ANALYSIS OF 300 MEDICO LEGAL CASES OF BURN IN LAHORE IN 2018 A RETROSPECTIVE STUDY

ARSLAN AHMED, ASIM AHMAD KHAN, SARAH ARIF, HUMAYUN TAHIR, ARIF RASHEED MALIK

ABSTRACT

Objective: The objective of the study is the medicolegal assessment of selective cases of burn victims in Lahore and to determine the characteristics and associated outcomes of burn patient presented at medicolegal clinic in Emergency and Accident Department of Mayo hospital, KEMU, Lahore.

Methods: A cross tabulation analysis is being conducted at King Edward Medical University after the approval from the ethical review committee. It is a retrospective study conducted from the Medicolegal cases of burn victims presented at King Edward Medical University during the period of January 2018 to December 2018 with the sample size of 300 using non-probability purposive sampling technique.

Results: In the present study, the highest prevalence of cases was in the age group of 0-10 years (62.67%) followed by the victims lying in the age group of 21-30 years (13%) out of which 50% victims were male and 50% victims were females. Majority of the cases (90.67%) were presented within 6 hours of the injury and only 9.33% were reported after 10 hours of the incident. In more than half (53.67%) of the victims 20% or less body area was burnt. In 33% cases 20-40% area was burnt. Full body (81-100%) burn cases were only 3% while 75% burnt area cases were only 2.33%. About 53.33% cases were wet scalds including gas explosions, 39.67% cases were dry flame burns, However, the rest of 7% were the cases of electrocution.

Conclusion: Burn injuries are prevalent in children of both genders equally. Most of the cases are presented in the first 6 hours of the incident. The cause is usually known and includes hot liquids, flame or electrocution. The injury may be external or internal depending upon the cause and extent.

Key words: Burns, Demographics, Medicolegal, Analysis

INTRODUCTION

Burn is an injury caused by application of heat to external or internal body surfaces of a person. It includes all types of thermal lesions whether produced by heated metallic object, flames, fluids at or near boiling point and pressure steam. [5]

Acute thermal injuries requiring medical treatment affect nearly half a million Americans each year, with approximately 40,000 hospitalizations and 3,400 deaths annually.[2] Burn injury can lead to significant morbidity and mortality, including both physical and psychological sequelae, with a considerable associated health-economic impact.[3] There are a number of factors that have been demonstrated to directly influence the extent and pattern of burn injury sustained by the child, including the characteristics of the child (such as age and ethnicity) & the heat source (iron, chemical agent or hot beverage).[4]

Burns are the fourth leading cause of injury following road traffic injuries, falls and interpersonal violence, accounting for 5 - 12% of all injuries worldwide and around 11 million patients requiring medical attention.[1]

Over 96% of fatal fire-related burns occur in low- and middle-income countries. In addition to those who die, millions more are left with lifelong disabilities and disfigurements, often with resulting stigma and rejection.[6]

OBJECTIVES

The objectives of the study were:

- The Medico-legal assessment of selective cases of burns in Lahore in the year 2018.
- The demographics of various types of burns.
- To assist in general public health and understanding the true forensic nature of medicolegal burns.
- To analyze the characteristics and associated outcomes of burn injury patients presented at Department of Forensic Medicine & Toxicology, KEMU, Lahore.

METHODOLOGY & DATA COLLECTION:

This is a retrospective study and cross-sectional observational study which was carried out at Record Room, Department of Forensic Medicine & Toxicology, KEMU, Lahore in which selective medico-legal cases of burns presented during the year 2018 were analysed. Burn victims seeking medical care and medico-legal reports were included in the study. This study was conducted during the period of January 2018 to December 2018. Total cases were 748 out of which 300 cases were studied. The sampling technique was non-probability purposive. The analysis was of cross-tabulation quantitative type.

The data collected by means of Performa is tabulated on the basis of:

- Age of victim
- Gender of victim
- Source of Injury
- Site of Injury
- Percentage Area Burnt
- Duration of Injury
- Type of burn
- General Physical Appearance

The tabulated data then under-went statistical analysis on Statistical Package For Social Sciences. The related tables and graphs were drawn to visually represent the tabulated data.

RESULTS

A total of 300 cases of burn were studied at Department of Forensic Medicine & Toxicology, KEMU, Lahore.

The gender distribution in such cases is shown in Table I and Figure I.

Table I: Showing Gender distribution of Burn victims

Gender	Cases (n)	%age
Male	150	50
Female	150	50

In total cases of 300, both the genders were equally affected with a percentage distribution of 50% and 50% (n= 150)

The age group dispensation in such scenarios is shown in the Table II and Figure II. The age groups were divided in 5 groups.

As it is quite obvious, the age group 01-10 years was more inclined to show burn injuries with a total of 188 cases comprising 62.67%. Similarly 13% (n = 39) of the victims were in their young 20's. About 11% of the victims were teenagers. The incidence of middle age to old burn injuries(>40y) was only 9.33%(n=28). Age group of 31-40 years was found least affected. (n=12, 4%)

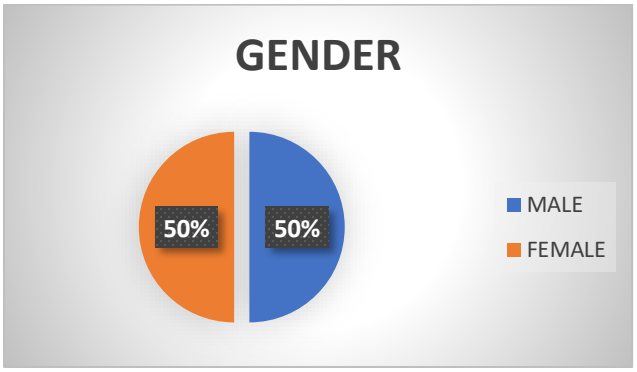

Figure I: Representing gender of burn victims

Table II: Showing age distribution of burn victims.

Age	Cases (n)	% age
0-10 years	188	62.67
11-20 years	33	11
21-30 years	39	13
31- 40 years	12	4
>40 years	28	9.33

Figure II: Representing age group of burn victims

Table III: Classification of burn cases on the basis of source of injury

Source of injury	Cases (n)	% age
Hot liquids	145	48.33
Flame	122	40.67
Electric	21	7
Gas explosion	12	4

Based on the source of injury, graphical representation and tabulated data is shown in Table III and Figure III .

From the figure, there are majorly 4 causes of burn their preponderance is as: hot liquid burns with a percentage of 48.33%(n=145) are most common. Secondly, flame burns account for 40.67%(n=122) of the cases. Electrocution and Gas Explosion together make up 11% of the cases with electric 7%(n=21) and gas explosion rest of 4%(n=12) cases.

The side of the body burnt were quite selective and diverse in classification as shown in the Table IV and Figure IV.

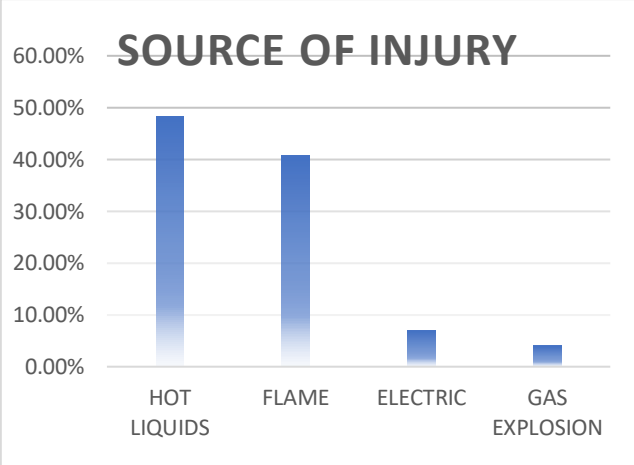

Figure III: Representing classification of burn cases on the basis of source of injury

Table IV: Showing classification of burn cases on the basis of side of injury

Side of injury	Cases (n)	% age
Left side	59	19.67
Right side	50	16.67
Bilateral	191	63.66

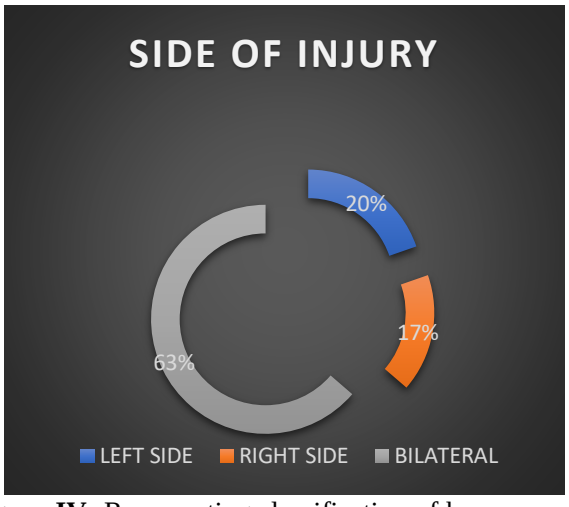

Figure IV: Representing classification of burn cases on the basis of side of injury

As illustrated, burns were both, one sided and bilateral in which 63.66% (n=191) cases were bilateral burns, 19.67%(n=59) were left sided and 16.67%(n=50) were right sided.

Prevalence of the part injured e.g head, face, thorax, abdomen, pelvis, upper limb, lower limb and full body are illustrated in Table V and Figure V.

Table V: Showing classification of burn cases on the basis of site of injury

Site of injury	Cases (n)	% age
Head & face	98	12.68
Thorax	150	19.40
Abdomen	158	20.44
Pelvis	53	6.86
Upper limb	148	19.15
Lower limb	157	20.31
Full body	9	1.16

Predominantly burns were confined to Limbs and Face, Thorax with a respective %age of 39.46% and 32.08%. Rest of the areas were abdomen and pelvis 27.3% and full body burn 1.16%.

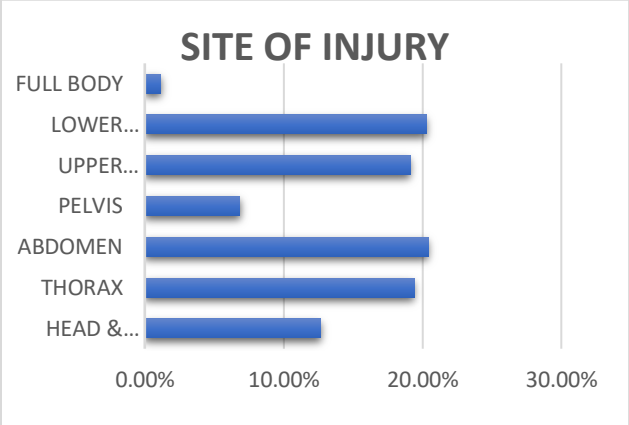

Figure V: Representing classification of burn cases on the basis of site of injury

Burnt area %age was divided into 5 range-based groups as illustrated and tabulated in Table VI and Figure VI respectively.

Table VI: Showing percentage of the body burnt

Burnt area %age	Cases (n)	%age
0-20	161	53.67
21-40	99	33
41-60	24	8
61-80	7	2.33
81-100	9	3

As graphically represented, minor burns (0-20%) were a common occurrence with a percentage of 53.67%(n=161). The frequency of the group (21-40%) was 33%(n=99). Rest of the 3 groups have combined percentage of 13.33%(n=40)

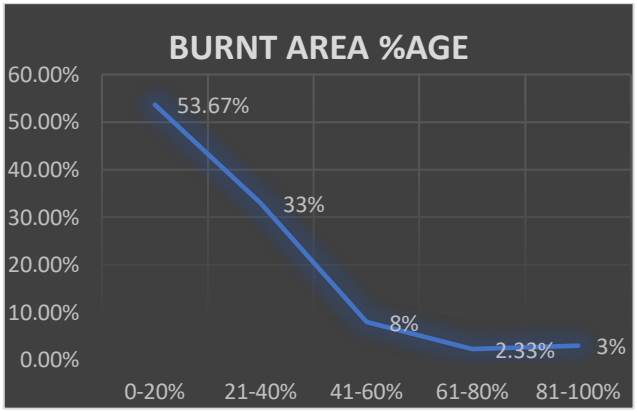

Figure VI: Representing percentage of area of the body burnt in burn victims

Cases were presented to the Forensic Department after multiple time durations. As illustrated in Table VII and Figure VII.

Cases were fresh i.e presented within 6 hours mostly (90.67%, n=272). Others were dealt with after 6 hours i.e old (9.33%, n=28)

Depending upon the source of injury 2 types of burn have been identified i.e dry and wet burn. As illustrated in Table VIII and Figure VIII.

Table VII: Showing classification of burn cases on the basis of duration of injury

Duration of injury	Cases (n)	%age
Within 6 hours	272	90.67
After 6 hours	28	9.33

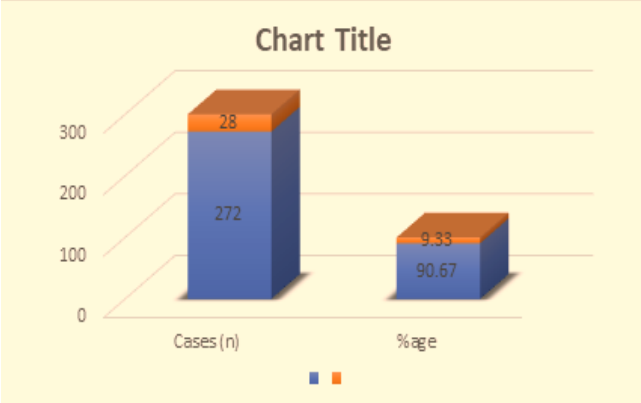

Figure VII: Representing classification of burn cases on the basis of duration of injury

Table VIII: Showing classification of burn on the basis of type of burn

Type of burn	Cases (n)	% age
Wet burn	160	53.33
Dry burn	119	39.67
Electrocution	21	7

Scalds i.e wet burns accounted for 53.33%(n=160) of the total cases while dry burns were less predominant with the percentage of 39.67(n=119) the rest of the cases were of electrocution.7%(n=21).

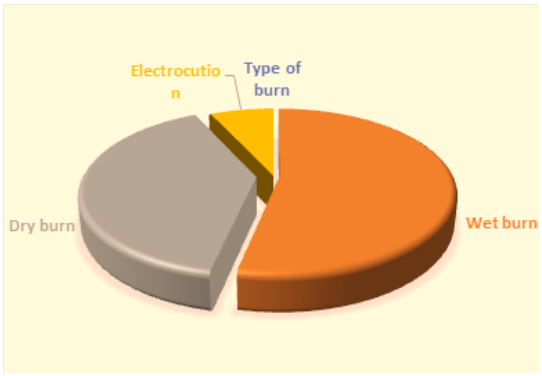

Figure VIII: Representing classification of burn cases on the basis of type of burn

Table IX: Showing General Physical Appearance of burn victims

General Physical Appearance	Cases (n)	% age
Conscious	259	86.33
Unconcious	41	13.67

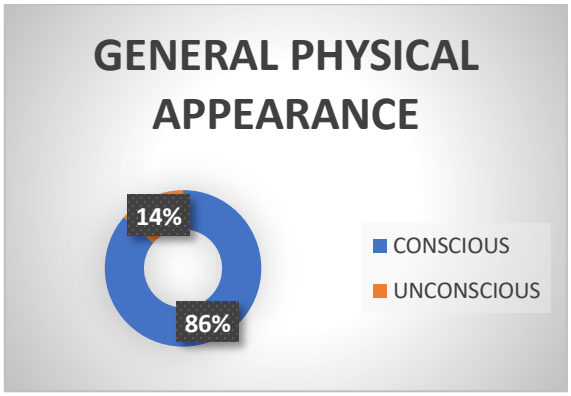

Figure IX: Representing General Physical Appearance of burn victims

Injury caused alteration in the state of consciousness and some patients were unconscious as well when brought to the department. As illustrated in Table IX and Figure IX.

Injury caused to a vital area resulted in unconscious in some patients (13.67%). However most of the victims were alert and aware of surroundings (86.33%).

DISCUSSION

The topic of medicolegal cases of burns is an under discussed topic in 3rd World Countries including Pakistan. The tendency of burns is more in lower class because of unawreness and carelessness on their part. The goal of this study is to provide descriptive, differential, demographic and parameter based analysis of 300 medicolegal cases of burn injuries which resulted in survival. It is comprised of 300 selective cases of the year of 2018 taken from Department of Forensic Medicine & Toxicology, KEMU, Lahore.

The females are mostly burned due to household explosions or cooking oil burns it can also be a flame burn and sometime the burns are inflicted upon by the partner. Our study shows an equal predominance and susceptibility of both the genders to burn exposure. As most of the cases are unintentional so there is no partiality in the gender affected. Our observations on gender differed from other studies from Pakistan, India and Eastren Mediterranean Region with fewer females as compared to males experiencing burn injuries.[7,8] Another study by Naralwar and Meshram [20] found 64% females and 36% males suffered with 1.76 times more frequent involvement of females.

Our study shows children between the age group of 1 to 10 years to be more affected by the burns mostly unintentional (62.67%). Second most prone age group was of teenagers(11-20y) (33%). Our findings are comparable to another study conducted in South Korea in the year 2011-16 which showed that children of age less than 6 years are more prone to injury because of there less development of motor functions. [9,10].

Source of injury has been a serious topic of discussion in a manner that it shows diversity of causes. Scald, flame burns, electrocution injury and gas explosion are some major causes among which scalds accounts for almost half of the total cases (48.33%). This is consistent with previous studies from Pakistan, Iran, India and reviews from EMRO region. [7,11]. Previous studies have reported kerosene stove burners and wood-based cooking fuel as the main source of burn related injuries amongst the females of Southeast Asia. [12].

Depending upon the cause the burn could be of any site(s) or side(s) of the body. Bilateral burns are predominant according to our study (63.67%) because of the occupational and household hazards in lower class. Our research shows the highest frequency of limb injuries (39.45%). Second highest were of abdomen front and back (20.45%). This is in contrast to a fatality study conducted in India back in 2004-2005 which stated that extremities were involved in 100% cases, followed by head and neck in 94% cases, chest and abdomen in 92% cases, genitalia in 50% case [13]. In the study conducted by Datey et al, it was observed that maximum cases had burns involving limbs and trunk, next in order was involvement of head, face & neck and genitalia. [14].

Burnt area percentage or degree depends upon situation created when the incident occurred e.g in an oil spill or an industrial burn the burns are usually gross bodily burns involving mostly a large part of the body it affects the body on the outside as well as the inside and sometimes permanent damage ensues in a vital organ that may take the life of a person, However, we studied not the postmortem cases but the medicolegal cases of burns on the account to chart out the demographics of different parameters. According to our study the percentage area burnt is classified into 5 broad ranges among which the most frequent range group is under 20% . The second most frequent group is quarter to half body burns (21-40%). Another study conducted in India in the year 2004-2005 challenges our study saying that maximum percentage of burns, 32% cases were in the category of 91- 100%. Only 14% cases had sustained less than 50% burns. [13]. In the study of Aggarwal and Chandra [15], percentage of burns was up to 25% in 3 cases, between 25-50% in 32 cases, between 50-75% in 23 cases and was more than 75% of surface area in 42 cases.

In Pakistan the cases due to general unawareness in past were less presented to the medical consultation departments however in past years the household, industrial and criminal cases have peaked so however the ratio may have decreased the overall proportion to number of cases presented has rose a bit. Out of the 300 cases we studied 272 were presented within 6 hours (90.67%) and sometimes under an hour of which the record is not usually available. The rest of the 28 cases (9.33%) were presented after mixed intervals so these have been accounted as old in our study. Other studies conducted in other countries may add to our criteria of duration of injury and presentation to the MLC department. They state that boys visited the ED much more often than girls, especially in the hospital admission group, and this result is similar to that stated in previous studies conducted in other countries [16,17].

Burns inflicted to the body are mainly of 2 types, wet (scalds) and dry burns. They are named on the basis of the source causing them and the have different central and systemic affects. Wet burns cause blistering

affect while dry burns usually cause swelling and scarrings. Our study was conducted to classify the the type of burn based on the source causing it. So, the distribution wasn't a distinctive one however dry burn took the light with a 50.67% and rest of 49.33 % were wet scald burns. Scald and flame burns were the most common cause of burns, which is consistent with previous studies from Pakistan, Iran, India, and reviews from the EMRO region.[18,19]

Forensic department at KEMU provided us with an extra parameter of study. The mental consciousness and unconsciousness of a patient is directly or indirectly related the degree of burn inflicted. Our study gave us a benefit of knowing the physical condition of the person at the time he/she presented. So, we found out that most of the patients were conscious (86.33%) and the rest were unconscious or semiconscious (13.67%).

LIMITATIONS

This study is retrospective observational study that does not enquire into the mental health status of the victim. Moreover, it does not discuss how the burn was inflicted i.e intentional or unintentional or any particular cause because of lack of data provided. It also does not cover the entire demographic of the said area but was performed while restricted to the medicolegal cases presented at the Department of Forensic Medicine and Toxicology, KEMU, Lahore.

CONCLUSIONS

Medicolegal cases of burn are an emerging topic in countries like Pakistan and is prevalent among the children of age 1-10 years (62.67%) in both males and females (50%) and are mostly presented within 6 hours of the incident. The most frequent cause is hot liquid which causes a scald burn. Occupational and industrial cases are bilateral (63.67%) and area burnt are mostly limbs (39.45%). Victims present in conscious state predominantly (86.33%) .

REFERENCES

1. laitan PB, Olaitan JO: Burns and scalds – epidemiology and prevention in a developing country. Niger J Med 2004, 14(1) :9-16.
2. Gibran NS, Wiechman S, Meyers W et al : J Burn Care Res. 2013 Jul-Aug; 34(4):361-85
3. Kemp A, Jones S, Lawson Z, Maguire SA. Patterns of burns and scalds in children. Arch Dis Child. 2014;99:316–21
4. Teo AL, Van As AB, Cooper J. A comparison of the epidemiology of paediatric burns between Scotland and South Africa. Burns. 2012;38:802–6
5. Nasib R. Awan : Principles & Practice of Forensic Medicine by Zubair Books – Second Edition
6. World Health Organization [Violence and Injury Prevention ; Burns] [online] Available on URL: https://www.who.int/violence_injury_prevention/other_injury/burns/en/
7. Hashmi M, Kamal R: Management of patients in a dedicated burns intensive care unit (BICU) in a developing country. Burns 2013, 39(3):493-500
8. Iqbal T, Saaiq M, Ali Z: Epidemiology and outcome of burns: Early experience at the country's first national burns Centre. Burns 2013, 39(2):358-362**)**
9. Peden M. World report on child injury prevention: World Health Organization; 2008**.**
10. Chung E. Burn injuries in China: a one year survey at the United Christian Hospital. Hong Kong Practice. 1996;18:631–6. Othman N, Kendrick D: Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. BMC public health 2010, 10:83 Othman N, Kendrick D: Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. BMC public health 2010, 10:83
11. Othman N, Kendrick D: Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. BMC public health 2010, 10:83 Kumar S, Ali W, Verma AK, Pandey A, Rathore S: Epidemiology and mortality of burns in the Lucknow Region, India–a 5 year study. Burns 2013, 39(8):1599-1605
12. Kumar S, Ali W, Verma AK, Pandey A, Rathore S: Epidemiology and mortality of burns in the Lucknow Region, India–a 5 year study. Burns 2013, 39(8):1599-1605
13. Rahul Chawla, Ashok Chanana,, Hukumat Rai, A. D. Aggarwal, Harnam Singh, Gaurav Sharma, A Two-year Burns Fatality Study,0971-0973
14. Datey S, Muathy WS, Taskar AD. A study of burn injury cases from three hospitals. Ind J Public Health 1981; 25: 117- 124.
15. Smith JW, Aston SJ. Thermal and Electrical injuries. Grabb and Smith‟s Plastic Surgery. 4th Ed. Boston: Little Brown. 1991: p. 675.
16. Karimi H, Montevalian A, Motabar AR, Safari R, Parvas MS, Vasigh M. Epidemiology of paediatric burns in Iran. Annals of burns and fire disasters. 2012;25(3):115–20. pmid:23466950
17. Tarim A, Nursal TZ, Yildirim S, Noyan T, Moray G, Haberal M. Epidemiology of pediatric burn injuries in southern Turkey. The Journal of burn care & rehabilitation. 2005;26(4):327–30.

18. Golshan A, Patel C, Hyder AA: A systematic review of the epidemiology of unintentional burn injuries in South Asia. Journal of public health 2013, 35(3):384-396
19. Sadeghi-Bazargani H, Mohammadi R: Epidemiology of burns in Iran during the last decade (2000-2010): review of literature and methodological considerations. Burns 2012, 38(3):319-329.
20. Narlawar UW, Meshram FA. Epidemiological determinants of burns and its outcome in Nagpur. Milestone J DMER 2002; 2(1):19.