ORIGINAL ARTICLE

Epidemiology of burns and its relation with morbidity and mortality in Ayub teaching hospital

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Abstract

Objective: To determine the epidemiological, clinical variables and common risk factors responsible for fatal outcome of burn patients in order to create awareness at mass level.

Materials and methods: A prospective study of 678 patients admitted in burn unit from July 2011 to June 2015. Patients' information including demographic characteristic, cause of burn, place of accident, grading, percent of burning, treatment given at hospital and outcome were recorded.

Results: Out of 678 patients 60.18% of females were affected. Accidental and domestic phenomenon was leading in all flame affects 50.88% of all patients. Mostly 11-20 years of people suffered.

Conclusion: The mortality rate of burn injuries is alarming as compared to other injuries. Proper measures have to be taken at national and international level to decrease the incidence of burns and hence decrease the morbidity and mortality associated with it.

Key Words: Epidemiology, Burn, Prospective Studies, Mortality

Introduction:

Burns are mostly related to injuries to the skin but can also directly injure the lungs, airways and occasionally can affect muscles, bones and other internal organs. Burn is a serious and challenging public health problem in developing countries.[1] It remain a global problem due to the lack of infrastructure and trained professionals as well as increased cost of management, all of which have an impact on the outcome.[2] Burn ranked fourth in all injuries, account for over 300,000 deaths each year throughout the world[3,4] and seventh in the hospital admission.[5] WHO has reported highest incidence of burns from Pakistan as compared to global incidence.[6] Burns may be due to flame, scald, electrical, or chemical.[7] The epidemiology of burns is diverse across the world and also within a country because of differences in the cultural and socio-economic factors and the availability of health-care facilities.[8] Burn patients need prolonged hospitalization and hence increased expense for the patients, their families and society.[9] Most victims of major burns come from poor, under- developed areas. These people have little formal education and are either low skilled temporary workers or unemployed.[10] Children are particularly vulnerable to burn injuries, accounting for almost 50% of all burn patients in some studies.[11]The most common accidents among children occur at preschool age and are due to hot liquid burns in the kitchen at meal preparation times.[12]

Though burns constitute an important percentage of accident-related deaths, 80-90% of the burns are preventable.[13]

The severity of the injury is usually characterized by the area of skin affected, site, depth of the injury, the age of the patient and the presence of coexisting illness. Minor burn injuries are treated within the community, but more severe burns are admitted within burn care unit with care provided by a multi-disciplinary team, as this has been proven to offer the best possible

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outcome for the patient. Mortality rate of patients having burn are high, more patients die of pneumonia but burn wound sepsis remains an important infectious complication in this population.[14] Because of the recent advances, the survival and quality of life in burn patients has been improved.[15]

Material and Methods:

The study was a prospective of all 678 patients admitted to the Burns Unit between July 2011 and June 2015. Those patients who were managed as outpatients in emergency unit were not included. All patients' data were collected by using a proforma including demographic data, cause of burn, manner of injury, anatomical location, percentage of body surface area burned, degree of burn and treatment given at hospital. The data was then analyzed with Statistical Packages for Social Science (SPSS) version 17.0.

The degree of burns was assessed clinically. First- degree burn refers to superficial epithelial burn causing skin redness, pain and without scar formation. Superficial second degree burn involves the superficial layer of the dermis with blistering, blanching on pressure and extremely painful. Third degree involves the deeper dermal layer with the skin appearing white, with no blanching on pressure and subsequent scar formation. Forth degree burn involves full skin thickness with no pain due to the destruction of nerves, and will lead to extensive scarring.

The percentage of burns was assessed clinically by using Lund and Browder charting or Rule of Nine. Burns on critical sites such as face, hands, feet, perineum, inhalation injury or patients with serious pre-existing medical disorder were considered major burns and were admitted.

After admission initial management include maintenance of airway, breathing, circulation, iv fluids and antibiotics, pain killers and wound wash were done. Those who need debridement or superficial skin graft, amputations or need referral to specialized centers were managed accordingly.

Results:

This was a prospective study of 678 patients admitted in burn unit of ATH. There were 270(39.82%) males and 408 (60.18%) female out of 678 patients as shown in table-1. Patients' age were distributed in groups, 1-10 were 118(17.40%), 11-20 were 201(29.65%), 21-30 were 87(12.83%), 31-40 were 104 (15.34%), 41-50 were 92(13.57%) and above 50 were 76(11.21%) out of 678 patients as shown in table- 2. Patients with lower limbs involvement were 254(37.50%), head and neck involvement were 104(15.34%), those with upper limbs were 119(17.55%), thorax involvement were in 67(9.88%) and those with back and abdomen were 44(6.49%) and 90(13.24%) out of 678 patients as shown in table-3. Patients with accidental injury were 568(83.78%), homicidal were 67(9.88%) and those with suicidal were 43(6.34%) out of 678 patients as shown in table-4. Patients presented with flame burn are 345(50.88%), with scalds were 187 (27.59%) , with electrical were 96 (14.16%), those with inflammable liquids were 23(3.36%), those with chemicals and other types of injury were 15(2.27%) and 12(1.74%) as shown in table-5. Patients with age less than 10 years were 108(15.93%), between 11-20 years were 240 (35.40%), between 21-30 years were 90 (13.27%), between 31-40(19.18%), between 41-50 and above 50 years were 83(12.24%) and 27(3.98%) out of 678 patients as shown in table -6. Out of 678 patients 285(42.04%) have injury at work place, 340(50.15%) have injury at home and those with outdoor injuries and others were 40(5.90%) and 13(1.91%) as shown in table-7.Patients from urban were 265(39.08%), from rural were 326(48.08%) and from others areas were 87(12.84%) out of 678 patients as shown in table-8. 210(30.97%) patients having grade 1 injury, 271(39.97%) having grade 11 burn, 128(18.88%) having grade three burn and 69(10.18%) having grade four burn out of 678 patients as shown in table-9.

Patients who were managed with dressings, regular debridement's and supportive therapy were 361(53.24%), those to whom skin grafting were done were 62(9.14%), those who undergone

Table I: *Frequency of gender of patients*

Gender	Number	Percent
Male	270	39.82
Female	408	60.18
Total	678	100.00

Table II: *Frequency of age distribution*

Age wise distribution	Number	Percent
1 -10 years	118	17.40
11-20 years	201	29.65
21-30	87	12.83
31-40	104	15.34
41-50	92	13.57
>50	76	11.21
Total	678	100.00

Table III: *Frequency of site involved*

Sites Involved	Number	Percent
Thighs and legs	254	37.50
Head and neck	104	15.34
Arm and forearm	119	17.55
Chest	67	9.88
Back	44	6.49
Abdomen	90	13.24
Total	678	100.00

Table IV: *Frequency of Manner of burn*

Weeks	Number	Percent
Accidental	568	83.78
Homicidal	67	9.88
Suicidal	43	6.34
Total	678	100.00

Table V: *Frequency of Mechanism of Injury*

Mechanism of injury	Number	Percent
Flame	345	50.88
Scalds	187	27.59
Electrical	96	14.16
Inflammable liquids	23	3.36
Chemicals	15	2.27
Others	12	1.74
Total	678	100.00

Table VI: *%age of body surface burned*

	Number	Percent
<10	108	15.93
11-20	240	35.40
21-30	90	13.27
31-40	130	19.18
41-50	83	12.24
>50	27	3.98
Total	678	100

Table VII: *Frequency of place of injury*

	Number	Percent
Domestic	340	50.15
Work	285	42.04
Out door	40	5.90
Others	13	1.91
Total	678	100.00

Table VIII: *Frequency of population involved*

	Number	Percent
Urban	265	39.08
Rural	326	48.08
Others	87	12.84
Total	678	100.00

Table IX: *Frequency of grade of burn*

Range of Movement	Number	Percent
I.	210	30.97
II.	271	39.97
III.	128	18.88
IV.	69	10.18
Total	678	100.00

Table X: *Frequency of treatment and outcome measures*

Outcome measure	Number	Percent
Dressings and debridement's	361	53.24
Skin grafting	62	9.14
Amputations	56	8.26
Refer to plastic surgery	40	5.90
Refer to other specialized burn units	48	7.08
Leave without medical advice	70	10.32
Mortality	41	6.051
Total	678	100.00

amputations were 56(8.26%), those who were to plastic surgery and to specialized burn units were 40(7.08%) and 48(7.08%), those who left without medical leave were 70(10.32%) and those who expired at ward were 41(6.051%) as shown in table-10.

Discussion:

Burn is a major health issue all over the world.

It is not only associated with higher rates of morbidity but also with mortality. In our study, 39.82% were males and 60.18% female out of 678 patients, similar findings were found in the study conducted in Iran, male were 45.6% and female were 54.4%.[16] while the study conducted in Malaysia the frequencies were 32% female and 68% male.[17] In our study, the maximum incidence occur between age 11-20 which is 29.65%. Similar findings found in study of Shams Vahadati S i.e 29.4%.[16] While the study conducted in India and Khyber Teaching Hospital maximum people i.e. 29% and 31.66% affected were of age less than 10.[14,18]

In our study 17.40% of patients between 1-10 years, 12.83% and 15.34% patients suffer between ages 21-30 years and 31-40 years. while the study conducted by Shams Vahdati S between 1-10 it was 27.5% which is higher than our study and the patient suffered burn between 21-30 years and 31-40 were 22.5% and 13.1%.[16] In our study between ages 41-50 and above 50 years were above 13.57% and 11.21%.while the study in Iran patients above 40 was 7.5% which is lower than our study.[16]

In our study the maximally site involved were thighs and legs i.e 37.50%, head and neck involved in 15.34%, arm and forearm involved in 17.55%, chest involved in 9.88%, back and abdomen involved in 6.49% and 13.24%. While the study conducted by Kitara majority of the burns were in the upper limbs (45%), lower limbs (35%), Trunk (15%) and head and neck (5%).[19] However in LEAO study, anterior thorax involvement were maximum 20, while face injuries were maximum in India.[2] In our study 83.78% of burns were accidental, 9.88% were homicidal and 6.34% were suicidal. While the study conducted in India (87%) sustained accidental burns, (9%) sustained suicidal burns, while (4%) sustained homicidal burns.[7] In our study 50.88% of patients suffer from flame, 27.59% burned due to scalds, 2.27% due to chemicals and 14.16% due to electricity. While the study in India, similar to our study flame affects the most while electric burns after it, then chemicals and scalds.[7] In study of England and Isphagan the leading cause were scald.[8,9]

In our study frequency of less than 10% burned were 15.93%, between 11-20% of burn were found in 35.40%. 21-30% of burn were in 13.27%. 19.18% of patients suffered between 31-40% of their body surface area, 12.24% and 3.98% of patients suffer between 41-50% and more than 50% of their body surface areas. Similar to our study the maximum number of patients range between 11-20 years in study of Rooh ul Muqim [18] while in study of Akhtar majority of the patients were in 21-40 yrs age group followed by 33.05% in ”20 yrs age group.[21]

In our study 50.15% of patient's incidence of burn occurred at home, 42.04% of patients received incidence during work. 5.90% and 1.91% suffered as outdoor and some other mechanism. While in Vahadati study home incidence were 45.6%, at workplace were 18.75%. Outdoor 24.4 % and others 11.25%.[16] In our study 39.08% of patients belong from urban area, while from rural area and some other place it is 48.08% and 12.84%. While the study conducted by Khan TS the urban population involved is 22% and rural 88%. Similar findings were found in Usama study.[22]

In our study, regarding grading of burn, 1st degree burn patients were 30.97%, Second degree burn were 39.97%, third degree burn patients were 18.88% and forth degree burn were 10.18%.maximum burns were second degree burn ,similar findings were found in study of Vahdati and K Y Chan.[16,23] In our study 53.24% of patients undergone simple dressings and debridement's and were regular followed up while in study of Rooh-ul-Muqim, 54.16% undergone simple dressings and debridement's.[18]

In our study 9.14% of patients undergone grafting and 8.26% of patients undergone amputations while higher rate of grafting and amputations were found in Rooh ul Muqim and Gupta study.[18,7] In our study the mortality rate was 6.05%. Higher level of mortality was found in other studies.[7,24,25] While the study at Turkey lower rate of mortality i.e. 5.6% were observed.[26]

In our study 5.90% were refer to plastic surgery and 7.08% were refer to other specialized burn unit while in Muqim study 15% were refer to plastic surgery and 6.66% were refer to specialized burn unit.[18]

Conclusion:

Burn injuries are one of the most important public health issue and cause of morbidity and mortality in Pakistan. The Policies regarding population health protection should be focused on those areas and those subpopulations in order to minimize the effect of such injuries on them. Moreover, a well-equipped Burns Unit is necessary to provide adequate care for this group of patients. This is increasingly more relevant with the rising number of admissions. A multi-sectoral approach in the management, prevention and control of burns should be adopted in this region.

Conflict of Interest: None

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Role and contribution of authors:

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