ORIGINAL ARTICLE
HEALTH RELATED QUALITY OF LIFE AFTER BURNS: ARE WE REALLY TREATING BURNS?

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Background: During the last few decades management of burns has undergone positive revolutionary change. Today, over 50% of all patients with burns involving 80% of their total body-surface area can survive. Although the objective assessment by attending physician can well define a patient's degree of health, the patient's subjective perceptions and expectations that can influence burn survivors' experience of their life is much more important. **Methods:** Adult burn patients of both sexes admitted to burn unit with major burns either by size or site who required reconstruction for burn injury were the subjects of this study. The health related quality of life was assessed using SF-36v2®, questionnaire. **Results:** The mild to moderate pain complaint by 87 (88%) of all burn survivors, badly impact role physical and general health with resultant decrease in physical component summary. What was more difficult to explain was the decreased mental health which is evident soon after the incidence and persisted throughout the period of follow-up, showing statistically insignificant improvement when compared from basal score (p=0.008). Longitudinal decline in HRQoL had strong relationship with female sex, involvement of prime area, hospital admissions, hospital stay and sessions of surgery. Sex, occupation, involvement of prime area and hospital admissions, were the important predictors for decrease in physical component summary of burn survivors. Involvement of prime area and hospital admissions were important determinant for decrease in mental component summary. **Conclusion:** The level and quality of multidisciplinary rehabilitation that these victims needs is very low as compared to developed countries. These patients need long term professional, psychological, and social support.
Keywords: Quality of Life, Burn Survivors, Health related Quality of Life, subjective health

INTRODUCTION

It was in 1948 when World Health Organization defined health as 'not only the absence of disease and infirmity but also the presence of physical, mental, and social well-being'.[1] In clinical practice subject was conceptualised very slowly during last few decades, recently Health Related Quality of Life (HRQoL) have become more important in health research in general and particularly[2] in burn care, probably due to improved survival as result of intensive care.

During the last few decades management of burns has undergone revolutionary change due to multiple factors that include therapeutic developments like improved resuscitation phase with appropriate intravenous fluids, use of skin substitutes, intensive clinical monitoring, early tangential excision and grafting, advanced critical care and nutritional support, broad spectrum systemic/topical antibiotics and above all, development of multidisciplinary specialised burn centres. Today, over 50% of all patients with burns involving 80% of their total body-surface area can survive, and the survival rate may even be higher in adolescents and young adults.[3] However this decreased mortality is achieved at the price of prolong hospitalisation and repeated admissions, multiple reconstructive procedures, intensive physiotherapy and yet some residual morbidity either in the form of scarring, contracture, amputation, pain, or difficulties in psychological adjustment.[4] This mandates to determine long term effects of different clinical and surgical intervention upon life of the burn survivor. Consequent upon this scenario this is easy to understand when we see shift of focus of interest from preventing death to quality of life.[5] 'Health-related quality of life' refers to the physical, psychological, and social domains of health, seen as distinct areas that are influenced by a person's experiences, beliefs, expectations, and perceptions.[6] Each of these components can be measured both objectively and subjectively. Although the objective assessment by attending physician can well-define a patient's degree of health, the patient's subjective perceptions and expectations that can influence burn survivors' experience of their life is much more important. The quality of life can be assessed simply by asking one question, such as 'Please rate your quality of life or overall health on a scale from 1 to 10', it may provide general insight but 'overall health' will only vaguely defined and the quantity being measured too hazy to be interpreted more exactly.[7] It is therefore important that the questionnaires use to measure health related quality of life, must be valid, has reliability, and high responsiveness.[8]

The objective of this study was to evaluate the HRQoL in burn survivors in our set-up.

PATIENTS AND METHODS

This prospective study was conducted at Burn Unit Liaquat University Hospital from Jan 2008 to July 2010.

Adult burn patients of both sex admitted to burn unit with major burns either by size (affecting 20–40% Body Surface Area, BSA) or site (burns involving face, hands, perineum, joints) who required reconstruction for burn injury were the subject of this study. Patients having more than 40% BSA affected and those who had either minor, major or disarticulated amputation were excluded. The patients aged 60 or greater and those with any co-morbidity like hypertension, diabetes and arthritis were also excluded. Informed consent was obtained from all cases. These patients were managed as per protocol of the unit. These patients were followed regularly till all indicated surgical procedure(s) as well as physiotherapy concluded. All study subjects were interviewed thrice to assess the subjective HRQoL.

The health related quality of life was assessed using SF-36v2®. It was provided with Urdu version as well. The SF-36 provides a valid, subjective measure of physical and mental health and has recently been tested in Asian population.[9] The QualityMetric Health Outcomes™ scoring consist of 8 domains that include bodily pain (BP), vitality (VT), general health (GH), mental health (MH), physical function (PF), role physical (RP), role emotional (RE), and social function (SF); and two summary scales, Physical Component Summary (PCS) and Mental Component Summary (MCS). The SF score is product of these two summary scales. Subscales and the summary scores range from 0–100, with higher values representing better quality of life.

The baseline HRQoL was documented by asking patient to recall the health status before the incidence of burn and questionnaire filled within 5 days of admission. For all enrolled subjects after discharge from hospital, two follow up questionnaires were filled, first at 5 months and second at 6 months. By that time all patients had apparently recovered as all indicated surgical procedure(s) including physiotherapy had undertaken. At each time questionnaire was filled as interview with the patient.

The demographic and medical variables recorded, include age, sex, occupation, body surface area affected in percent, type (aetiology) of burn, prime area affected, hospital admissions, total hospital stay, and surgical procedure(s) performed.

During period of study 305 patients of burn were admitted, 174 patients fulfilled the inclusion criteria, 34 patients died due to severity of burn injury, while 18 were lost at 1st follow-up and another 23 patients did not report for 2nd follow-up. Data of 99 patients was available for analysis.

The data of survey forms entered into QualityMetric Health Outcomes™ Scoring Software 3.0 and exported to SPSS. The demographic variables were entered into SPSS. SF-36 scores for all 8 scale domains, two summary scales, and SF score collected soon after admission (basal) and on 1st and 2nd follow-up was entered. The continuous data was presented as mean/range and SD. As most of data appeared skewed, parametric test could not be applied[10] and even more so transformation could not solve this problem of non-normal distribution[11], the SF-36 score taken at 3 occasions were compared using non-parametric Wilcoxon signed ranks test. Due to the common problem of asphericity type of non-uniform error in repeated measures, within subjects and between subjects effects of different independent variables on SF scoring were analysed by general linear model repeated measures (multivariate analysis); for the purpose all independent variables were entered into the model as factors. The continuous independent variables were converted into string value and $p<0.05$ was considered statistically significant. To determine which independent variable can predict change in HRQoL, stepwise multiple linear regression analyses was performed. Physical Component Summary (PCS) and Mental Component Summary (MCS) score on 1st and 2nd follow-up were considered as dependent variable.

RESULTS

The age range of patients was 19–57 years (mean 30.45 years). Male were 67 and female were 32. The mean BSA affected was 18.73%, (4.50–37.50%). In 62 patients injury was from flame, in 27 from scald, in 6 from electricity, and in 4 cases burns from chemicals. The occupations of the patients are shown in Table-1.

Table-1: Occupation status of the subjects (n=99)

Occupation	Frequency	Percentage
Un-employed	9	9.1
Office Job	10	10.1
Student	16	16.2
Farmer	19	19.2
Manual worker	10	10.1
Technical Job	6	6.1
Household	22	22.2
Land Lord	4	4.0
Employer-Executive	3	3.0
Total	99	100

The prime areas (face, hands, perineum, joints either alone or in combination) were involved in 47 cases (32 male and 15 female). All patients with or without involvement of prime area had reconstructive surgery done for their burn injury either in the form of partial/full thickness skin graft, local skin flap or revision surgery. Majority (46.46%) of patients had one session, while 25.25% patients had three sessions of surgery. Two sessions were performed in 8.08% cases and more than three sessions were done in 20.20% cases. Due to same reasons 53 (53.53%) patients needed repeated admissions/hospitalisation. Twenty-six patients were admitted twice, 21 thrice, while 6 patients were admitted four times for corrective/revision surgeries (Table-2).

Table-2: Frequency of Hospital Admission(s)

Hospital admission	Frequency	percentage
Once	46	46.5
Twice	26	26.3
Thrice	21	21.2
Four times	6	6.1

The repeated admissions resulted in overall prolong hospital stay with mean hospital stay of 35 days and a range of 12–88 days. Table-3 shows comparisons of 8 domains, and MCS and PCS. As evident all patients partially recovered physically and emotionally (±2 SD to basal score) with excellent vitality. However improvement in mean scores lag far behind with respect to general health, social functioning and mental health, difference is greater than 2 SD.

Table-3: Summary of SF score

Domain	Basal Mean (SD)	2nd Follow-Up Mean (SD)	p-Value*
Physical Function	94.09(5.169)	74.95 (6.757)	<0.001
Role Physical	59.95 (16.107)	37.83 (13.07)	<0.001
Body Pain	100 (0.00)	83.83 (8.235)	<0.001
General Health	74.75 (23.281)	56.75 (10.53)	<0.001
Vitality	100 (0.00)	100 (0.00)	1.00
Social Functioning	80.99 (15.238)	68.80 (22.83)	<0.001
Role Emotional	50.24 (4.951)	78.59 (6.498)	<0.001
Mental Health	37.13 (9.84)	32.93 (12.227)	0.008
PCS	83.46(2.111)	58.14(9.789)	<0.001
MCS	77.47(2.819)	46.64(8.995)	<0.001
SF	85.20(1.857)	56.11(8.536)	<0.001

*Wilcoxon signed ranks test

Physical component summary, mental component summary and SF score obtained soon after admission when compared with those at 1st and 2nd follow-up with Wilcoxon Signed Ranks Test showed statistically significant difference (Table-4). All patients showed improvement in their score, but failed to achieve score as before incidence with variability in SD.

Table-4: Comparison of summary scales and SF Score

	Mean	SD	Z	p-Value b
PCS (Basal)	83.48	2.111	-	-
PCS 1st Follow-Up	40.61	9.214	-	-
PCS 2nd Follow-up	58.14	9.789	-	-
PCS*PCS 1st Follow-up	-	-	-8.641a	<0.001
PCS*PCS 2nd Follow-up	-	-	-8.640a	<0.001
MCS (Basal)	77.47	2.819	-	-
MCS 1st Follow-up	34.38	8.386	-	-
MCS 2nd Follow-up	46.64	8.995	-	-
MCS*MCS 1st Follow-up	-	-	-8.641a	<0.001
MCS*MCS 2nd Follow-up	-	-	-8.640a	<0.001
SF Score (Basal)	85.20	1.857	-	-
SF Score 1st Follow-up	39.99	8.399	-	-
SF Score 2nd Follow-up	56.11	8.536	-	-
SF Score*SF 1st Follow-up	-	-	-8.641a	<0.001
SF Score*SF 2nf Follow-up	-	-	-8.641a	<0.001

a. Based on positive ranks. b. Wilcoxon Signed Ranks Test

Despite every possible measure taken to correct deformity, these patients failed to attain their basal score. We therefore analysed factor(s) responsible for this declined within and between subjects by using general

linear model repeated measures (multivariate analysis) and SF score recorded on three occasions were entered as dependent variables. The factors assessed include age, sex, aetiology, body surface area burn, prime area involvement, occupation, hospital admission, hospital stay and session(s) of surgery. The factor responsible for statistically significant longitudinal change in SF score includes involvement of prime area, hospital admissions, hospital stay, sessions of surgery and female sex. On the other hand the contribution of age, BSA%, aetiology of burn and occupation for reduced SF score was statistically insignificant (Table-5).

Table-5: SF score versus Independent Variables (Multivariate Analysis)

SF Score	p-value (within subject)	p-value (between subject)
SF Score*Sex	0.208	0.058
SF Score*Age	0.572	0.878
SF Score*BSA%	0.213	0.394
SF Score*Aetiology	0.356	0.154
SF Score*Occupation	0.405	0.386
SF Score*Prime area	<0.001	<0.001
SF Score*Hospital Admission(s)	<0.001	<0.001
SF Score* Hospital Stay	<0.001	<0.001
SF Score* Sessions of Surgery	<0.001	<0.001

We performed stepwise multiple linear regression analyses to find out independent variable(s) that can predict change in physical and mental component scores (MCS, PCS) and SF score recorded on 2nd follow-up. The results are shown in Table-6.

Table-6: Predictive Models for Summary Scales and SF Score

SFScore	Beta	t	p
Sex*PCS 2nd follow-up	-0.268	-2.507	0.014
Sex*MCS 2nd follow-up	-0.207	-1.907	0.060
Sex*SF score 2nd follow-up	-0.256	-2.396	0.019
Age*PCS 2nd follow-up	-0.163	-1.555	0.123
Age*MCS 2nd follow-up	-0.118	-1.112	0.269
Age*SF score 2nd follow-up	-0.138	-1.324	0.189
Occupation *PCS 2nd follow-up	0.240	2.213	0.029
Occupation *MCS 2nd follow-up	0.204	1.864	0.065
Occupation*SF score 2nd follow-up	0.234	2.167	0.033
Aetiology*PCS 2nd follow-up	-0.124	-1.005	0.317
Aetiology*MCS 2nd follow-up	-0.061	-0.490	0.625
Aetiology*SF score 2nd follow-up	-0.102	-0.825	0.411
BSA%*PCS 2nd follow-up	0.025	0.203	0.840
BSA%*MCS 2nd follow-up	0.128	1.027	0.307
BSA%*SF score 2nd follow-up	0.116	0.945	0.347
Prime area affected*PCS 2nd follow-up	0.421	2.564	0.012
Prime area affected*MCS 2nd follow-up	0.379	2.740	0.007
Prime area affected*SF score 2nd follow-up	0.438	3.021	0.003
Hospital admission*PCS 2nd follow-up	-0.706	-1.917	0.058
Hospital admission*MCS 2nd follow-up	-0.673	-2.169	0.033
Hospital admission*SF score 2nd follow-up	-0.816	-2.508	0.014
Hospital stay*SF score 2nd follow-up	0.271	1.287	0.201
Hospital stay*PCS 2nd follow-up	0.236	0.992	0.324
Hospital stay*MCS 2nd follow-up	0.276	1.378	0.171
Surgery*PCS 2nd follow-up	0.375	1.345	0.182
Surgery*MCS 2nd follow-up	0.068	0.290	0.773
Surgery*SF score 2nd follow-up	0.326	1.323	0.189

DISCUSSION

There are many factors that make life after burns almost a chronic condition, these includes adjustment with new body image[12], scarring, variable physical impairment and readjustment into social life that can persist for decades[13] making quality of life a genuine issue[14] that necessitate frequent assessment of health related quality of life. In contrast to Anzarut et al[15] who reported good quality of life among burn survivors, the results of this study showed that subjective HRQoL was compromised among all patients. This poor quality of life encompasses not only the physical health but also affects the mental health. The physical component summary of SF score was found significantly decreased at 1st follow-up (mean time 5 months after discharge from hospital) along with all other domain when compared to basal reference value. On retest almost all domains improved when compared to first test, yet burn survivors could not attain their (health related) HRQoL as was before the incidence. The physical health in SF scoring depends primarily on physical functioning, role physical, body pain, and general health. The pain complains (mild to moderate) by 88% of all burn survivors in this series is almost identical to study by Vittorio Pavoni et al[16] who reported 79% but in contrast to 47% reported by Shakespeare[17]. The probable explanation for this variation may be that Shakespeare only studied cases with less than 20% BSA while Vittorio studied cases with BSA up to 40%, we studied cases of burn with up to 37.50% 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 component summary. Long term follow-up with appropriate rehabilitation is necessary to evaluate this factor.

What is more difficult to explain is the decreased mental health which is evident soon after the incidence and persisted throughout the period of rehabilitation showing statistically insignificant improvement. The SF 36 being generic questionnaire reports general psychological disturbances[18] and therefore cannot be expected to reveal specific diagnosis, yet the finding is similar to other studies that have reported high prevalence of anxiety, depression and post-traumatic stress disorders[10, 20]. Although it has been suggested that to address this problem long term follow-up is necessary[21], on the other hand it has recently been shown that new body image is the single most important factor that determines mental/psychological health not only in short term[22], but also after the long follow-up.[23,24] This may partially explain decreased mental health

found in this series of patients as prime areas were affected in 47% of cases.

The results of multivariate analysis showed that longitudinal declined in HRQoL has strong relationship with female sex, involvement of prime area like face, hospital admissions, hospital stay, and sessions of surgery. All SF domains were more decreased in female; the declined physical component summery for female may partially be explained by their weaker physique. We found more marked impairment of mental health in women compared to men, a finding identical to that reported by Van Loey[19] and Novelli[21]. Failure to cope with active social life, household work load, and more concern about disfigurement has led to mental exhaustion and therefore less favourable recovery of mental health. Further, in either sex prolonged hospital stay consequent upon repeated admissions undertaken for reconstructive surgery to correct deformity, badly affects HRQoL in burn victims, suggesting that steps must be taken to shorten hospital stay and reconstructive surgery performed in one setting whenever feasible. On the other hand factors used for objective assessment of severity of burns like age of the patient and BSA% affected[25], aetiology of burn, and occupation showed no relationship with HRQoL and therefore subjective perception of HRQoL with respect to physical as well as mental health in burn survivors is independent of burn severity indices.

The results of linear regression showed that sex, occupation, involvement of prime area and hospital admissions, are the important predictors for decrease in physical component summary of burn survivors while involvement of prime area and hospital admissions are important determinant for decreased in mental component summary. The return to work was not the variable of interest in this study however the failure to return to work or work as to pre-burn status as predictor of poor HRQoL in this model is consistent with other studies.[26,27]

The analysis of SF score on 2nd follow-up showed that female sex of patient, occupation, involvement of prime area, and repeated hospital admissions can predict poor quality of life among burn survivors. If HRQoL with respect to physical health is to be improve then, female patients with burn, patients engaged in job demanding use of hands and joints, and those with involvement of prime area must be prioritised and hospital admissions be reduced to minimum as it will help us to improve the mental health as well, with consequent improvement in overall HRQoL.

The prevalence of accidental as well as self inflicted burn[28] has tremendously increased in our country and many burn centres are providing acute

care to burn victims. However the level and quality of multidisciplinary rehabilitation that these victims need is very low as compared to developed countries.

CONCLUSION

The burn survivors need long term professional, psychological, and social support, if HRQoL is to be improved.

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