%), 12 (8.7%), 7 (5.1%), 5 (3.6%), and 2 (1.4%) patients sustained 1-10%, 11-20%, 21-30%, 31-40%, 41-50%, 51-60%, 61-70%, 71-80%, 81-90%, and 91-100% burnt surface area; 56.4%, 34.0% and 9.6% of which was partial, mixed and full thickness, respectively (Table 3). The proportion of individual burn depth in each patient was not documented making it difficult to determine the reliability of the stated burn depth in the case files.

Figure 9
Table 3: Percentage of Total Burnt Surface Area and Depth of Burn

<table>
<thead>
<tr>
<th>Percentage of Burnt Surface Area</th>
<th>Partial</th>
<th>Full</th>
<th>Mixed</th>
<th>Not Stated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10%</td>
<td>19</td>
<td>5</td>
<td>2</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>11-20%</td>
<td>7</td>
<td>1</td>
<td>9</td>
<td></td>
<td>17</td>
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<tr>
<td>21-30%</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>31-40%</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>41-50%</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>51-60%</td>
<td>5</td>
<td>2</td>
<td>9</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>61-70%</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>71-80%</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>81-90%</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>91-100%</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Not Stated</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>9</td>
<td>32</td>
<td>44</td>
<td>138</td>
</tr>
</tbody>
</table>

SEASONAL VARIATION

There is no uniformly obvious seasonal variation in the incidence of burn injury in this study, though a high rate of occurrence was noted in the years 2001 and 2003 (Table 4).

Figure 10
Table 4: Month and Year of Injury

<table>
<thead>
<tr>
<th>Month of Injury 2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>February</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>March</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>April</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>May</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>June</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>July</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>August</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>September</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>14</td>
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<tr>
<td>October</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td>14</td>
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<tr>
<td>November</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>11</td>
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<tr>
<td>December</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
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<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
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<tr>
<td>Grand Total</td>
<td>36</td>
<td>20</td>
<td>39</td>
<td>17</td>
<td>138</td>
</tr>
</tbody>
</table>

OUTCOME:

The overall mortality among the 107 patients in this study with known outcome was 45.8%. However, the mortality rate was 81.7% for patients with burnt surface area above 30% as against 1.9% for BSA ≤30%. Figure 4 shows the disposition of the patients with reference to the percentage of total burnt surface area.

Figure 11
Figure 4: The outcome of burn in relation to the percentage of burnt surface area.

DISCUSSION

Burn still remains an injury of serious concern. The role of evaluation of the epidemiological parameters in reducing the burden of the injury cannot be overemphasized. A 2:1 male to female ratio was obtained in this study. This male preponderance is somewhat similar to that obtained in some parts of the country (Irrua, and Enugu) and in Singapore, though other studies in Nigeria and elsewhere had shown a slight female preponderance. The young adult in the age range of 20-29 years constitutes the main victim of burn; this is closely followed by the age group of 10-19 and 30-39 years, respectively. This finding closely correlates with that obtained in another study from Irrua and further confirmed the need to direct preventive measures towards these
adventurous groups of individuals that constitute the significant part of the workforce of the society. Flame, as in most studies, is the single most common cause of burn injury, and it plays a major role in all age groups as shown in figures 2a-d. Scald injury is mainly a problem in children, responsible for 41% of burn injury in that age group in this study. This leading role of scald injury in children had been well alluded to in previous studies. Other causes of burn injuries are liable for burns only in the 15-55 year age group who are highly adventurous and are at risk of injuries from violence, assault, and road traffic injury, frictional and electrical burns. Except for patients that sustained scald injury with equal sex incidence, all other causes of burns in this study occurred more commonly in males than in females.

Late presentation is the norm for most clinical conditions in our environment and burn injury is no exception. In this study, only 46.7% of the patients presented within 8 hours of injury, another 37.3% presented within 8 and 96 hours. The remaining 16% presented much later. As the earlier decrease in burn mortality recorded was due to adequate fluid resuscitation, this finding is of clinical importance as it may dictate those patients who may not have had adequate fluid resuscitation which might increase the risk of mortality. Another common occurrence in our environment is the potential for early wound infection because of the severe wound contamination from the various materials that patients poured on their wounds, and the longer it took them to present to the hospital the higher was the potential for contamination of the wound with the increasing risk of wound infection and possible mortality.

Burn injuries have been associated with certain occupations. Islam et al. had shown that welders, cooks, laborers, food service workers, and mechanics (regarded as artisans in this study) had higher incidence rates of work-related burn injury compared with other occupations. The occupation of only 46.4% of patients in this study was known, students and artisans constitute the greatest percentage of these patients. There is still need, however, to evaluate the students and the artisans with a view to identify their attitudes that may predispose them to burn injury. Half (50%) of the patients were not working. Of those, 59.4% were students, 37.5% were pupils and 3.1% were retired. This pattern closely resembles that in the study by Attia et al. in which the majority (67.2%) of their patients also were not working (31% were below school age, 25% were students, 41% were housewives and 3.2% were retired). There is the need to determine what actually predisposes them to burn injuries. Apart from determining the risk of burn injury, the patients' occupations also impact on the funding for burn care and the degree of rehabilitation post burn.

Though some studies have shown a seasonal variation in burn injuries, no seasonal variation was observed in this study. Jiburum and Olaitan reported that the majority of burn injuries in their study occurred in the months of December and January. A strong seasonal variation in the incidence of vehicle-related burns was also shown to be evident with the estimated peak occurring in mid-July in Massachusetts. A similar study in Oklahoma showed a seasonal variation in the incidence of burn injuries resulting from working on a motorized vehicle; forty percent of all injuries occurred during the summer months (June to August) and almost one-third (31%) of injuries occurred on the weekend.

The outcome from burn has been measured traditionally by the mortality rate following the injury. More recently, emphasis is shifting to length of hospital stay as a measure of outcome and prognostication. This is more so in facilities where mortality has been reduced to unit figures. The overall mortality among the 107 patients in this study with known outcome was 45.8%. However, the mortality rate was 81.7% for patients with burnt surface area above 30% as against 1.9% for BSA ≤30%. The 45.8% mortality rate in this study is higher than the 23.2% recorded in Enugu, Nigeria. These figures are dreadful considering the fact that mortality in burn now is usually less than 10% in the developed countries. It might just be time to start applying the predictors of burn mortality in the assessment of our burn patients with the aim of providing more specialized care for those at high risk of dying.

CONCLUSION

Burn injuries still remain a menace in our environment with virtually unacceptable mortality. Burn units were rare and far apart, but the trend is changing. Units are now springing up in more and more centres in Nigeria. Our centre now has a functioning unit. To what extent that development is far apart, but the trend is changing. Units are now springing up in more and more centres in Nigeria. Our centre now has a functioning unit. To what extent that development is contributing to a reduction in mortality is yet to be figured out. Whatever the case may be, the findings in this study set a challenge to improve on the prevention campaigns and professional assessment of patients.

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