

Original Article

Changes in the health status and functional outcomes in acute traumatic hand injury patients, during physical therapy treatment

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ABSTRACT

Introduction: Traumatic hand injury causes chronic disability. A large number of studies have reported impairments in clinical parameters, but few studies have described their disability experience. **Aims** To examine the functional disability and quality of life in traumatic hand injured patients receiving physical therapy. **Settings and Design:** The physiotherapy department in a multi-specialty public sector hospital. Convenient sampling method was used. **Materials and Methods:** The 36-item short-form health survey–MOS (SF-36, v2) and disabilities of arm, shoulder and hand (DASH) questionnaire were obtained and subjects were given physiotherapy, accordingly to their condition. Questionnaires were re-administered every month till discharge. **Statistical Analysis Used:** A One-way ANOVA test. **Results:** At end of 6 months, among eight subscales of SF-36, there is improvement in mean scores of physical functioning (39.1%). The bodily pain, general health, vitality, social function, and mental health had more than 100% improvement. DASH showed regression in disability (50.8%). **Conclusions:** Measuring quality of life (QOL) can provide detailed assessment of physical disability and treatment effects as well as the global impact of those effects on the person's daily life. Hence, the use of self-report questionnaires such as DASH and SF-36, combined with physical performance score, helps to achieve more comprehensive evaluation of outcome.

KEY WORDS

Disability; hand injury; quality of life

INTRODUCTION

Hand is one of the commonly injured parts of the body. A severe injury may have physical, psychological, social and

economical implications with long-term consequences.^[1] Quality of life (QOL) is important for the patients who may need to adapt to chronic disability. Measuring QOL can provide a detailed assessment of physical disability and treatment effects as well as the global impact of those effects on the person's daily life. Traditional treatment has focused on physical aspects of recovery, but a more holistic approach is needed.

MATERIALS AND METHODS

Fifty patients who were referred to physiotherapy

Access this article online	
Quick Response Code:	Website: www.ijps.org
	DOI: 10.4103/0970-0358.85358

department because he/she had experienced acute traumatic hand injury/surgery or both were conveniently selected. Patients who had significant secondary problems involving central nervous system and or cardio-vascular system or those who had associated lower limb injuries and the presence of any significant cognitive, hearing or visual impairment that will hamper understanding and reporting of questionnaires were excluded from the study.

The questionnaires used were medical outcomes study 36-item short-form health survey– MOS (SF-36, V2) standard. The short form 36 (SF-36) questionnaires is a widely used general health outcome measure with eight sub-scales that portray various domains of health. These sub-scales are scored out of a maximum score of 100, where higher scores indicate better health and wellbeing.^[2] The disabilities of arm, shoulder and hand (DASH) questionnaire is a standardized regional outcome measure that captures upper extremity disability from the perspective of the patient and is used to study clinical outcome in musculoskeletal disorders. The dash has been shown to be a reliable, valid and responsive tool for evaluating both proximal and distal disorders, confirming its usefulness across the whole extremity. (Solway 2002, p 63; Beaton, 2001, p 128).^[3]

The study was conducted in physiotherapy outpatient department in a multi-specialty public sector hospital. Ethics committee permission was obtained prior to the initiation of study. All hand trauma patients referred to the physiotherapy department were requested to participate in the study. After verbal consent, screening of exclusion criteria was done. Selected patients signed the informed consent form. The demographical data and physical examination were taken. The questionnaires were answered on an interview basis and subjects were given individualized physiotherapy intervention, according to their condition. Patients were re-evaluated and questionnaires were re-administered at every month till they were discharged.

DATA ANALYSIS

The changes in the mean score of SF-36 sub-scales and DASH were calculated between baseline and each month follow-up till they were discharged. Only 6 months follow up data were taken for statistical analysis, as was common for all the patients. A one-way ANOVA test was used to

determine whether the mean score was statistically significant between the baseline and consecutive follow-up. All tests with a *P*-value of less than 0.05 were considered to be statistically significant.

RESULTS

Socio-demographic characteristics

The age of patients ranged from 19 to 40 years (mean 27.6 ± 5.47 years). This finding is consistent with other studies where young males in the age group of 15–30 were more affected. In our study the males (84%) outnumbered females (16%). There were 34 right-hand injured (68%) and 16 left-hand injured (32%) patients. The dominant hand was injured in 45 cases (90%) whereas non-dominant was injured only in five cases (10%).

Out of total 50 patients, majority were flexor tendon injuries (44%), while crush hand, colles fracture, tendon injuries with distal neurovascular deficit were also there. [Table 1].

OUTCOME

In this study, among SF-36 subscales, the mean physical functioning (PF) score had statistically significant increase at the end of the second month (4.6%), fifth (12.0%) and sixth month (39.1%) [Figure 1].

The mean role limitation – Physical (RP) score had statistically significant increase after physiotherapy at the end of third month (26.1%), fifth (89.1%) and sixth month (139.3%) [Figure 2].

The mean bodily pain (BP) score had statistically significant increase after physiotherapy at the end of

Table 1: Profile of diagnosis

Diagnosis	No. of cases (N = 50)	Percentage (%)
Flexor tendon injury(FTI)	22	44.0
Extensor tendon injury(ETI)	09	18.0
Crush injury	05	10.0
Hand injury	04	08.0
Colles fracture	03	06.0
Colles fracture +distal neurovascular deficit (DNVD)	01	02.0
ETI +DNVD	01	02.0
FTI+ complex regional pain syndrome	01	02.0
FTI+DNVD	03	06.0
Re-implanted hand	01	02.0

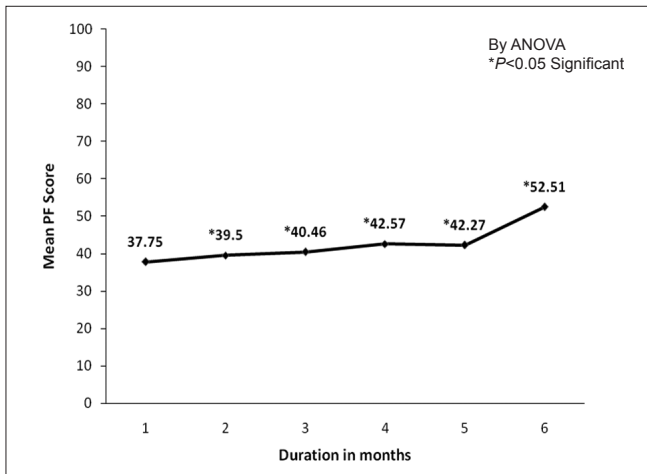


Figure 1: Changes in mean physical functioning (PF) score after the treatment

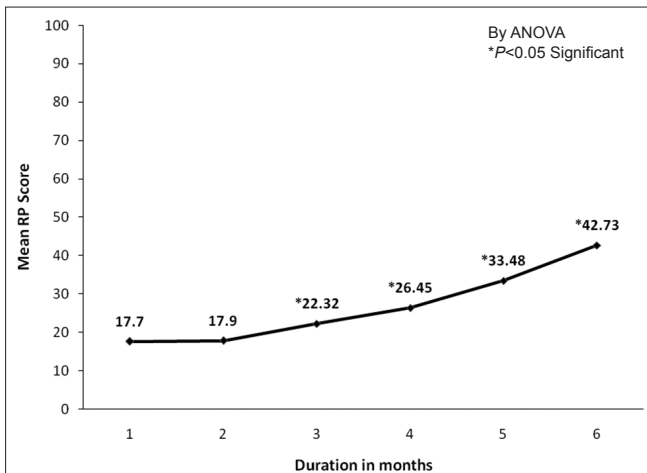


Figure 2: Changes in mean role limitation – physical (RP) score after the treatment

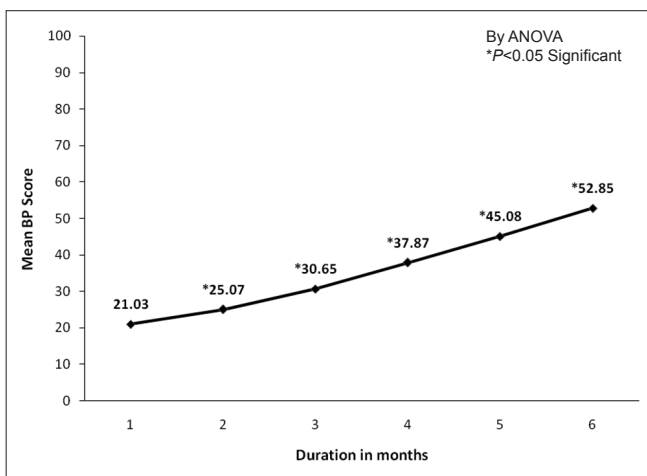


Figure 3: Changes in the mean bodily pain (BP) score after the treatment

second month (19.2%), fifth and sixth month (more than 100%) respectively. [Figure 3].

The mean general health (GH) score had statistically significant increase after physiotherapy at the end of second month (11.0%), fifth (66.8%) and sixth month (90.1%) [Figure 4].

The average vitality (VT) score had statistically significant increase at the end of second month (35.8%), fifth and sixth month (more than 100%), respectively [Figure 5].

The social functioning (SF) score had statistically significant increase at the end of second month (41.3%), fifth and sixth month (more than 100%), respectively [Figure 6].

The role limitation –emotional (RE) score had statistically significant increase at the end of second month (42.7%), fifth and sixth month (more than 100%), respectively. [Figure 7].

The mean mental health (MH) score had statistically significant increase after physiotherapy at the end of second month (60.9%), fifth and sixth month (more than 100%), respectively [Figure 8].

The average DASH score had a significant decrease at end of second month (5.6%), fifth (33.0%) and sixth month (50.8%), which were also statistically significant [Figure 9]

DISCUSSION

Socio-demographic characteristics

Age and sex are important epidemiological determinants for hand injuries. This study revealed that majority of cases was aged between 19–40 years. This finding is consistent with other studies where young males in the age group of 15–30 were more affected.^[4] In our study, the males (84%) outnumbered females (16%). This variation may be due to cultural and/or employment differences.^[5] In our culture, males dominate in industrial setups and so they are more prone to accidental industrial injuries. In the study, majority of patients were manual labourers and had accidental industrial injuries mostly in glass and plastic manufacturing companies. The mechanism of injury in our patients was majority sharp cut injury ($n=36$) and few were crush injury ($n=5$).

Injured hand

The right hand was injured in 34 patients (68%), the left hand injured in 16 patients (32%), dominant hand in the study was more commonly involved, whether they were

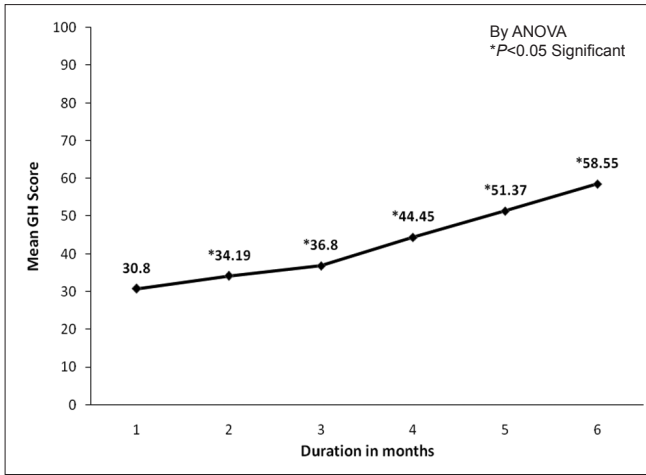


Figure 4: Changes in the mean general health (GH) perceptions score after the treatment

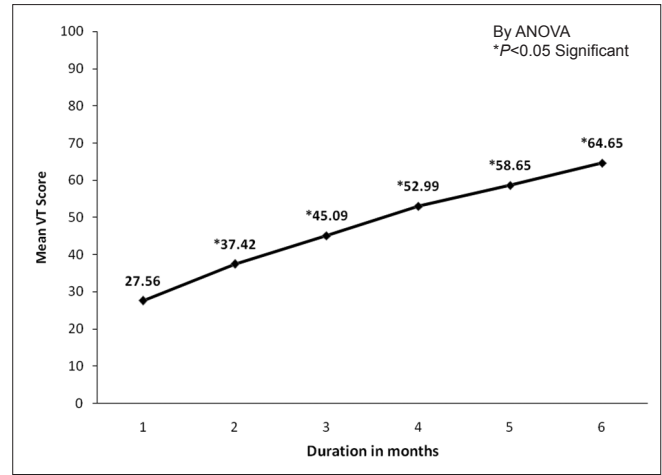


Figure 5: Changes in the mean vitality (VT) score after the treatment

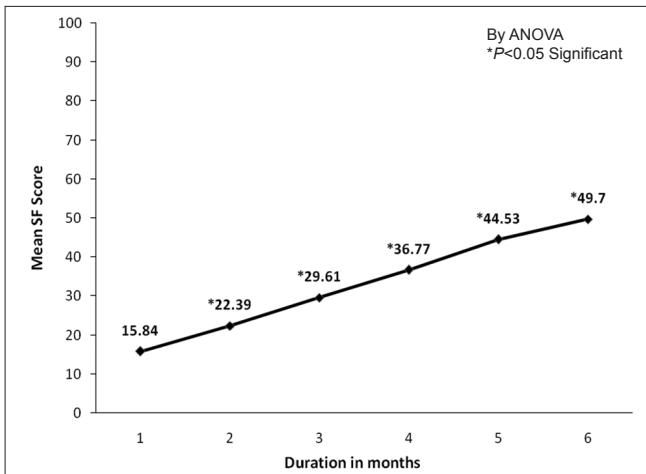


Figure 6: Changes in the mean social functioning (SF) score after the treatment

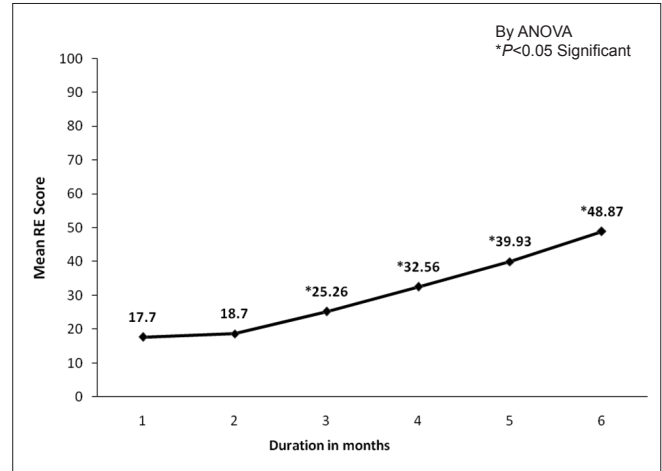


Figure 7: Changes in mean role limitations emotional (RE) score after the treatment

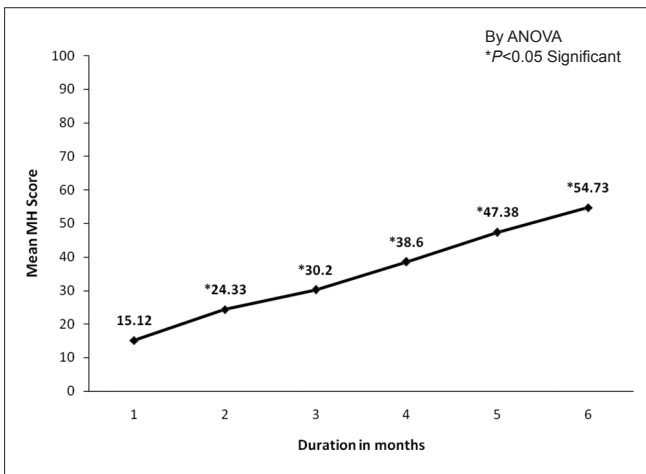


Figure 8: Changes in the mean mental health (MH) score after the treatment

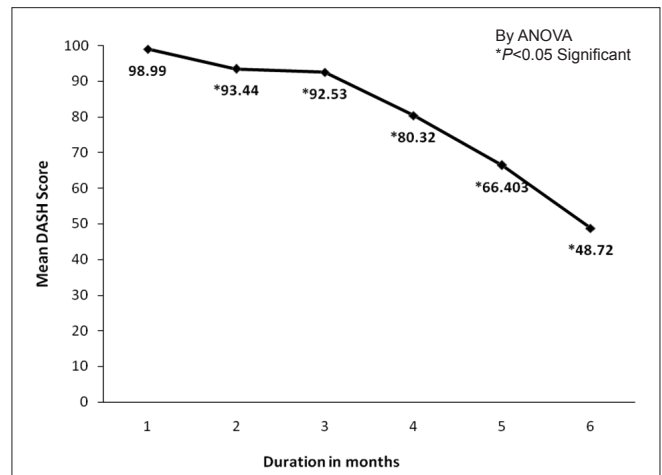


Figure 9: Changes in the mean dash score after the treatment

right- or left- dominant people. This result is similar to other studies performed and maybe because one is more

likely to injure the hand that is used most frequently used.^[6] The dominant hand was the right hand in 48

patients (98%) and the left hand in two patients (2%). The non-dominant hand primarily functions in term of stabilization and positioning whereas the dominant hand has a more active role and so is more prone to injury.^[7]

Majority of patients in this study were tendon injuries who were surgically treated with modified Kessler's technique and were given dorsal blocking splint for flexor tendon injuries and volar blocking splint in extensor tendon injuries, respectively. All the subjects were given hand therapy according to their functional need. The protocol of supervised controlled passive mobilisation was used for tendon injury. Examples of modalities used were active and passive mobilization, splinting for positioning and improving range of motion (ROM), ultrasound, a desensitization program, and sensory re-education.

In the past, the focus of outcome has been impairment based (e.g., radiographic data, strength, and range of motion). However, studies have shown that impairment is not necessarily the best method to measure outcome as it does not always reflect activity and or participation restrictions. So we measured health by self-report questionnaires. Subjective measures have been criticised in the past, because of variability in patient response and attitudes, lack of reliability and difficulty in validating these measures. It is precisely this data, however, that represents the outcomes that are often the most relevant to the patient. Hand therapist must address those issues that are most important to patients if they are to be able to provide the most cost-efficient care of the highest quality.^[8]

After using one way ANOVA, among the eight sub-scales of SF-36, at the end of second month of physiotherapy there was slight improvement in mean scores of all, followed by larger improvement at end of sixth month. This may be because immediately post injury the patients experienced depression and frustration due to loss of activities normally performed within a role and resulting dependence on the other.

While the magnitude of the changes in SF-36 domains varied, generally greater improvements were recorded for vitality, social functioning, role emotional, and mental health whereas only moderate changes in physical function, physical role and bodily pain. This maybe because with treatment the positivity for a good outcome is seen even if physically the improvement is not marked in the beginning.

Results provide some support for the use of SF-36 to evaluate outcomes of hand trauma patients, as improvements in vitality, social functioning, role emotional, and mental health of these patients would have been missed if only disease-specific instruments were used.

The DASH, a disease specific scale, showed slight regression in disability score in the first 2 months. This may be due to the rehabilitation protocol used for tendon injuries, where patient should not use his hand in first 4 weeks post surgery and is hand is also splinted till approximately sixth week. Later as the protocol emphasizes on range of motion and strengthening exercises, the disability score decreased markedly.

Evaluation of QOL allows the consideration of the effect of upper extremity pathology on global health status. Because other elements of physical and mental health contribute to quality of life, these generic instruments are less responsive in the evaluation of hand trauma. They provide an important perspective of the patient. Generic instruments may be selected as outcome measures, although they are known to be less responsive than specific measures, because they reflect a more global perspective and allow comparison of different pathologies and their relative impact on overall health. Grip and range of motion, which have been traditional outcome measures after any hand trauma, are most responsive. They do not necessarily correspond to functional capability and therefore may not reflect outcomes that are of priority to patients. Evaluation of patient-rated outcome has become an important component of outcome evaluation.^[9]

CONCLUSIONS

Self-report questionnaires give us an idea of patient's status in the immediate post-operative period at a time when physical measurements cannot be assessed. Questionnaires combined with a physical evaluation helps to achieve a more comprehensive evaluation of outcome in traumatic hand injury patients. Physiotherapists can set more individualized goals, thereby fostering more targeted treatment approaches and potentially achieving more successful outcomes.

RECOMMENDATION

Because of the high percentage of industrial hand injuries in our study, preventable measures such as strict

implementation of safety measures and proper training of employees should be done should be taken, as a part of industrial therapy which may play a major role in avoiding these accidental injuries.

ACKNOWLEDGMENT

I wish to express my gratitude to my guide, for her valuable guidance without which this work would not have taken shape. I wish to express my gratitude to my Head of Department, for her valuable support and help during the study. I am deeply indebted to all my colleagues for their support and valuable inputs. Last but not the least I would like to thank all the subjects of my study without whom this task would not have been possible.

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How to cite this article: John R, Verma CV. Changes in the health status and functional outcomes in acute traumatic hand injury patients, during physical therapy treatment. *Indian J Plast Surg* 2011;44:362-7.
Source of Support: Nil, **Conflict of Interest:** None declared.