 DOI : 10.48165/jiafm.2023.45.1.13

ORIGINAL ARTICLE

Effect of Burns over Speech: In Context to Dying Declaration

Darandale S,[1] Zine KU,[2] Sane MR,[3] Kulkarni R,[4] Patekar M.[5]

Medical Superintendent,[1] Professor & Head,[2] Associate Professor,[3] Research Associate,[4] Assistant Professor.[5]

1. Sub-District Hospital, Pathardi, Ahmednagar.

2. Department of Forensic Medicine & Toxicology, Government Medical College, Aurangabad.

3. Department of Forensic Medicine & Toxicology, All India Institute of Medical Sciences, Nagpur.

4. Department of Forensic Medicine, SAIMS, Indore.

5. Department of Forensic Medicine, Government Medical College, Baramati.

Abstract :

The dying declaration remains important evidence in trials of burned victims in India. However, its evidentiary value is often negated because facial involvement or larger body area involved due to burns may make victims incapable of speaking properly. Hence, this study aimed to study the effect of burn on speech in relation to parameters like age, gender, and total body surface area affected (TBSA). The study included eighty patients having burn injuries over the head, neck, face, and upper chest. They were evaluated longitudinally from the time of infliction of burns at six hourly intervals, at 6 hours, 12 hours, 18 hours, and 24 hours. The speech was assessed using a scale having components of orientation, content, coherence, and articulation. The speech was well preserved in maximally affected age groups (21-40 years); speech was found to be preserved in varying involvement of body surface area. While considering gender and speech, it is observed that speech is relatively unaffected in females; in fact, females can tolerate burns better than males and have well-preserved speech. The above findings were constant at all-time intervals, i.e., at 6 hours, 12 hours, 18 hours, and 24 hours. Overall, the study disproves the notion that burn victims having facial involvement and greater total body surface area (TBSA) involvement cannot give a valid dying declaration.

Keywords : Dying declaration; Burns; Speech status; Total body surface area (TBSA).

Introduction :

A dying declaration as connoted under section 32[1] of the Indian Evidence Act (IEA) is 'a statement which a person makes as to the cause of his death, or as to any of the circumstances of the transaction which resulted in his death, in cases in which the cause of that person's death comes into question'. The legislature has accorded a special sanctity to statements given by a dying person due to the maxim- "Nemo moriturus praesumitur mentire," i.e., a man will not meet his maker with a lie in his mouth.[1] However, to pass the test of reliability, a dying declaration has to be subjected to very close scrutiny, keeping in view that the statement has been made in the absence of the accused, who had no opportunity to test the statement's veracity by cross-examination. Once the Court has concluded that the dying declaration was the truthful version, there is no question of further corroboration. One of the essential criteria for the validity of a dying declaration is to assess the fitness of the declarant to give the statement. If the victim is under medical supervision, then the law looks upon a medical opinion to certify the 'compos mentis,' i.e., the fitness of the declarant.[2] Such an evaluation must be inclusive as to whether the victim is able to comprehend and speak.[3] Hence, this study aimed to test the hypothesis that increasing the surface area of burns will affect the cognitive and articulation aspect of speech in relation to parameters like age, gender, and total body surface area.

Corresponding Author
Mandar Ramchandra Sane
Email : drmrsane@gmail.com

Article History
DOR : 14.06.22; DOA : 07.11.22

Methodology :

Study design : An observational, prospective study was conducted over one year (January to December 2015). All the patients admitted to the burn ward of a tertiary care centre were considered for the study, who had sustained burns injuries involving the head, neck, face, and upper chest. Cases that were unconscious since admission and/or became unconscious after some time were excluded from the study. Similarly, patients in whom tracheostomy was done were excluded from the study. In addition, to ensure that impaired speech was attributable to burns, patients suffering from injuries or any debilitating illness other than burns that may affect the speech were not included in the study.

Procedures : The study was initiated after the approval of the Institutional Ethics Committee. Informed consent was taken from the patients fulfilling inclusion and exclusion criteria. Each case was evaluated at the earliest since admission to the burns ward. History was obtained from the patient or relatives regarding the time of infliction of burns, which was considered the commencement of the timeframe for subsequent six-hourly periodic evaluation of the patient. The cases were evaluated longitudinally from the time of infliction of burns at six hourly intervals, at 6 hours, 12 hours, 18 hours, and 24 hours. Patients who refused to continue participation were excluded from the study. A review of medical records was done with particular reference to the extension of burn injury (Total Burn Surface Area

or TBSA) and duration of hospitalisation. Data of the patients, who died during the course of treatment, were collected up-to-the respective event. Patients with deep facial burns are prone to have chest burns. Circumferential deep chest burns can form eschar, impair breathing and hence may affect speech to a certain extent till escharotomies and airway management restore breathing. However, the prognosis of burn injuries depends more upon the extent of the body surface involved than upon the degree/depth of burns.[4] Hence, the extent of burns, i.e. surface area involvement due to burns, was analysed using Wallace, 1951 (Rule of '9'). All cases were studied with reference to the association of gender and speech score, the co-relation of TBSA percentage and speech score and the co-relation of age group and speech score.

A pre-designed and pre-tested questionnaire was filled with information obtained from the study participants to analyse speech. The questionnaire included questions framed to evaluate cognitive and articulation elements of speech in four components, i.e., orientation, content, coherence, and articulation. After the assessment, the degree of severity of speech impairment was rated using a speech score, consisting of a descendant 3-point scale ranging from the normal speech pattern to grossly impaired speech (Table 1). The speech was considered to be preserved when at least three of the four components (orientation, content, coherence and articulation) were intact, ie., with a cumulative score of 6 or more. Similarly, the speech was considered affected when more than one component was impaired, ie., a cumulative score of less than 6. The speech scale was pre-tested on ten burn victims who were admitted and satisfied eligibility criteria. A group of Forensic Professionals validated it.

Statistical analysis : Data were collected in a structured proforma and summarized with descriptive statistics. Pearson Co-relation test, a statistical measure of the strength of a linear relationship between paired data, was applied to determine the degree of correlation. The Chi-square test was applied to assess the degree of association between gender and score of speech. Statistical significance was set at $p<0.05$. An independent sample t-test was used to analyse the difference of TBSA among categories of affected and preserved speech among burn patients.

Results :

During this period total of 631 new cases were presented at the burn ward of the tertiary centre, out of which a total of 80 cases were studied. From these 80 cases, 64 cases were available for study at 6 hours after sustaining burns, 78 cases were available at 12 hours after sustaining burns, 74 cases were available at 18 hours after sustaining burns, and 64 cases were available 24 hours after sustaining burns. Maximum cases were females (n=54, 67.5%), while males constituted 26 cases (32.5%). The age group of 21 to 40 was maximally involved (n=61, 76.2%), followed by 41 to 60 years. Burns cases above 60 % of TBSA constituted 57 cases (71.25 %), with maximum cases of 61 to 80 % TBSA (n=29, 36.2%), followed by cases of 81 to 100 % of TBSA (n=28, 35%). Maximum cases were due to accidental infliction (n=56, 70 %), followed by suicidal deaths (n=17, 21.2%), and homicidal deaths (n=7, 8.7%). Analysis of speech was done with respect to gender, age group, and total body surface area (TBSA) of burns involved.

While considering the relation between the percentage of body surface burned and speech score in burns victims, it is observed that speech was predominantly found to be preserved in all the groups of TBSA burns, and it was not affected significantly by the increasing percentage of burns of TBSA (Table 2). While considering age and speech score in burns victims, speech is well preserved in maximally affected age groups (21-40 years) (Table 4). Similarly, while considering gender and speech status, it is observed that speech is relatively unaffected in females; in fact, females had a well-preserved speech despite more TBSA (Table 5). The above findings were constant at all-time intervals, ie., at 6 hours, 12 hours, 18 hours, and 24 hours. The results reject the hypothesis that increasing the surface area of burns will affect the cognitive and articulation aspect of speech (in relation to parameters like age, gender and TBSA).

Discussion :

The dying declaration has attained extensive applicability in burn cases since burn victims usually survive to reach a hospital and Judicial Officers get an opportunity to record a statement of a burned victim. Burns victims in India are invariably females due to the social evil of 'bride burning'.[5] Apart from the offence of homicide, various sections of the Indian Penal Code like the

Table 1: Score for evaluation of responses by a patient for each component of speech.

Components of speech	Degree of impairment	Score
Orientation	Normal	2
	Slightly impaired	1
	Grossly impaired	0
Content	Normal	2
	Slightly impaired	1
	Grossly impaired	0
Coherence	Normal	2
	Slightly impaired	1
	Grossly impaired	0
Articulation	Normal	2
	Slightly impaired	1
	Grossly impaired	0

(Cumulative score of four components- Minimum score: 0, Maximum score: 8)

Table 2: Co-relation of the score of speech with TBSA of burns.

TBSA (%)	Cumulative speech score#							
	6 hours		12 hours		18 hours		24 hours	
	<6	≥6	<6	≥6	<6	≥6	<6	≥6
1 to 20	0 (0%)	0 (0%)	0 (0%)	2 (100%)	0 (0%)	2 (100%)	0 (0%)	2 (100%)
21 to 40	1 (11%)	8 (89%)	6 (60%)	4 (40%)	1 (11%)	8 (89%)	1 (10%)	9 (90%)
41 to 60	1 (13%)	7 (87%)	1 (10%)	9 (90%)	2 (20%)	8 (80%)	3 (37%)	5 (63%)
61 to 80	7 (33%)	14 (66%)	10 (34%)	19 (66%)	9 (32%)	19 (68%)	9 (43%)	12 (57%)
81 to 100	8 (31%)	18 (69%)	4 (15%)	23 (85%)	6 (24%)	19 (76%)	8 (35%)	15 (65%)
Co-relation*	r = -0.160 (p>0.001)		-0.105 (p>0.001)		-0.170 (p>0.001)		-0.211 (p>0.001)	

(TBSA= Total Body Surface Area; *Pearson correlation; #Impaired Speech (<6), Preserved Speech (≥6))

 DOI : 10.48165/jiafm.2023.45.1.13

304B, 498A, and Dowry Prohibition Act are dedicated to curbing this menace. Females (n=54, 67.5%) outnumbered males (n=26, 32.5%) in the present study. Other studies also observed more female victims.[5,6] Some of the reasons reported for female preponderance are compromised working environment in the in-law's house, dowry disputes, or marital disharmony.[5,7] Present study shows that the 21 to 40 age group was maximally involved (n=61, 76.2 %) and the speech was found to be well preserved in maximally affected age groups (21-40 years). Other Indian studies also reported similar incidences in the age group of 21-40 years.[6] The study by Gupta BD & Jani CB[3] also noted most cases in the age group of 21-30 years (45 %), followed by the age group of 31-40 years (24 %). However, they did not conclude regarding the role of age in the effect of burns over speech. This age group involves victims (particularly females) who are recently married and suffering from dowry evil.

Ambiguity remains about the ability of the burn victim to give a valid statement. It is primarily due to a lack of unequivocal medical research evidence, which can instil confidence in the Judiciary about the ability of a burned victim to give a statement. Courts have occasionally taken diagonally opposite views on this matter.

Table 3: Difference of TBSA among categories of affected and preserved speech among burn patients.

	Speech score categories	Mean SD (Median)	P-value*	α value
6 hours	≤ 6	70.80 ± 23.35 (80.00)	0.182	0.877
	<6	79.17 ± 17.13 (80.00)		
12 hours	≤ 6	70.40 ± 23.75 (80.00)	0.963	0.904
	<6	70.68 ± 19.42 (75.00)		
18 hours	≤ 6	68.78 ± 23.64 (72.5)	0.269	0.891
	<6	75.33 ± 17.43 (75.00)		
24 hours	≤ 6	66.58 ± 25.98 (70.00)	0.142	0.905
	<6	74.90 ± 18.06 (80.00)		

*Independent sample t-test

Table 4: Co-relation of the score of speech with the age of victims.

Age (Year)	Cumulative speech score#							
	6 hours		12 hours		18 hours		24 hours	
	<6	≥6	<6	≥6	<6	≥6	<6	≥6
1 to 20	1 (25%)	3 (75%)	1 (14%)	6 (86%)	2 (33%)	4 (67%)	2 (33%)	4 (67%)
21 to 40	11 (22%)	38 (78%)	13 (23%)	44 (77%)	11 (19%)	46 (81%)	12 (25%)	36 (75%)
41 to 60	5 (56%)	4 (44%)	4 (33%)	8 (67%)	4 (40%)	6 (60%)	6 (67%)	3 (33%)
61 to 80	0 (0%)	2 (100%)	1 (50%)	1 (50%)	1 (100%)	0 (0%)	1 (100%)	0 (0%)
Co-relation*	r = -0.119 (p>0.001)		r =-0.0696 (p>0.001)		r =-0.170 (p>0.001)		r =-0.2108 (p>0.001)	

(*Pearson correlation; #Impaired Speech (<6), Preserved Speech (≥6))

Table 5: Association of the score of speech with the gender of victims.

Gender	Cumulative speech score#							
	6 hours		12 hours		18 hours		24 hours	
	<6	≥6	<6	≥6	<6	≥6	<6	≥6
Male	10 (53%)	8 (18%)	10 (53%)	15 (25%)	9 (47%)	13 (24%)	10 (53%)	8 (18%)
Female	9 (47%)	37 (82%)	09 (47%)	44 (75%)	10 (53%)	42 (76%)	09 (47%)	37 (82%)
The Chi-Square test	8.0282 (p>0.001)		4.8851 (p>0.001)		3.8071 (p>0.001)		8.0282 (p>0.001)	

Judicial Acceptance : a. Courts accepting the statement by the burn victim : The Judiciary have usually upheld the prosecution versions that burn victims could speak despite burns. It held that the patients having 100% burn injuries of 2nd and 3rd degree does not lead to the presumption that they were not physically and mentally fit to give the dying declaration.[8] Apex court framed landmark guidelines for scrutiny of dying declaration and stated that 'court in order to satisfy whether deceased was in a fit mental condition to make the dying declaration look upon to the medical opinion.[9]

b. Court rejecting the statement by burn victim : A doubt about the ability of burn victims to give valid statements has been raised on multiple occasions in trial courts.[10,11] It is usually argued that the victim was possibly not capable of making the dying declaration because of burns or due to the extent of burns.[12] Courts have agreed with the defence counsel that the burn victim could not speak[13,14] and set aside earlier convictions. Even though burn victims gave detailed statements, the shock and agony suffered by the patient discredited her capacity to give such statements.[13,14] This was primarily due to a lack of convincing medical evidence presented before the courts. Only in one instance, medical literature was cited as a supporting point in the argument.[10] Discretion of courts will always prevail while corroborating the statement of victims with other intricacies of the case. However, the Doctor's assessment regarding the fitness of such victims to give a statement must be considered without reluctance.

Medical evidence : The present study shows that speech was preserved in most burn victims when interviewed in the temporal time frame. It was compared in context with age groups, gender, and extent of burns (TBSA). The initial 24 hours after the infliction of burns are crucial as a patient may succumb to neurogenic shock due to burns, and for obvious reasons, patients with more TBSA burns are likely to affect. Studies[6,7] have reported that 13 to 18 % of total burn patients have not survived for more than 24 hours. Hence present study has considered the ability of speech for initial 24 hours.

TBSA involvement of 81 to 100 % constituted maximum cases (35 %), similar to reported observations wherein 38 % of patients had 81-100 % TBSA involvement.[3] Burns above 50 % TBSA are reported to be fatal;[7] hence, more cases having greater TBSA adds strength to the present study, as results will be pertinent in cases that are likely to be fatal. A study by Verma SK et al.[15] and Gupta BD and Jani CB[3] reported that speech was relatively preserved in cases with more TBSA. However, the above studies had less sample size and did not correlate with different age groups. Carla Tierney Hendricks et al.[16] observed that persons with burn injuries are at risk for cognitive-communication impairments and these cognitive difficulties influence communication skills. In the present study, the value of the Pearson correlation coefficient at 6 hours, 12 hours, 18 hours and 24 hours shows a non-significant correlation between speech score and TBSA of burns, i.e., speech score is not affected significantly with the increasing percentage

of burns of TBSA. Speech is preserved even in patients with more considerable TBSA involvement.

Studies[3,7] have reported that approximately 86 to 90 % of burn victims had face involvement. Facial involvement and larger TBSA involvement are frequently used as grounds to discredit the dying declaration, arguing that such patients could not speak. In the present study, all cases had facial burns. Hence, it is observed that this affection does not render the patient incapable of speaking. Though the speech may be laboured or difficult, but the quality of speech as to taking the dying declaration is maintained.

Gender-wise speech evaluation shows that predominantly preserved speech was observed at six-hourly, 12-hourly, 18 hourly and 24-hourly intervals. It was observed that speech was relatively more preserved in females, i.e. components of speech including orientation, content, coherence, and articulation were intact. These components are vital in consideration for a valid dying declaration. Verma SK et al.[15] also reported that females could tolerate burns better than males; however, they analysed speech only 6 hours after the infliction of burns.

A larger sample size, longitudinal follow-up of patients, objective scoring of speech status, and statistical analyses of various parameters on speech are the study's strengths. Objective scoring of speech overrides subjective errors in the interpretation of preservation of speech. The study's findings corroborate the commonly held belief among medical professionals that patients with extensive burns who are resuscitated well in a setting of a tertiary care setup are often oriented and can articulate well the events leading to the burn injury. The present study provides evidence in support of the above corroboration. However, the study had limitations due to attrition in the follow-up of patients due to loss of consciousness or death of the patient. Similarly, the study has considered patients up to 24 hours after the infliction of burns. However, the presentation of cases after 24 hours or less than optimum resuscitation in the initial 24 hours can result in a compromised sensorium and thus may make the patient unfit for a dying declaration.

Conclusion :

The present study followed cases at six hourly intervals, up to 24 hours. The study shows a non-significant correlation between speech score and TBSA of burns, speech score and age groups involved, and a non-significant association between speech score and gender. The speech was not found to be impaired with increased TBSA; speech was not found to be affected by age. The speech was predominantly found to be better preserved in females. The results reject the hypothesis that increasing the surface area of burns will affect the cognitive and articulation aspect of speech (in relation to parameters like age, gender, and TBSA).

Thus, the present study will go a long way in serving Medical persons involved in certifying the fitness of a dying burn victim to give a statement (Dying declaration). Similarly, Judiciary may find this study helpful while considering the validity of dying declarations in burn victims. The present study also disproves the notion that burn victims with facial involvement and greater TBSA involvement cannot give a valid dying declaration.

References :

1. Gorea RK, Aggarwal OP. Critical appraisal of dying declaration. J Indian Acad Forensic Med. 2004;26(1):24–6.
2. Kumar L, Kulbhushan, Behera C, Kumar A. Medico-Legal Aspects of Dying Declaration in India. J Indian Acad Forensic Med. 2014;36(3):281–3.
3. Gupta BD, Jani CB. Status of compos mentis in relation to dying declaration in burn patients. J Indian Acad Forensic Med. 2004;25(4):133–6.
4. Vij K. Textbook of Forensic Medicine and Toxicology. 5th ed. New Delhi: Elsevier; 2011. 162 p.
5. Kumar V, Mohanty MK, Kanth S. Fatal burns in Manipal area: A 10-year study. J Forensic Leg Med. 2007;14:3–6.
6. Mishra PK, Tomar J, Sane MR, Saxena D, Yadav A. Profile of death in burn cases: A post-mortem study. J Indian Acad Forensic Med. 2016;38(1):8–10.
7. Tomar J, Mishra PK, Sane M, Saxena D, Varun A. Epidemiology and outcome of burn injuries-A prospective study. Indian J Forensic Community Med [Internet]. 2017;4(1):58–62. Available from: https://www.researchgate.net /publication/316169935
8. Gujarat High Court. Bachubhai Valjibhai vs The State of Gujarat. 1999.
9. Supreme Court of India. Smt. Paniben vs The State of Gujarat. 1992.
10. Delhi High Court. Latoor Singh vs The State of Nct of Delhi. 2015.
11. Delhi Sessions Court. State vs. Mithilesh. 2010.
12. Supreme Court of India. Om Prakash Etc. Vs The State Of Punjab. 1992.
13. Bombay High Court. Deepak Baliram Bajaj And Another vs The State Of Maharashtra. 1993.
14. Supreme Court of India. Sampat Babso Kale vs The State Of Maharashtra. 2019.
15. Verma SK, Biswas G, Navneethan S, Agarwal BBL. Effect of burns on speech [Internet]. Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology. 2000. Available from: 'Paper 7:EFFECT OF BURNS ON SPEECH: Anil Aggrawals Internet Journal of Forensic Medicine.
16. Hendricks CT, Camara K, Boole KV, Napoli MF, Goldstein R, Ryan CM, Schneider JC. Burn injuries and their Impact on cognitive-communication skills in the inpatient rehabilitation setting. J Burn Care Res. 2017;38(1):e359-e369.