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Research Article

Profile of Burns Cases and Factors Associated With Mortality in the State of Karnataka, India - A Retrospective Study

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Abstract

In a developing country like India, injuries due to burns continue to be a challenging problem. Burns is one of the preventable unintentional injuries, with high fatality in India. Currently, in India there is no formal injury surveillance system and epidemiological data regarding burns cases is very sparse and not systematic. The present study makes an attempt to give a profile of Burns cases availing benefit under different health schemes in Karnataka state.

Methodology: Retrospective data of burns victims from all over Karnataka claiming benefit under different social security schemes of Government of Karnataka between April 2015 and March 2016 was collected from online database of Suvarna Arogya Suraksha Trust

Results: The median age of cases was 28.50 years [Inter quartile range (IQR) 22 and 95% Confidence interval (CI): 27.81 to 30.55). The majority (53.4%) of the victims claiming benefit under the schemes was males and burns was accidental in nature. Nearly half of the cases were treated in the hospitals of Bangalore division. About 72% of them had improved and discharged from the empanelled hospital. The majority of the cases had sustained 3rd-degree burns with duration of the hospital stay between 8 to 30 days.

Conclusion: The burden of burns was more in economically productive age group, especially among males though fatal burns were more among females. TBSA and gender were the significant predictors of the mortality.

INTRODUCTION

Five of the 15 leading causes of death in persons 15–29 years of age, are unintentional injuries including road traffic injuries, drowning, burns, poisoning, and falls [1]. BURNS are one of the preventable unintentional injuries, with high fatality. Burns are devastating of all injuries, often resulting in significant morbidity, mortality and impairment of emotional well-being [2].

Globally in the year 2004, the incidence of burns severe enough to require medical attention was nearly 11 million people and ranked fourth in all injuries, behind road traffic accidents, falls and interpersonal violence [8]. Fire-related burns are among the leading causes of DALYs lost in LMIC [2]. Burns and fires account for over 3, 00,000 deaths every year throughout the world, 90% of burn deaths occur in LMIC [8]. South East Asia alone accounting for over half of these fire related deaths .In India fire- related deaths were estimated over 163 000 in 2001 , which is about 2% of all deaths [3]. Out of which 106 000 (65%) were female deaths, 57% of which happened in women between 15 and 34 years of age [3]. India as a whole, 15% and 14% of all deaths in women of age groups 15–24 and 25-34 years were fire related [3]. This is all because of cost of treatment for burn cases is too much to seek the medical attention hence Currently in Karnataka cashless tertiary treatment for burns cases through Health assurance schemes like Vajpayee Arogyashree Scheme (VAS) for BPL families, Rajiv Arogya Bhagya Scheme (RABS) for APL families and Jyothi Sanjeevini Scheme (JSS) in 187 empanelled government and private tertiary care centres managing through SAST (Suvarna Arogya Suraksha Trust). The Government of Karnataka established a Suvarna Arogya Suraksha Trust in 2009. It's an independent, autonomous separate body established and registered under the aegis of Health and Family Welfare Department, Karnataka, under the Indian Trust Act, 1882.

Epidemiological study is an important modality to analyze the cause, magnitude and profile of burn in a particular region and population. Epidemiological study is the first step in planning preventive and management strategies; hence, any endeavor in this direction is appreciable [1].

Currently in India there is no formal injury surveillance system and epidemiological data regarding burns cases is very sparse and not systematic. Present study makes an attempt to give a profile of Burns cases in a state of South India.

Objectives

1. To describe the socio- demographic and clinical profile of burns cases treated in the empanelled hospitals of Karnataka state.
2. To analyze the factors associated with the mortality among the burns cases treated in the empanelled hospitals of the state.

MATERIALS AND METHODS

Study setting and study design

A cross sectional study was done in a Karnataka state, one of the 28 states in India, which has 65.09 million population, sex ratio of 973 females per 1000 males, literacy rate is about 75.36%. The state has been divided into 30 districts, which come under four administrative divisions, Bengaluru division (9 districts), Belgaum division (7 districts), Gulbarga division (6 districts) and Mysore division (8 districts).

Methodology

The data was collected from a online data base of SAST, which contains case sheets and photographs of all burn cases claiming health assurance schemes across the state in the empanelled hospitals. Each case sheet and photograph was downloaded from the data base and studied in detail to collect socio demographic details (age, gender, burns cases social category and administrative division of treating hospital), injury (burns) details (place of burns, time of burns, mode of burns, cause of burns and time interval from injury to admission in SAST empanelled hospitals) and clinical profile of burns (percentage of TBSA involved, degree of burns, area of body burnt, length of hospital stay and treatment outcome). Total 1113 cases who had submitted their pre authorization, 362 were treated for contracture which were old cases and 116 cases did not submit their claim (who's case sheets are not available) were excluded from the study. Finally 635 cases were studied, among them 458 were improved and discharged, 120 cases died during treatment in hospital and 57 cases were classified as others (DAMA, Discharge on request, transferred out). All the fatal burns (120) were studied for factors associated with it. Data was entered and analyzed using SPSS version 20, descriptive variables expressed in terms of frequency and percentage. Binary logistics regression was used to determine factors associated with burns mortality

RESULTS

Among total 635 burns cases, 103 (16.22%) were less than 10 years, 82 (12.91%) were 11 to 20 years, 175 (27.56%) were 21 to 30 years, 129 (20.32%) were 31 to 40 years, 78 (12.28%) were 41 to 50 years, 42 (6.62%) were 51 to 60 years and 26 (4.09%) were above 60 years.

Majority of the burns cases 49.3 % belonged to 21 to 40 years of age group followed by 32.3% in less than 20 years of age and 2.9% (32/1113) were above 60 years age. Median age affected for all cases was 28.50 years [Inter quartile range (IQR) 22 and 95% Confidence interval (CI): 27.81 to 30.55).

Majority i.e. (343/635) 54.02% of the burns victim claimed under assurance scheme were males with male to female ratio of 1: 0.85. Nearly 90%of the cases had burnt 30 to 60% of TBSA (Total Body Surface Area), Median TBSA burnt was 30% (IQR 29 and 95%CI, 31.5 to 47.49) (Table 1).

Nearly 98% of burns were of second and third degree (Figure 1), in about 72.4% of cases upper limbs and lower limbs were affected, followed by anterior trunk and head and neck (Figure 2). Nearly 48.5% (308/635) burns cases were treated in government hospitals and 51.5% (327/635) were treated in private hospitals, but majority (55%) with more than 30% of TBSA was treated in government hospitals. Nearly 90% of burns were accidental in nature followed by suicidal and homicidal (Table 2).

About 75.8% (481/635) burns had occurred at home followed by work place. Majority of burns (29.0%) occurred between 4 pm to 10pm (Table 3) and that is also the times where majority of fatal burns had occurred (Figure 3). Majority of the cases were thermal (scalds, flame and contact burns) in nature 83.8% (532/635) followed by electrical burns 8.5% (54/635) and chemical burns 0.3% (2/635). In Nearly 7.4% (47/635) cases the cause was not mentioned in the documents.

Time interval from injury to empanelled definitive care hospitals under SAST and duration of stay

Time interval from injury to definitive care at empanelled

Table 1: Distribution of cases according to Total Body Surface Area (TBSA) of burns.

% of TBSA burnt	Total no	Percentage
< 30	334	52.6
30 to 60	226	35.6
>60	75	11.8
Total	**635**	**100.0**

TBSA: Total Body Surface Area

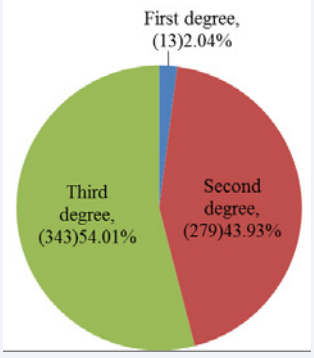

Figure 1 Distribution of burns cases according to degree of burns.

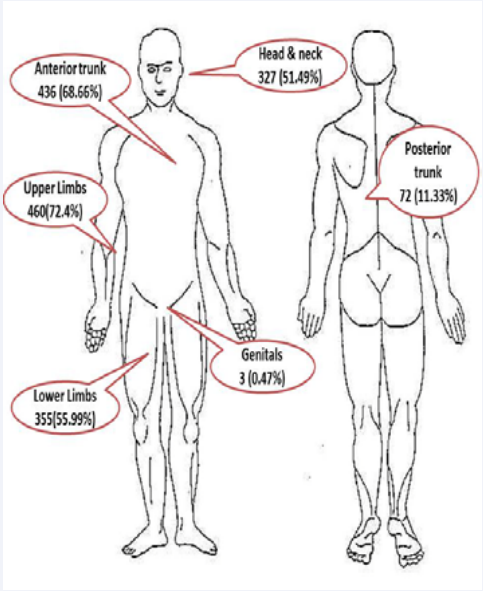

Figure 2 Anatomical area of body burnt.

Table 2: Distribution according to mode of burns and gender

Mode of Burns	Total (%)
Accidental	566(89.1)
Suicidal	50(7.9)
Homicidal	6(1.0)
NS/NL(not speceified/not legible)	13(2.0)
Total	635(100)

hospitals under SAST ranges from same day to 73 days. Median time intervals from burn injury to definitive care at empanelled hospital are 1day, IQR 4 (CI 3.30 to 4.64 for 95%).

About 32% (203/635) of burns cases were admitted to definitive burns care centers empanelled under SAST on the same day, 42% (267/635) within a week, 12.4% (79/635) of them were admitted more than a week after burns injury. About 25.20% (160/635) burns cases were hospitalized for less than 1week, 61.26% (389/635) between 8days to 30 days and 13.54 % (86/635) were for more than 30 days.

Length of hospital stay ranged from 1 to 165 days, with median 13.5 days (IQR 16 and 95% CI 15.78 -18.13).

Treatment outcome of burns cases in empanelled hospitals

About 72.12% of burns cases were improved and discharged and 18.9% were died. Others (8.98%) were unknown. Among total 635 cases studied, 120 had death as outcome, showing case fatality rate of 18.9.

Factors associated with mortality of burns cases treated in empanelled hospitals across state

A logistic regression analysis was done to understand the factors associated with death of burns victims admitted to empanel tertiary care centers under SAST between April 2015 and March 2016. A test of the full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between acceptors and decliners of the offer (chi square = 24.096, p<.001with, df = 2) (Table 4).

Nagelkerke's R2 of 0.63.737 indicated a moderately strong relationship between prediction and grouping. Prediction success overall was 88.3% (93.4 F% for improved and discharged and 69.2% for died). The Wald criterion demonstrated that only gender (female), Cause (thermal) and percentage of TBSA burnt (> 30%) made a significant contribution to prediction of death (Table 4). Other factors like patient's age, mode of injury, place of injury, length of hospital stay, and type of hospital and time interval from injury to admission in definitive care centers are not significant predictors. Exp (B) value indicates that when gender raised by one unit (one person) the odds ratio is 3.56 times larger in favor of females. Exp (B) value indicates that when cause raised by one unit the odds ratio is 3.49 times larger and odds ratio 43.37 for percentage of TBSA category > 30% burns have all contributed towards the death of the burns victims (Table 4).

DISCUSSION

There is no standard injury surveillance system in the state and data regarding burns is very sparse. This is a study first of its kind which has made an attempt to pool data of burns cases across the state and helps in understanding the profile and outcome of burns cases treated in all the empanelled hospitals of the state**.** Though the less severe cases might get treatment in

Table 3: Place and time distribution of burns.

		Time of injury				
Place of	04:01AM	10:01AM	04.01PM	10:01PM		**Total**
occurrence	to	to	to	to	NS/NL	N (%)
	10:00AM	04:00PM	10.00PM	04:00AM		
Home	70	108	153	41	109	481(75.8)
Work place	7	20	7	2	13	49 (7.7)
Out door	3	5	6	3	5	22 (3.5)
NS/NL	9	12	18	1	43	83 (13.0)
Total N(%)	89(14.0)	145(22.9)	184(29.0)	47(7.4)	170(26.7)	635 (100)

NS /NL: Not specified/Not legible.

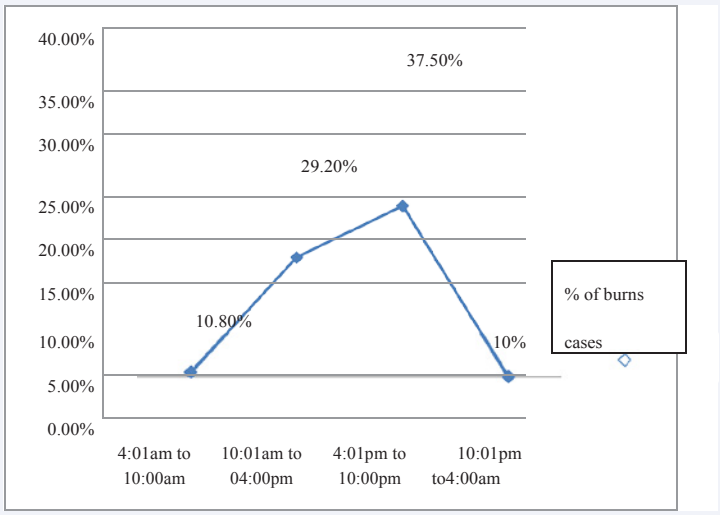

Figure 3 Time of occurrence of fatal burns.

Table 4: Binary logistic regression: variables in the equation.

	B	S.E.	Wald	df	Sig.	Exp(B)
Patient age	.033	.011	9.212	1	.002	1.033
Mode of burns	-1.913	.469	16.628	1	.000	.148
Gender	1.268	.323	15.455	1	.000	3.555
Place of burns	-.009	.626	.000	1	.989	.991
Cause of burns	1.250	1.194	1.098	1	.295	3.492
Percentage of TBSA burnt	3.770	.517	53.212	1	.000	43.369
Length of hospital stay	-2.121	.328	41.734	1	.000	.120
Type of hospital	-.957	.328	8.507	1	.004	.384
Time interval from injury to definitive care	-1.330	.314	17.980	1	.000	.265
Constant	-2.646	1.443	3.364	1	.067	.071

Variable(s) entered on step 1: Patient age, Mode of burns, Gender, Place of burns, Cause of burns, Percentage of TBSA burnt, Length of hospital stay, Type of hospital, Time interval from injury to definitive care.

private hospitals (not empanelled under SAST) without claiming social security schemes, current study still throws light on majority of burns cases in the sate as burns being medico legal case, most often get referred to government hospital setting which are empanelled under SAST for definitive care. Majority of the burns cases 49.3 % belonged to 21 to 40 years of age group, which is very productive, which is similar to other, studies [4-11].

Majority i.e. (343/635) 54.02% of the burn victims claimed under assurance scheme were males Though this finding is similar to studies done in Rohtak and Kashmir [7,8] it's in contrast few other studies [4,5,9,12], which had reported the female gender predominance. According to a study done by S. Bhattacharya, there was gradual increase in the proportion of female burn burns cases from 1993 to 1998 but since 1999 there is gradual decline [4].

About 75.8 % (481/635) burns had occurred at home, inferring that home was the most common place of occurrence compared to work place and outdoor, which is similar to the observations in studies done by R.B. Abuja et al. [4], Usama B.Ghaffar et al. [5], Subrahmanyam [8] and Shankar Gowri et al. [9], which reported, 93.56%, 97.56%, 92% and 97.5% of burns occurring at home respectively. Which also explains the fact that majority of burns are occurring between 4 pm to 10pm, which is after the working hours [10] majority stay at home during this time. Nearly 90% of burns were accidental in nature similar to other studies [4,6-9] which points to the fact that most of the burns are unintentional injuries but in contrast a study done on thermal burns in five states including Karnataka during the period of 2005-2008 has reported that 80%of burns as non-accidental and occurring mainly in females [13].

Among total 635 cases studied, 120 had death as outcome, showing case fatality rate of 18.9, which is less compared to studies done by R.B. Abuja et al. [4], Usama B. Ghaffar et al. [5], Subrahmanyam [8] and Shankar Gowri et al. [9], where mortality rate was51.8%, 26%, 56.5% and 31.58% respectively.

Multiple regression analysis shows that gender and TBSA are significant predictors of the mortality in burns cases which is similar to other studies [13,14].

CONCLUSION

Burns were more in economically productive age group, especially among males but fatal burns were more among females. Accidental burns were the commonest and many sought care beyond golden hour. TBSA and gender were the significant predictors of the mortality.

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