



**Assessment of quality of life in Thermal (flame) burn patients: An observational study at Tertiary Care Teaching Hospital in Warangal, A.P., India**

Nitesh Tirumala<sup>1\*</sup>, Subash Vijaya Kumar<sup>1</sup>, M. Sathyadev<sup>2</sup>, Jyosthna Devi Ande<sup>1</sup>, Kishore Guguloth<sup>1</sup>, Ch. Ravi Kiran<sup>2</sup> and N. Chandana<sup>1</sup>

1, Department of Pharmacy Practice, Vaagdevi College of Pharmacy,  
MGM Hospital, Warangal, (Andhra Pradesh) - India

2, Ex. Superintendent MGM Hospital, Professor & HOD of Surgery, Kakatiya Medical College,  
Warangal, (Andhra Pradesh) - India

**Abstract**

A severe burn causes significant physical and psychological consequences. The outcome therefore varies considerably, with various types of impact on all aspects of a person's life and sometimes with permanent impairments. Therefore, this study was aimed to investigate generic quality of life in burn patients at hospital discharge. This is a Prospective observational study conducted from January 1<sup>st</sup> to July 1<sup>st</sup>, 2013 in Mahatma Gandhi Memorial Hospital, Warangal, A.P., India. The questionnaire was obtained from the EuroQol group Foundation, after obtaining permission. All analysis was performed with the statistical package graph pad prism for Windows version 5. During the period of six months, 143 patients (54 Males and 89 Females) with mean age of 30.73±12.02 years were studied. Seventy eight percent (78.26%) of total population reported (moderate to severe) problems in the item "pain/discomfort", 73.16% in the item usual activities followed by self-care (68.29%), anxiety and depression (53.65%) and mobility (31.79%). The EQ-VAS scores of patients who reported no problems, moderate problems and severe problems were 78.2, 67 and 61, respectively. Our findings suggest that the quality of life is compressed in burn patients.

Key-Words: quality of life, thermal burns, EuroQol group

**Introduction**

Burn patients constitute a heterogeneous population with wide variation in age, mechanism of injury, depth and site of burn and with a high level of comorbidity. The outcome therefore varies considerably, with various types of impact on all aspects of a person's life and sometimes with permanent impairments [1, 2]. One of the most frequent impairments post burn is scar contracture, which limits movement and deforms normal anatomical structures [1-3]. Deep burn injuries sometimes heal with hypertrophic scarring, and surgical reconstruction may be required. Amputations are sometimes necessary after deep limb injuries, particularly when they are caused by high voltage electricity [2]. Another consequence of severe burn is loss of muscle mass, resulting in reduced strength [3].

Pruritis, or itch, is one of the most disturbing issues for patients postburn, and the pathophysiology is not well known [4]. Although the severity of pruritus tends to diminish with time in most patients, it can remain a problem for a long time after severe burn [2, 3, 6]. Burn-related pain is experienced not only in the acute stage of injury but also in the longer term [2,7]. Pain is also one of the greatest obstacles to successful burn rehabilitation [8]. A high prevalence of burn-related pain (52 %) on average 11 years postburn was identified in a study, and pain was reported to interfere with both rehabilitation and daily life [9].

One common concept of well-being is Quality of life (QoL). QoL can be defined as an individual's perception of his or her position in life in the context of the culture and value systems in which he or she is living and in relation to his or her goals, expectations, standards and concerns [10]. HRQoL focuses on the impact an injury or illness has on quality of life, including the individual's perception of his or her

**\* Corresponding Author**

E.mail: nitu.tin@gmail.com, vijayvijay66@yahoo.co.in

injury or illness, and how this interferes with the individual's ability to live a fulfilling life [11]. HRQoL is a subjective measure of well-being, and can be defined as the individual's perception of physical, mental and social health over time [12]. Therefore, this study was aimed investigate generic HRQoL of burn patients at hospital discharge.

### **Material and Methods**

#### **Study design and study setting**

This is a Prospective observational study conducted for 6 months from January 1<sup>st</sup> to July 1<sup>st</sup>, 2013 at Department of Burns and plastic surgery department (IP and OP) in Mahatma Gandhi Memorial Hospital, Warangal, A.P., India. Burns centre of the MGMH is the largest public sector trauma centre in Warangal region, which receives burn patients in critical conditions from provinces of Telangana region, India. It is a 20 bed facility with its own Intensive Care Surgical Unit (ICSU), plastic surgery and clinical pharmacy service centre.

#### **Study subjects**

The study considers the patients with age of 02 – 72 years on being in-patients/discharged. The sample consists of men and women referred from Emergency department to burns ward. The inclusion criteria were all patients having thermal (Flame) burns of any % TBSA of any age and gender and of any duration presenting to our unit. Burns due to any cause (accidental, homicidal, suicidal), and any thickness (superficial, mixed, deep) were included. Other burns due to electrical, scald and chemical cause, and cases with associated (secondary) injuries like fractures, penetrating wounds, and cases with co-morbid conditions were excluded from the study.

#### **Methodology**

##### **EQ- 5D INDEX and EQ VAS**

The questionnaire was obtained from the EuroQol group Foundation, after obtaining permission from organisation through the email from Tzaddy Osenga to use the same (EQ-5D-3L). The interview questionnaire completed by participants had three sections:

- Socio-demographic background (age, sex, education, residence and marital status).
- Details about current injury (type of injury and injured body part).
- QoL, as by the European Quality of Life Five Dimensions (EQ-5D-3L).

The questionnaire was developed in English. The questionnaire was tested in a pilot study and validated prior to implementation. The EQ-5D is a brief, standardised, generic measure of QoL that provides a profile of patient's function and a global health state rating.

The EQ-5D-3L allows assessment of an individual's physical, social and psychological status, measurement of QoL from the individual's subjective view and identification of possible predictors of diminished QoL in specific individuals and groups. It defines health in terms of five dimensions: *mobility, self-care, usual activities (work, study, housework, family and leisure), pain or discomfort and anxiety or depression*. Each dimension is subdivided into three categories, which indicate whether the respondent has no problem, a moderate problem or an extreme problem. This information can be used to guide the management of patients who have sustained burn injuries. The instrument generates a global rating of current health using a VAS, with scores ranging from 0 (worst imaginable) to 100 (best imaginable). The EQ-5D comprises two pages: on the first page, respondents record the extent of their problem in each of the five dimensions, and on the second page, they record their perception of their overall health on a VAS. Patients were asked to complete both sections. The self-rated QoL was collected from injured subjects by asking them to report their current QoL after injury. The mean VAS score was calculated and compared according with different variables.

#### **Ethical considerations**

Human Ethical Committee (HEC) approval was obtained from Kakatiya Medical College (KMC) affiliated to Dr. NTR University of Health Sciences, Andhra Pradesh, India and permission to collect data was given by the Medical Superintendent of Mahatma Gandhi Memorial Hospital (MGMH) of Warangal. Written consent was obtained from all the patients included in the study or from the caregivers by using patient consent form after providing the information. All data were de-identified and kept confidential.

#### **Statistical analysis**

All analysis was performed with the statistical package graph pad prism for Windows (version 5). Results were presented as the mean  $\pm$  standard deviation (SD) (continuous variables) or percentage (categorical variables). T-test (for continuous variables) and chi-square test or Fisher's exact test when expected frequencies were too small (for categorical variables) were used to compare the clinical characteristics of the ICU survivors and ICU non-survivors. For assessing differences in baseline characteristics of burn patients to EuroQ 5D and EQ VAS questionnaire, we used independent samples t -test and kruskalwallis test. Statistical significance was considered if  $p < 0.05$ .

### **Results and Discussion**

During the period of six months, 143 patients (54 Males and 89 Females) were admitted to burns and



plastic surgery unit after burn injury. The mean age of patients was  $30.73 \pm 12.02$  years. The mean age of male patients was  $34.20 \pm 13.29$  and female patients was  $28.62 \pm 10.71$  years. In the study population, 78.32% were married, 17% were unmarried and 5% were divorced/ widowed. Unequal number of patients came from urban (20.27%) and rural (79.72%) backgrounds. Further, the percentage of burns seen mostly in secondary school level was 40%, followed by illiterates (21.6%), intermediate (18.88%) and graduates (16.78%). Majority of burn cases were seen in female population (62.22%) and most of them were House wives (37.76%). Table 1 shows Socio-demographic attributes of burn patients in our study population. Forty percent of patients were from 20 – 29 years of age group. The frequency and distribution of patients according to gender and age in years were represented in table 2. The main alleged cause of burn injury among the patients was intentional (58.7%) and followed by accidental (41.20%). The main accelerant of burn injury frequently reported was kerosene (75%) and least used agent was petrol (3%). The average percentage of TBSA in total population was found to be  $49.43 \pm 28.00$ , whereas mean %TBSA burned in male was  $38.98 \pm 25.93$  and in female was  $55.76 \pm 27.43$  which has depicted in Figure 1. Most of the patients 28% had burns to upper limbs, followed by trunk was 26%. In our study population, most of the patients (40%) had suffered from deep burns. Among deep burns, the percentage of females (72%) was higher than males (28%). In total number of population (143), 60.13% patients survived burns. Mortality was found to be 39.86% which may be due to high degree of burn leading to hypovolemic shock, respiratory distress or septicaemia.

#### **Descriptive statistics of EQ-5D**

Seventy eight per cent (78.26%) of total population reported (moderate to severe) problems in the item “pain/discomfort”, 73.16% in the item usual activities followed by self-care (68.29%), anxiety and depression (53.65%) and mobility (31.79%). The distribution of EQ-VAS scores were done. The mean EQ-vas score was  $70.21 \pm 1.241$  (0 to 100 = worst to best imaginable health state) with median 70.00 and class interval 67.74-72.68 (Table 3).

When EQ-5D index and EQ-VAS were compared (Figure 2), the EQ-VAS scores of patients who reported no problems, moderate problems and severe problems were 78.2, 67 and 61 respectively. These values were found to be statistically significant (Kruskalwallis test,  $P = 0.0013$ ).

#### **Descriptive statistics EQ-5D Index and EQ-VAS scores of patients according to gender**

Out of 89 female patients in our study, 45 patients (50.5%) were interviewed with EQ-5D questionnaire. Majority of female have few problems to severe problems in performing usual activities (86.5%). Moderate to severe problems of self-care, pain/discomfort and Anxiety/Depression in female patients were found to be 77.77%, 77.77% and 62% respectively. Out of 54 male patients in our study, 37 patients (68.5%) were interviewed with EQ-5D questionnaire. Majority of males have moderate to severe problems in pain 81%. Few to severe problems in self-care, usual activities and Anxiety in male patients were reported to be 56.7%, 56.4% and 43% respectively. Both groups were leastly affected in mobility (male 27% and female 46.6%). There was statistical difference between male and female ( $P=0.0336$ , chi square test).

Mean EQ-VAS scores of male and female were 71.64 and 69.02 respectively. Even though there is slight difference between male and female, there is no statistical significant difference (t-test p-value 0.2454).

#### **Descriptive statistics of EQ-5D Index and EQ-VAS scores according to age group**

Pain was major complaint of all age groups, predominant in <19 years (88.8%) and >60 years (83%). In age groups of 20-39 and 40-59 years all items were equally affected. These values were significant (Kruskalwallis test,  $p < 0.0001$ ).

The mean EQ-VAS scores of age group  $\leq 19$  years was 69.77, 20-39 years was 69.36, 40-59 years 72.72 and  $\geq 60$  years 70.16 respectively, which was not significantly different (Kruskalwallis test, p-value 0.5737).

#### **Descriptive statistics of EQ-5D Index and EQ-VAS scores according to cause of burns**

Seventy seven percentage of accidental and 81% of non-accidental patients reported pain. Usual activities, self-care, anxiety and mobility that of non-accidental burns were found to be 86%, 81.5%, 73% and 47% and for accidental burn patients 61%, 57%, 45.3% and 30%, respectively. Mean EQ-VAS score of accidental and non-accidental was found to be 72.30 and 67.52 respectively; there was no statistical significance (paired t-test, P-value 0.0708).

#### **Descriptive statistics of EQ-5D Index and EQ-VAS scores according to Percentage Total Body Surface Area (%TBSA) burned**

EQ-5D index of more than 60% TBSA burned patients showed that there was moderate to severe problems in all categories. Less than 19% TBSA burned patients presented with slight problems in all items of EQ-5D index. There was statistical difference between %TBSA versus EQ-5D (Kruskalwallis test, p-

value<0.0037). The mean EQ-VAS scores of %TBSA <19 % was 79.7, 20-39% was 68.82, 40-59% was 63.55 and 60-79% was 69.5, respectively, these differences were statistically significant (Kruskalwallis test, p-value<0.0001).

**Descriptive statistics of EQ-5D Index and EQ-VAS scores according to depth**

EQ-5D Index scores of deep injuries presented moderate to severe problems in all categories, mainly in self-care and usual activities (99.99%). Mixed flame burns reported impairment in self-care was 93.09%. Superficial burn injuries presented with slight problems in all categories of EQ-5D index. These differences were statistically significant (Kruskalwallis test p-value 0.0001).

The mean EQ-VAS scores according to depth were 64.11, 67.1 and 73.5 respectively; these values were significant (Kruskalwallis test 7.339, P-value 0.0255).

**Descriptive statistics of EQ-5D Index and EQ-VAS according to injured body part**

There was more number of moderate to severe problems in mobility of patients whose lower limbs were affected (58%). Self-care was mostly affected in patients with trunk injury, followed by face and both limbs (90%), (78%) and (72%). Lower limbs showed moderate to severe problems in categories such as usual activities, pain and anxiety which were 88%, 88% and 80%, respectively.

Mean EQ-VAS score of accidental and non-accidental was found to be 72.30 and 67.52 respectively, there was no statistical significance (paired t-test t-value=1.920, p-value 0.0708).

A severe burn causes significant physical and psychological consequences: most burned patients experience various levels of distress even though they cannot be classified as true psychological or psychiatric disorders. There are many factors that make life after burns almost a chronic condition; these include adjustment with new body image, scarring, variable physical impairment and readjustment into social life that can persist for decades. We found that, in severe burn patients, the QoL was influenced by consequences of injury both in psychological and physical health. The results of this study showed that subjective QoL was compromised among all patients. Even with advances in burn care over recent decades, the mortality remains high among the severely burned patients.

This study provides first data on the impact of severe burn injury on QoL of Telangana region. The EQ-5D was the instrument of choice because it is simple and short and has acceptable reliability. The questionnaire permitted estimation of an overall quality-of-life index

and specifically measured range physical and non-physical dimensions. In terms of Health problems experienced by study participants immediately after first follow up after injury, the findings indicated that the majority had moderate to severe levels of pain/discomfort (78.26%), difficulty performing usual activities (73.16%), limitations in self-care (68.29%), Anxiety/ Depression (53.65%), or mobility problems reflecting the multifaceted impact of burn injury.

Our findings are consistent with those of a Swedish study of QoL 5years after major trauma [13]. Granja *et al.* [14] reported as many as 78% of patients were experiencing pain/ discomfort 6months after injury. The pain complaints (mild to moderate) by 78% of all burn survivors in this series is almost identical to study by Vittorio Pavani *et al.* [15] and Syed Mohammed *et al.* [16] but in contrast to 47% reported by Shakespeare [17]. The probable explanation for this variation may be that Shakespeare only studied cases less than 20% BSA while Vittorio and Syed studied cases with BSA up to 40% , we studied cases of burn up to 80% BSA. This high prevalence of pain in burn survivors has made everyday activities difficult to perform and therefore badly affect physical and general health with resultant decrease in physical and general health component summary. Long term follow-up with appropriate rehabilitation is necessary to evaluate this factor.

We found that marked impairment of physical functions and mental health in women compared to men, a finding identical to that reported by Van Loey *et al.* [18], Novelli *et al.* [19] and Syed Mohammed *et al.* [16]. Failure to cope with active social life, household work, and difficulty in performing usual activities may be due to pain, and more concern about disfigurement has led to mental exhaustion and therefore less favourable recovery and low quality of life.

Our patients EQ-5D index and VAS scores did not show significant differences with regard to age and aetiology of burn injury. Any age group and any cause of aetiology either accidental or non-accidental and either flame or kerosene, the impact of the burn is equal. None of the published studies on this topic involved a population directly comparable to ours.

In current study, it was observed that burn severity indices (% BSA affected, burn extent and site injured) effects the QoL of the burn patients. It was observed that patients with severe burns showed poor quality of life when compared to moderately and mild burned patients. These findings are consistent with findings of other authors. Druery *et al.* [20] reported that the mobility and self-care were significantly altered when burn injury was more than 20%. Wiechman and



Patterson [21] reported who sustained larger burns took longer time to return to work. Lionelli et al. [22] and in a Dutch study, showed QoL is independent burn severity indices.

### **Conclusion**

By identifying the mainly impaired areas of a patient's quality of life (QoL), specific physical and psychological support programmes can be provided. Our findings suggest that the quality of life is compressed in burn patients. As both the physical and psychological dimensions were compromised at the discharge, the injury will still cause major limitations even after discharge that extend well beyond the physical area to involve emotional, social and relation aspects. At times it is suggested that depression is an understandable reaction of burn injury and perhaps all burn patients.

If the EQ-5D were to administered to all burn patients after discharge, their individual state of health could assessed early and, consequently, a specific programme could be readily implemented. Identifying the most impaired areas of the QoL would allow the implementation of specific psychological or physiotherapy support programmes, and this should also lead to an economic benefit by promoting the return to work (including housework) and social life.

Persistent pain is a problem revealed by many of injured patients. This demonstrates that pain management in the acute and subacute phases of trauma care is clearly important. Improved pain management for trauma patients not only increases comfort and reduces suffering but also reduces morbidity and improves long term outcomes.

### **References**

1. Esselman PC.(2007) Burn rehabilitation: An overview. *Arch Phys Med Rehabil*, 88:3-6.
2. Esselman PC, Thombs BD, Magyar-Russell G, Fauerbach JA. (2006). Burn rehabilitation: state of the science. *Am J Phys Med Rehabil*,85:383-413.
3. Falder S, Browne A, Edgar D, Staples E, Fong J, Rea S, et al.(2009) Core outcomes for adult burn survivors: a clinical overview. *Burns*,35:618-41.
4. Warden GD, Warner PM.(2007)Functionlasequele and disability assessment. *Total Burn Care*. London: WB Saunders Company Ltd. 781-96.
5. Goutos I, Dziejewski P, Richardson PM (2009). Pruritus in burns: review article. *J Burn Care Res*.30:221-8.
6. Malenfant A, Forget R, Papillon J, Amsel R, Frigon JY, Choiniere M (1996). Prevalence and characteristics of chronic sensory problems in burn patients. *Pain*.67:493-500.
7. Schneider JC, Bassi S, Ryan CM(2009). Barriers impacting employment after burn injury. *J Burn Care Res*. 30:294-300.
8. Richard R, Baryza MJ, Carr JA, Dewey WS, Dougherty ME, Forbes-DuchartL, et al. (2009).Burn rehabilitation and research: proceedings of a consensus summit. *J Burn Care Res*. 30:543-73.
9. Dauber A, Osgood PF, Breslau AJ, Vernon HL, Carr DB (2002). Chronic persistent pain after severe burns: a survey of 358 burn survivors. *Pain Med*. 3:6- 17.
10. Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument (WHOQOL)(1993). *Qual Life Res*. 2:153-9.
11. Fitzpatrick R, Davey C, Buxton MJ, Jones DR (1998). Evaluating patient-based outcome measures for use in clinical trials. *Health Technology Assessment*. [review]. 2:412-14.
12. Patrick DL, Erickson P (1993). Health status and health policy: quality of life in health care : evaluation and resource allocation. New York: Oxford Univ. Press;.
13. Sluys K, Haggmark T, Iselius L (2005). Outcome and quality of life 5 years after major trauma. *J Trauma* 59:223–32.
14. Granja C, Teixeira-Pinto A, Costa-Pereira A (2002). Quality of life after intensive care-evaluation with EQ-5D questionnaire. *Intensive Care Med* 28:898–907.
15. Pavoni V, Giancesello L, Paparella L, Buoninsegni LT, Barboni E. (2010). Outcome predictors and quality of life of severe burn patients admitted to intensive care unit. *Scand J Trauma Resusc Emerg Med*; 18:24.
16. Syed Mohammed Tahir, Mohammed MunirMemon\*, Syed Asad Ali\*, SaadiaRasheed (2011).Health related quality of life after burns: are we really treating burns? *J Ayub Med Coll Abbottabad* 23(2).
17. Shakespeare V. (1998) Effect of small burn injury on physical, social and psychological health at 3–4 months after discharge. *Burns* 24:739–44.
18. Van Loey NE, Van Son MJ (2003). Psychopathology and psychological problems in patients with burn scars: epidemiology and management. *Am J ClinDermatol* 4: 245–272.

19. Novelli B, Melandri D, Bertolotti G, Vidotto G (2009). Quality of life impact as outcome in burns patients. *G Ital Med LavErgon* 31(1 Suppl A):A58–63.
20. Druery M, Brown TlaH, Muller M (2005). Long term functional outcomes and quality of life following severe burn injury. *Burns* 31:692-705.
21. Wiechman SA, Patterson DR (2004). Psychosocial aspects of burn injuries. *BMJ* Aug; 329(7462) : 391–393.
22. Lionelli GT, Pickus EJ, Beckum OK, Decoursey RL, Korentager RA(2005). A three decade analysis of factors affecting burn mortality in the elderly. *Burns* 31:957–63.

**Table 1: Socio-demographic attributes of burn patients**

	Variables	No. of Patients	Percentage (%)
<b>Sex</b>	Male	54	37.7
	Female	89	62.22
<b>Marital Status</b>	Married	112	78.32
	Single	24	16.78
	Divorced/Widowed	07	4.89
<b>Education</b>	Illiterate	31	21.67
	Primary	04	2.79
	Secondary	57	39.86
	Intermediate	27	18.88
	Graduate	24	16.78
<b>Domicile</b>	Urban	29	20.27
	Rural	114	79.72
<b>Occupation</b>	Labour	14	9.79
	Farmers	18	12.58
	Housewife	54	37.76
	Business	16	11.18
	Driver	06	4.19
	Student	24	16.78
	Teacher	04	2.79
	Carpenter	02	1.39
	Chef	04	2.79
	Lab Assistant	02	1.29

**Table 2: Age-Gender wise distribution of burns patients**

Age in groups (in years)	Male 'n'	Female 'n'	Total number of patients 'n'	Percentage (%)
<10	1	1	2	1.39
10-19	2	13	15	10.48
20-29	15	42	57	39.86
30-39	19	19	38	26.57
40-49	8	10	18	12.58
≥50	9	4	13	9.09

*n indicate number of patients*

Table 3: EQ-5D and EQ-VAS total scoring

EQ-5D	Scoring	Total N (%)	Male N (%)	Female N (%)	EQ-VAS
Mobility	No problems	51 (62.19)	27 (72.97)	24 (53.33)	73.86
	Moderate	26 (31.70)	8 (21.62)	18 (40)	64.86
	Severe	5 (6.09)	2 (5.40)	03 (6.66)	61.00
Self-Care	No problems	26 (31.70)	16 (43.24)	10 (22.22)	79.07
	Moderate	41 (50)	28 (75.67)	28 (62.22)	68.34
	Severe	15 (18.29)	08 (21.62)	07(15.55)	59.93
Usual Activities	No problems	22 (26.82)	16 (43.24)	06 (13.33)	82.27
	Moderate	49 (59.75)	17 (45.94)	32 (71.1)	66.73
	Severe	11 (13.41)	04 (10.81)	07 (15.55)	61.54
Pain	No problems	17 (20.73)	07 (18.91)	10 (22.22)	78.94
	Moderate	47 (57.39)	21 (56.75)	26 (57.77)	69.53
	Severe	18 (21.95)	09 (24.32)	09 (20)	63.72
Anxiety/ Depression	No problems	38 (46.34)	21 (56.75)	17 (37.7)	77.44
	Moderate	34 (41.46)	10 (27.02)	24 (53.33)	64.67
	Severe	10 (12.19)	06 (16.21)	04 (8.88)	61.50



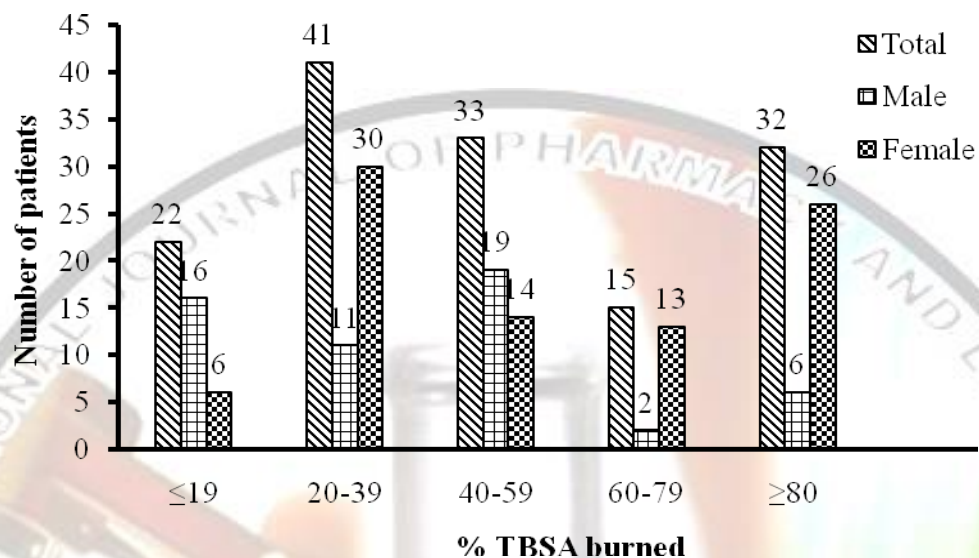


Fig. 1: Distribution of patients according to percentage TBSA burned

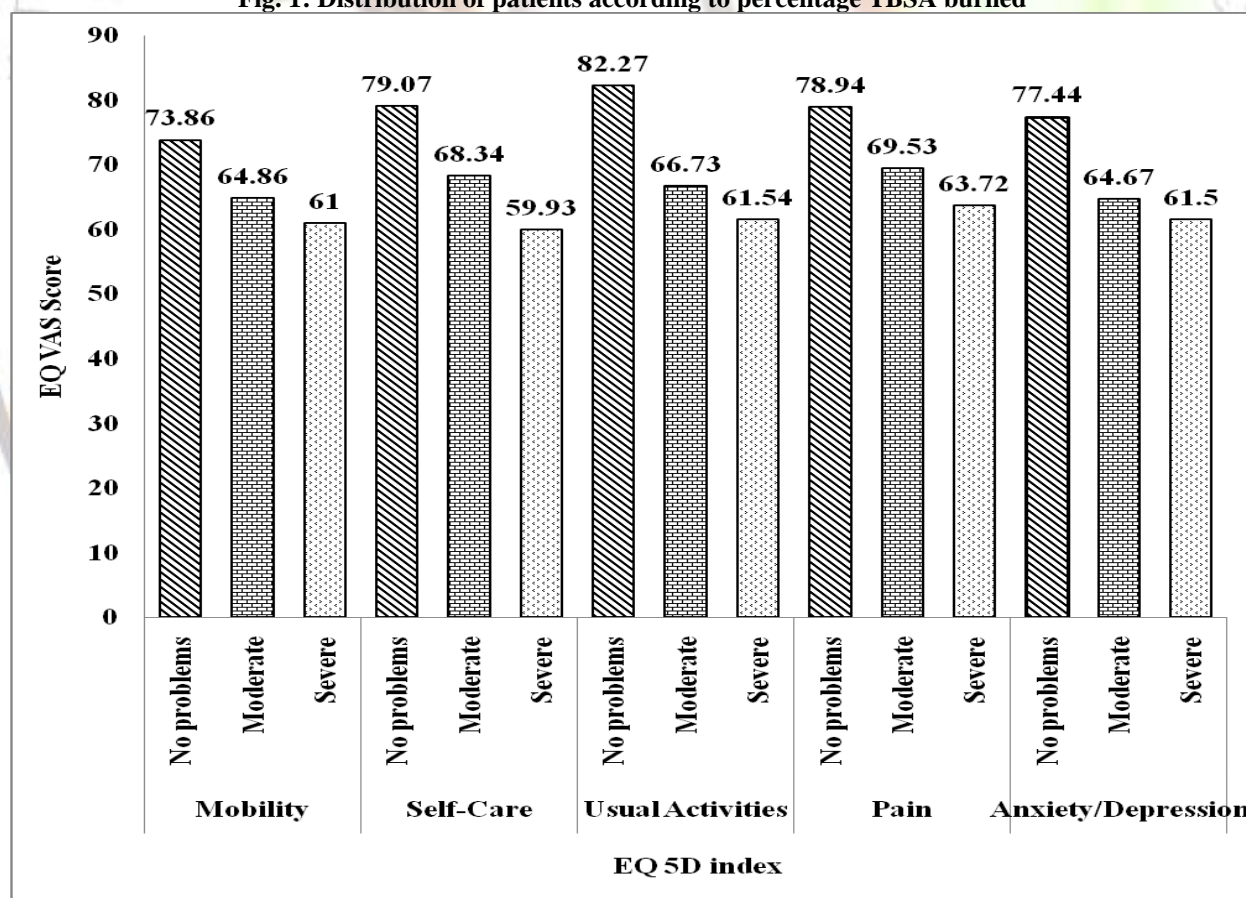


Fig. 2: EQ-VAS total scoring of study participants