



A Study of the Health-related Quality of Life in Injured Patients Three Years after ICU Hospitalization

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Abstract

Introduction: Health-related quality of life (HRQOL) considerably decreases after injured. This study aimed to assess and compare the quality of life during a three years' period after injury and hospital stay among the injured patients admitted in an Intensive Care Unit (ICU) for 24 hours at least with non-ICU injured patients as the control group.

Methods: In this cross-sectional study, 204 injured patients treated by the injured team of Shahid Rajae Injured Center of Shiraz, Iran, were evaluated from January 2019 to December 2020. HRQOL was measured using the Medical Outcomes Study Short Form 36 (SF-36). Patients were called and asked to answer the SF-36 questionnaire according to the current condition. SPSS was used to analyze the data.

Results: The mean age of the ICU and non-ICU patients was 34.34 and 37.68 years, respectively. The majority of patients in both ICU and non-ICU groups were male (83.5%, 88.1%) and under 60 years of age (91.3%, 92.1%). The injury severity score (ISS) was marked as critical in 66.99% of ICU patients. The mean SF-36 scores in ICU patients were lower than the similar indices in non-ICU patients in all dimensions ($P < 0.001$) Except for social functioning, a non-significant difference was observed between the ICU and non-ICU patients for only two subscales.

Conclusion: Health-related quality of life among the patients with sustained severe injuries who were admitted to ICU decreased considerably after three years follow up. Given that certain factors can help identify patients in need of sufficient pain management, adequate information can help injury specialist teams for follow-ups.

Keywords: Injury, Life quality, Intensive care units, Health-related quality of life, Quality of life, ICU, SF-36

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Introduction

Injury is the leading first cause of death and disability for both women and men among 15 - 49 years old in Iran (1, 2). Although improvements in injury prevention and hospital care have increased the survival rate in the last decades, the growing cost of health systems has made the outcome an eminent factor in assessing the balance between the costs and benefits of treatment (3, 4). Survival and quality of life are two main goals of the injured care. In early injured outcome studies, physical function and survival rate were the major investigated criteria. However, a multi-perspective study of outcomes using self-report questionnaires provides a comprehensive approach for such analyses. With the advances in the injured management during recent years and increased survival rate of patients, the long term outcome of these cares and new services on the patients' health-related quality of life (HRQOL) has drawn much

more attention (5). Several studies have demonstrated that compared to pre-trauma status and also general population, HRQOL decreases significantly in patients after injury (6-8). Given that most of similar studies are devoted to target HRQOL in patients with specified injuries, especially those who suffer from severe and serious ones, documentation regarding the impact of mixed types of injury with a broad range of severity may help to better understand the impact of different contributing factors to HRQOL (9-11). Besides, optimized and early-stage post-trauma treatment and rehabilitation are possible if there is only a clear view of the factors influencing HRQOL after injury. Predicting factors of HRQOL that have been reported in the literature can be categorized into three phases: pre-injury, injury, and post-injury. Previous studies have indicated the following characteristics as predictors of a high HRQOL after injury: male gender (12, 13), lower age (14, 15), lower

number of injuries, lower injury severity score (ISS), shorter duration of hospital stay, lack of admission in the ICU (16, 17), and lack of any pre-existing diseases (18, 19). Although several retrospective and prospective studies have shown that quality of life decreases after ICU stay, only few have compared the HRQOL in ICU and non-ICU patients (20, 21). Thus, more studies may clarify whether ICU stay plays an important role in the consequent burden of injury. The main aim of the present study was to evaluate the outcome and HRQOL 3 years after injury in a population hospitalized and treated in the ICU at a regional trauma center in Shiraz and compare it with injured patients who did not require intensive-care treatment.

Materials and Methods

Study Population, Data Source and Procedures

In this cross-sectional study, data of 204 injured patients categorized into two groups of ICU (n=103) and non-ICU (n=101) cases with different types of injuries who were admitted to Shahid Rajaei Trauma Center of Shiraz, Iran, from January 2019 to December 2020 were evaluated. This hospital is a trauma referral center for Southern Iran and serves a population of approximately 4 million people. Patients are transferred to this center only if the specialized trauma cares and services are not available at local hospitals (22). All eligible ICU patients for inclusion referred to the trauma team were over 18 years old and were hospitalized for 24 hours at least. The exclusion criteria were patients without complete hospital records, cognitively impaired patients who were unable to fill out a questionnaire, did not consent to participate in this study, died, could not speak Persian well enough to participate, had an unknown phone number or address, and also those referred due to intentional self-harm and self-inflicted injuries. Hence, initially 401 patients (300 ICU patients and 101 non-ICU patients) were selected. Eligible patients received written information regarding the study and gave their informed consent. Then, they were called to answer the questions in the SF-36 questionnaires according to their current health status through telephone contact. Finally, 204 cases (103 ICU patients and 101 non-ICU patients) completed the study.

Measures and Definitions

The Persian translation of SF-36, which has been previously validated in Iranian cases, was used to measure the HRQOL (23). The SF-36 is a generic 36-item questionnaire, which consists of eight

dimensions with equal weight questions directly transformed into a 0-100 scale. The higher the score, the less the disability; thus, a score of 100 is equivalent to no disability. Each scale is on the assumption that each question carries equal weight. The eight sections are on mental health (five question), vitality (four question), physical functioning (ten question), bodily pain (two question), general health (five question), role-physical (four question), role-emotional (three question), and social functioning (two question) (24).

Injury Severity Score (ISS) was calculated based on diagnosis on medical records, a prominent index in trauma monitoring and evaluating that has been regarded as the “gold standard” in injury severity grading (25, 26). To represent an overall indicator for the body injuries, the ISS system, which yields scores from 1 to 75, calculates the highest severity code in each of the three most severely injured ISS body regions, squares each one, and then adds the three squared numbers (27).

Glasgow Coma Scale (GCS), based on three different behavioral responses: motor, verbal, and eye reactions, was used to measure the level of consciousness at the time of admission to hospital. The GCS is scored from 3 (deep unconsciousness or dead) to 15 (fully awake) (28). Acute Physiology and Chronic Health Evaluation (APACHE) IV is a severity-of-disease classification system. Based on several measurements, an integer score from 0 to 100 is applied within 24 hours of admission of a patient to ICU; higher scores indicate more severe disease and a higher risk of mortality (29). Acute Physiology Score (APS) is another severity of disease classification system optimized for comparing the patients with different diseases (30).

After collecting and reviewing data from the patients' records, information on demographics, injury diagnosis, cause of injury, treatments, and patient outcomes were obtained from the trauma medical records during hospitalization in Shahid Rajaei Hospital. On the other hand, quality of life data were collected using an interview with patients and other data were collected from the medical records. Scores on each dimension were compared between ICU and non-ICU patients. Data were collected and presented as mean and standard deviation. Statistical analyses were performed using SPSS software (version 15). T-test and Chi-square test were used to compare the two groups. Statistical significance was considered at $P < 0.05$. The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences, Iran (Approval ID: IR.SUUMS.AC.1392.3874).

Results

Demographic and Clinical Characteristics

Of 204 patients aged between 18-80 whose hospital records were evaluated in this study, 103 were in need of ICU care. The majority of patients in both groups were male and under 60 years of age; hence, there were no significant differences between the two groups regarding age and sex ($P>0.05$) (Table 1). Injury characteristics and medical history variables of ICU patients are also depicted (Table 2).

Length of special treatment procedures and classification of patients' severity of injury according to Injury Severity Score (ISS), Acute Physiology and Chronic Health Evaluation (APACHE) IV and Acute Physiology Score (APS) are shown in Table 3.

The mean SF-36 scores in ICU patients were lower than the similar indices in non-ICU patients in all other nine domains, except for social functioning (Table 4). A significant difference was observed between the two groups in eight domains.

Discussion

The main finding demonstrated that patients who were severely injured with diverse degrees of injury had decreased quality of life after 3 years; the mean scores for all subscales of HRQOL were improved in non-ICU patients than those in the ICU group. This result is also consistent with the findings of previous studies; a one year follow-up of injured patients which evaluated HRQOL in patients with longer than 24 hours of ICU stay showed a significant improvement in the 3rd to 12th month interval (31). Moreover, other previous trauma outcome research reports in the literature confirm the results of this study. In a study by Eddleston et al. on 143 out of 370 patients admitted in the ICU ward who had survived 3 months after discharge, morbidity, mortality and quality of life were assessed during a one-year period of time. Eighty percent of patients reported satisfaction with their quality of life. This study results are similar to those of a previous study in which patients had low

Table 1: Comparison of demographic variables of ICU and non-ICU patients, namely age and sex

Demographic variables	ICU patients (n=103)	Non-ICU patients (n=101)	P value
Sex	Male	86 (83.5%)	0.19
	Female	17 (16.5%)	
Age (Mean±SD)	34.34±14.65 (year)	37.68±13.34 (year)	P<0.0001
Age	<60	94 (91.3%)	P<0.0001
	≥60	9 (8.7%)	

Table 2: Characteristics of injury and medical history variables of ICU patients

Variable	Yes	No
Multiple trauma	100 (97.10%)	3 (2.90%)
Mechanical ventilation	84 (81.60%)	19 (18.40%)
Neurosurgery	89 (86.40%)	14 (13.60%)
Alive after ICU	99 (96.10%)	4 (3.90%)
Hypertension	13 (12.60%)	90 (87.40%)
Diabetes mellitus	2 (1.90%)	101 (98.10%)
Opium	18 (17.50%)	85 (82.50%)
Cigarette smoking	45 (43.70%)	58 (56.30%)

Table 3: Clinical variables of ICU and non-ICU patients

Clinical Variables	ICU patients (n=103)
Injury Severity	
Serious (ISS 9-15)	4 (3.88%)
Severe (ISS 16-24)	30 (29.12%)
Critical (ISS > 24)	69 (66.99%)
APS (mean±SD)	54.00±17.12
APACHE IV (mean±SD)	56.14±18.08
GCS at arrival (mean±SD)	7.22±2.42
Length of treatment	
Mechanical ventilation days (mean±SD)	5.20±5.10
ICU days (mean±SD)	20.26±15.27
Hospital days (mean±SD)	10.77±8.68

Table 4: Comparison of SF-36 (Mean±SD) Scores between ICU and non-ICU patients

SF-36 Scores	ICU patients (n=103)	Non-ICU patients (n=101)	P value
Physical functioning	78.14±20.94	89.16±11.43	P<0.001*
Role Physical	74.15±23.82	83.41±19.45	0.006*
Bodily Pain	48.18±17.30	38.52±16.52	P<0.001*
General Health	62.79±7.23	63.20±6.76	0.638
Vitality	65.30±6.42	67.63±18.17	0.073
Social Functioning	62.13±10.35	60.89±15.88	0.040*
Role Emotional	75.74±23.89	91.71±17.18	P<0.001*
Mental Health	62.12±6.17	71.12±10.04	P<0.001*
PCS ^a	50.63±6.48	52.84±5.72	0.004*
MCS ^b	45.51±3.58	48.53±4.64	P<0.001*

*P value<0.05 is considered as statistically significant. **Lower means than non-ICU patients; ^aPhysical Component Summary; ^bMental Component Summary

incidence of ICU-related psychological illness after 3 months, high levels of fatigue, sleep disturbance and poor concentration; however, all three symptoms improved within the last 9 months (32). A prospective longitudinal cohort study in UK assessed the quality of life from the period before ICU admission till five years after ICU discharge in 205 patients who participated in a survey 5 years after major trauma. In spite of the decrease in mean SF-36 physical scores, mental scores were similar to those of normal population. This study concluded that, with the lower quality of life after five years in patients admitted in ICU, critical illnesses associated with ICU admission should be supported with ongoing health care (33).

There were some limitations in the present study. The subjects were recruited from one trauma center in the south of Iran. Besides, with a participation rate of 34% for the eligible ICU patients, the extent of generalizing the results to the whole trauma population is limited. This low response rate might partly be caused by being exhausted due to mental or physical burdens that prevented answering an extensive questionnaire. A higher response rate would be achieved in case of using a shorter questionnaire. Confounding elements in the pre-trauma phase, such as employment status, social support, personality traits, income, race, morbidity, and alcohol and substance abuse were not included in this study, and these factors could have influenced the result.

Conclusion

Based on this study results, it can be concluded that health-related quality of life decreased in severely injured patients followed for three years. In comparison to ICU patients, the HRQOL in nine dimensions of SF-36 were lower than the control non-ICU population of our sample. Finally, providing adequate information and long-term follow-up of trauma patients can oblige health professionals by

identifying patients that require additional help and support after discharge from acute care medical centers.

Conflict of Interest: None declared.

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