

Occupational Therapy Intervention in Combination Flexor Tendon and Peripheral Nerve Injury 10 Patients with Disabilities of Arm, Shoulder and Hand

Farzane Yazdani; Fariba Dehkordi*

University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Objectives: Measuring outcomes of intervention is one of the most important components of occupational therapy process. The Disabilities of Arm, Shoulder and hand (DASH) questionnaire is a valid and reliable instrument to measure outcomes of the occupational therapy services in the area of hand therapy. The study aims to measure outcomes from interventions of hand therapy in patients with the combined flexor tendon and peripheral nerve injuries in hand.

Method: In this cross sectional study, the Persian version of DASH questionnaire was filled by 20 patients with the combined flexor tendon and peripheral nerve injuries (17 males and 3 females with the age range of 18-58 years) referred to Asma Rehabilitation Center and it was reported that there was a relationship between variables of age, gender, literacy and accurate diagnosis (injured flexor tendon and peripheral nerve) with score calculated in DASH questionnaire.

Results: According to the variables of age, sex, education level and accurate diagnosis, patients showed that according to the DASH in calculating the mean score of questionnaire, the rate of individual's disability is reduced by increasing age, women show more disability in work performances, the individual's music and sport performances indicate more disability by increasing the educational level and finally, individuals with the combined finger flexor and ulnar nerve have the higher rate of disabilities.

Discussion: patients with the combined flexor tendon and peripheral nerve injuries experience many disabilities even after surgery and rehabilitation.

Keywords: Combined flexor tendon and peripheral nerve injury, DASH questionnaire, hand therapy, outcome measure.

Submitted: 25 Sep. 2013

Accepted: 12 Nov. 2013

Introduction

Occupational therapy process has several components that one of the most important one is to measure outcomes of intervention and gathering valid and reliable information through standardized instruments can support the occupational therapy services in community and be an important basis for efficient treatment planning and enhance the therapist's clinical reasoning (1). On one hand, the Professional reputation needs to diagnose efficient versus non-efficient interventions (2). Also, measuring outcomes help other individuals to achieve more precise perception to occupational therapy and its services (3).

One of the important professional areas in occupational therapy is hand therapy. The upper

limb injuries disturb many areas of life such as work, leisure and self-care and endanger individual's career and family life seriously; on the other hand, in this area, occupational therapists have a close relationship with physicians and outcomes of their interventions even greatly affect surgical outcomes. Thus, the outcome measurement in hand therapy is very important (4). Also, it helps hand therapists to reach an appropriate understanding to their choice of practices and propel them toward evidence-based practice. Given the importance of measuring outcomes, in order to cite it, standard instruments are needed to obtain valid and reliable information. Disabilities of Arm, Shoulder and Hand (DASH) is a questionnaire consisted of 30 items which was developed by Orthopedic Surgeons Academy of

* All Correspondences to Fariba Dehkordi, A PhD. candidate in Occupational Therapy; Email: <fdehkordi@uswr.ac.ir>

American in the mid-1990s which is widely used to evaluate outcome measure of treatment of patients with upper limb injuries (5). The original version of the questionnaire was written in English language and demonstrated good test-retest reliability, convergent validity, longitudinal validity and responsiveness (6, 7). This questionnaire has been translated into several languages and is now available everywhere (8-13). In 2008, Mousavi and his colleagues translated DASH questionnaire into Persian language and made it valid and reliable. The results of the validity and reliability of the test were as follows: reliability 0.82 (P50.01), internal consistency 0.96, and validity (Pearson's coefficients ranged from $_{-0.25}$ to $_{-0.72}$; P50.001) in patients with upper extremity disorders including sub-acromial impingement syndrome, rotator cuff disease, epicondylitis, ulnar nerve entrapment, bursitis, instability, carpal tunnel syndrome, tenosynovitis and adhesive capsulitis (14).

The application of this questionnaire is easy and does not need any special training to perform and is easily filled by patients. According to its appropriate validity and reliability and accessibility of its Persian version, it is a suitable choice as outcome measure in upper limb patients. One of the upper limb injuries addressed by hand therapists is the combined Flexor Tendon and Peripheral Nerve Injuries Following peripheral nerve injury in addition to motor impairments, this injury may impose a lot of sensory impairments including the absence of pain, temperature and touch that cause wide disabilities in individual's career and family life, Greatly limited his participation and the quality of their life will be affected (15).

Despite all types of disabilities that these patients experience after injury, surgery and even rehabilitation, there is little information on their

disabilities, rehabilitation method and its obtained outcomes (16). Accordingly, the current study aims to measure outcomes of occupational therapy services in patients with the combined Flexor Tendon and Peripheral Nerve injuries in hand referred to Asma Center in 2008 and 2009 and its outcomes was reported using DASH questionnaire based on the variables of age, gender, the literacy and precise diagnosis of patient (the type of injured flexor tendon and peripheral nerve) so that it can provide a basis to identify groups that are more at risk or performance areas that in the case of more damage, cause disability and so help occupational therapists in decision-making process while treating these group of patients.

Methods

Sample and Setting: The present study was conducted in Asma Rehabilitation Center in Tehran. Participants for 3 months to one year interval from injury and were at least 15 years old and their educational level was about 5th grade primary school. 25 patients had inclusion criteria in this cross sectional study, the diagnosis of the combined Flexor Tendon and Peripheral Nerve injuries and had been operated by an orthopedic surgeon and also, referred to Asma occupational therapy center for rehabilitation between 2008 and 2009. 20 patients of these people were included in the present study after knowing about the aims of the study and signing consent form. The age range of the subjects were between 18 to 58 years in both sexes, male (n=17) and female (n=3). 20 participants in the study were compared in terms of the type of Flexor Tendon and involved Peripheral Nerve in terms of number in Table (1).

Table 1. Comparing the number of subjects in the study in terms of precise diagnosis

Diagnosis	Wrist flexor and median nerve	Wrist flexor and ulna nerve	Finger and wrist flexors and median and ulna nerves	Finger flexors and median nerve	Finger flexors and ulna nerve
Number	3	3	5	4	5

Instruments: The Disabilities of Arm, Shoulder and Hand (DASH) is a 30-item questionnaire on symptoms and performance of the upper limb involving with orthopedic interventions. Questions were on patient's symptoms and performance of the upper limbs during doing activities in preceding week. Every question has 5 options to response whose range is 1 as no difficulty and symptom to 5

as the lack of ability in doing activity and the most severe symptoms. The final score is the sum of scores in 100 that its increase is the sign of more involvement (100 means a severe disability) and its decrease is the sign of less involvement (zero means no disability) in the upper limbs. In addition to 30 questions, there are two series questions with four-item measures that answering to them is selective

and they are as DASH of sport and work and scored the same as the above. In this study, every three parts of questionnaire were studied.

Procedure: Patients attended the clinic with prior arrangement and first, their demographic information (including age, sex, literacy and precise diagnosis or injured Flexor Tendon and peripheral nerve) were filled for each patient based on therapy document in the center by the therapist. Then, DASH questionnaire was given to the subjects and they were requested to respond items for each part. The therapist was nearby during filling questionnaire; however, no additional explanation was needed because this questionnaire has been designed as a self-administered questionnaire.

Data Analysis: In this study, SPSS 17 software was used to analyze data. Researches entered the obtained data and calculated the mean scores in terms of demographic variables in each three parts of DASH questionnaire (In three parts of symptoms and disability, work performance and performance in music and sports).

Results

The Persian version of DASH questionnaire was completed by 20 patients with combined flexor tendon and peripheral nerve injuries and the results indicated the relationship between variables of age, gender, literacy and precise diagnosis (injured Flexor Tendon and peripheral nerve) with score calculated in DASH questionnaire (in three parts of symptoms and disability, occupational performances and performances related to music and sport). In parts of symptoms and disability, work performance and performance related to music and sport, the scores from the DASH questionnaire were scaled in the range of 0-100. The more the score is higher for each of the above areas, the more disability of individuals in that special area it indicates. Therefore score 100 indicates the lack of individual ability in that area and 0 indicates that the person is able to do the previous roles in the desired area without any problem.

For patients, the calculated score of DASH questionnaire were studied in terms of the age groups as following; the age of 18-25 (n=7) has a the mean score of symptoms and disability equal to 41.66, work performances equal to 34.66 and music and sport performances equal to 15. As it was previously mentioned, the smaller the mean calculated score for DASH questionnaire, the fewer the disability would be indicated. In this age group, subjects show the least disability in the music performances. In the age of 39-

48 (n= 8), the mean score is equal to 28.74 in symptoms and disability, 29.24 in work performance and 25 in music and sport performances that in this age group, patients indicated the least disability in music performances. In the age of 39-48 (n=2), the mean score is equal to 23.89 in symptoms and disability, 25 in work performance and 45 in music and sport performances that in this age group, the least disability is in symptoms and disability area and the most in sport and music performances. The last age group examined in the present study is 49-58 (n=2) and the mean calculated scores is equal to 9.16 for symptoms and disability, 5.62 for work performances and 48.31 for sport and music performances. In the above age group, the least disability was observed in occupational performances. The other variable studied in this study in terms of the score of DASH questionnaire is gender (male=17, female=3). For male patients, the mean calculated score of DASH questionnaire is equal to 25 for symptom and disability, 28.85 for work performances and 45 music and sport performances. In females, the mean scores of symptom and disability, work performance and music and sport performance was calculated equal to 30, 38.24 and 40, respectively. The above results show that both sexes indicated the highest rate of disability in music and sport performances while males had more disability in this area.

The literacy variable was studied in every three levels of above diploma (n=4), diploma (n=10) and under diploma in terms of DASH questionnaire score.

The mean score of symptom and disability is equal to 25, 18 and 32 in above diploma, diploma and under diploma, respectively thus in this area, the most disability was related to under diploma group. The work performances were 47 in above diploma group, 30 in diploma and 8 in under diploma indicating the highest rate of disability in work performances for above diploma group. The music and sport performances are 68, 45 and 30 in the above diploma, diploma and under diploma groups, respectively. According to the above results, the highest rate of disability to music and sport performances is in group having the above diploma education.

According to the precise diagnosis of patients, the calculated score of DASH questionnaire was studied to measure disability based on location and type of Flexor Tendon and Peripheral Nerve injury. The score of symptom and disability, work performance and music and sport performance have been compared in Figure (1).

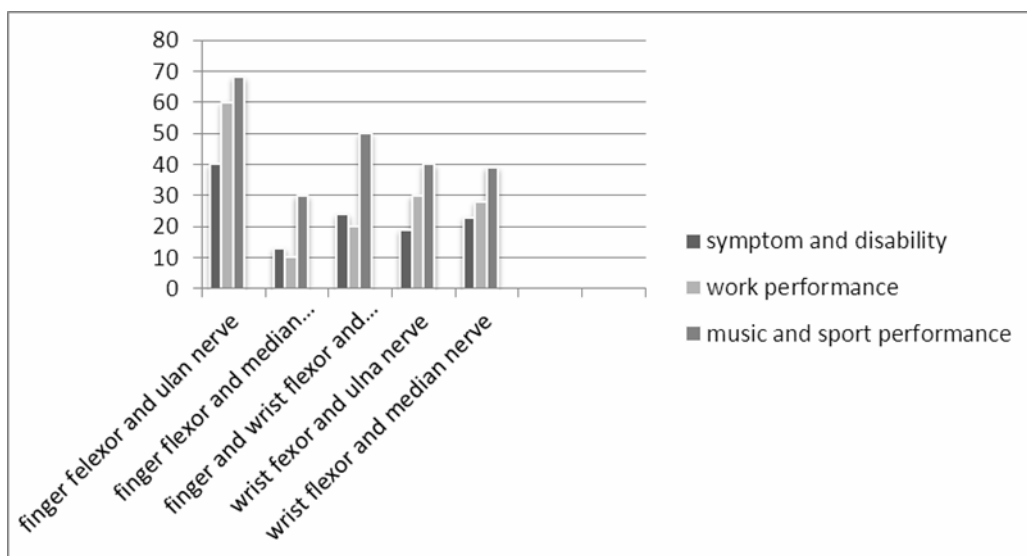


Figure 1. Comparing the calculated score of DASH questionnaire in terms of precise diagnosis

According to Figure (1), the calculated score of DASH questionnaire has indicated the highest rate of disability in finger flexors and ulnar nerve for every three parts of symptom and disability, work performances and the score of music and sport performance. In general, it seems that after surgery and even rehabilitation, patients with the combined Flexor Tendon and Peripheral Nerve injuries experience various disabilities in various areas of life and participations.

Discussion

Patients with the combined Flexor Tendon and Peripheral Nerve injuries in their hand experience the numerous sensory disabilities from Peripheral Nerve injuries in addition to disability in Flexion movement from Flexor Tendon injuries and these disabilities greatly change the active participation of individuals in career and life period. After surgery, these patients received rehabilitation services, especially occupational therapy while many disabilities affecting on their quality of life remained for them after rehabilitation. Despite all these, there was little information on disabilities of persons suffering from this injury. The present study measuring outcome of occupational therapy interventions in patients with combined Flexor Tendon and Peripheral Nerve injuries using DASH questionnaire (translated into Persian language and is valid and reliable). In this study, in terms of the score calculated in three parts of symptoms and disability, work performances and music and sport performances in DASH questionnaire, variable of age, gender, literacy and precise diagnosis (the type of Flexor

Tendon and Peripheral Nerve) was measured in 20 patients with combined Flexor Tendon and Peripheral Nerve injuries. Berger et al expressed that the adaptation of person to environment rises as the age increases. Thus, injury or disease may report the least disability as the age increases(17) while in the study, the calculated score of DASH questionnaire decreases indicating the least disability and is consistent with Berger's study on the elder with upper limb injuries. On one hand, as individuals grow up, they pay less attention to sport performances in their occupational balance(18). Therefore, in this study, the cause of increasing individual's disability in music and sport performances with age increasing is due to the lack of their attention to these performances. In the study done on individuals with fraction, Fink stated that women experience more disability in their work performances after fractions in upper limbs(19). Given that there is no accessible information on disabilities of patient with the combined Flexor Tendon and Peripheral Nerve injuries, the study results on work performances in terms of gender is consistent with results obtained on fractions in upper limbs and women showed more disability in their work performances.

The ulnar nerve injury causes the paralysis of small finger and ring; in other words, the paralysis to ulnar that after damage can irreparably damage to performance and needs more time for returning to occupation comparing to other peripheral nerves. In the present study, in every three areas of scoring of DASH, the most score or disability is for individuals with diagnosis of finger flexor and ulnar nerve damage resulting from many damages that paralyzed ulnar

nerve impose on hand performance or in ulnar nerve, the rate of required time is more to return into occupation. These results show that patients with the combined Flexor Tendon and Peripheral Nerve injuries indicate many disabilities even after occupational therapy services and according to the studied variables, some groups are more exposed to disability and their performance should be more considered by occupational therapists because occupational therapy measures and treats all aspects of life by holistic view. Meanwhile DASH questionnaire is an appropriate tool to measure occupational therapy services and it is hope that the present study provides a proper context for its application in occupational therapy clinics, especially hand therapy.

Conclusion

Outcome measure obtained from intervention is very important to improve the quality of patients' life of referred to occupational therapy. On one hand, some patients experience many disabilities even after occupational therapy and quality of their life is greatly affected and they suffered from many

injuries in the area of their occupational balance. So, it is very important to know patients' disabilities after interventions for occupational therapist so that they can increase their cooperation level and improve quality of their life.

The study limitations: For many patients, answering the questions that they didn't do last week and estimating its response were difficult. On one hand, individual may do many activities being no part of the most important hard activities for referrers by reparable method. Therefore, it can influence on scoring and interpreting the questionnaire. In fact, in the present questionnaire, the way of doing daily activities is not studied. Some patients didn't want to be present in center and cooperate in the study because they were off from rehabilitation center.

Acknowledgements

Authors thank all patients who participated in this study and authorities of Asma Rehabilitation Center and also respect the head of Asma hand rehabilitation center, Dr. Layeghi.

References

- Gutman SA, Mortera MH, Hinojosa J, Kramer P. Revision of the occupational therapy practice framework. *American Journal of Occupational Therapy*. 2007; 61:119-26.
- Welch A, Forster S. A clinical audit of the outcome of occupational therapy assessment and negotiated patient goals in the acute setting. *The British Journal of Occupational Therapy*. 2003;66(8):363-8.
- Fonaghy P, Mathews R, Pilling S. Report from the Chair of the Outcomes Reference Group. The Mental Health Outcomes Measurement Initiative. London: Royal College of Psychiatrists. 2004.
- Salerno D, Copley-Merriman C, Taylor T, Shinogle J, Schulz R. A review of functional status measures for workers with upper extremity disorders. *Occupational and environmental medicine*. 2002;59(10):664-70.
- Davis AM, Beaton DE, Hudak P, Amadio P, Bombardier C, Cole D, et al. Measuring disability of the upper extremity: A rationale supporting the use of a regional outcome measure. *Journal of Hand Therapy*. 1999;12(4):269-74.
- Gummesson C, Atroshi I, Ekdahl C. The Disabilities of the Arm, Shoulder and Hand outcome questionnaire: longitudinal construct validity and measuring self-rated health change after surgery. *BMC Musculoskeletal Disord*. 2003;4:11.
- SooHoo NF, McDonald AP, al SJ. Evaluation of the construct validity of the DASH questionnaire by correlation to the SF-36. *J Hand Surg [Am]*. 2002;27: 537-41.
- Themistocleous GS, Goudelis G, Kyrou I, Chloros GD, Krokos A, Galanos A, et al. Translation into Greek, cross-cultural adaptation and validation of the Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH). *Journal of Hand Therapy*. 2006;19(3):350-7.
- Liang H-W, Wang H-K, Yao G, Horng Y-S, Hou S-M. Psychometric evaluation of the Taiwan version of the Disability of the Arm, Shoulder, and Hand (DASH) questionnaire. *Journal of the Formosan Medical Association= Taiwan yi zhi*. 2004;103(10):773-9.
- Imaeda T, Toh S, Nakao Y, Nishida J, Hirata H, Ijichi M, et al. Validation of the Japanese Society for Surgery of the Hand version of the Disability of the Arm, Shoulder, and Hand questionnaire. *Journal of Orthopaedic Science*. 2005;10(4):353-9.
- Padua R, Padua L, Ceccarelli E, Romanini E, Zanoli G, Amadio P, et al. Italian version of the Disability of the Arm, Shoulder and Hand (DASH) questionnaire. Cross-cultural adaptation and validation. *Journal of hand surgery (british and european volume)*. 2003;28(2):179-86.
- Lee E, Chung M, Li A, Lo S. Construct validity of the Chinese version of the disabilities of the arm, shoulder and hand questionnaire (DASH-HKPWH). *Journal of hand surgery (british and european volume)*. 2005;30(1):29-34.
- Atroshi I, Gummesson C, Andersson B, Dahlgren E, Johansson A. The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire: reliability and validity of the Swedish version evaluated in 176 patients. *Acta Orthopaedica*. 2000;71(6):613-8.
- Mousavi SJ, Parnianpour M, Abedi M, Askary-Ashtiani A, Karimi A, Khorsandi A, et al. Cultural adaptation and validation of the Persian version of the Disabilities of the Arm, Shoulder and Hand (DASH) outcome measure. *Clinical rehabilitation*. 2008;22(8):749-57.
- Rogers GD, Henshall AL, Sach RP, Wallis KA. Simultaneous laceration of the median and ulnar nerves with flexor tendons at the wrist. *The Journal of hand surgery*. 1990;15(6):990-5.

16. Werdin F, Schaller H. [Combined flexor tendon and nerve injury of the hand]. *Der Orthopade*. 2008;37(12):1202-9.
17. Berger S. Effectiveness of Occupational Therapy Interventions for Older Adults Living With Low Vision. *The American Journal of Occupational Therapy*. 2013;67(3):263-5.
18. Hearle D, Rees V, Prince J. Balance of occupation in older adults: experiences in a residential care home. *Quality in Ageing and Older Adults*. 2012;13(2):125-34.
19. Fink H, Ensrud K, Nelson D, Kerani R, Schreiner P, Zhao Y, et al. Disability after clinical fracture in postmenopausal women with low bone density: the fracture intervention trial (FIT). *Osteoporosis international*. 2003;14(1):69-76.