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Inter-observer agreement of the musculoskeletal system disability levels of individuals presenting at disability health boards

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Abstract

The classification and scoring of disability in Turkey are done within the framework of the "Regulation on Disability Assessment for Adults". However, evaluation of disabled individuals by different physicians despite having the same disability may lead to conflicting results. This study aims to investigate the inter-observer agreement of physiatrists and orthopedists in the evaluation of patients who applied to the Disability Health Board because of musculoskeletal system pathologies. Ten people with musculoskeletal problems and four physicians, including two physical therapists and two orthopedists, were included in this study. The patients were evaluated by the physicians according to the provisions of the "Regulations for the Disability Assessment of Adults" in random order in separate rooms on the same day. The mean disability points were found to be 19.4±14.8 for physiatrist 1 (PMR1), 16.5±13.1 for PMR2, 17.9 ±14.9 for orthopedist 1 (O1), and 18.7±15.9 for O2. No statistically significant difference was determined between the 4 physicians in respect of the points given (p=0.85). The agreement between all 4 physicians was found to be 0.85 (95% CI:0.68-0.95). In the paired analyses, the ICC ranged from 0.73 to 0.96, with the lowest agreement between PMR2-O2, and the highest agreement between O1-O2. In conclusion, the results of this study showed that there was not an absolute agreement between physiatrists and orthopedists because of the complex structure in determining the disability rate of the musculoskeletal system, the fact that patient compliance is important, and that the approach of the physician can be different. For physicians participating in the Health Board to be able to provide standardization, there is a need for theoretical and patient-based training, the appropriate time to be allocated for patient evaluation, and the open points in the items of the regulation should be eliminated.

Keywords: Musculoskeletal system, disability, physical examination

Introduction

Disabled individuals cannot fulfill the age, gender, social and cultural roles expected of a healthy individual. Therefore, disability is not only a personal factor but also a societal concern. Identifying disabled individuals and providing physical, economic, psychological, and social support is one of the main responsibilities of the administrators of a country. The quality of care and service provided for the disabled is related to the level of development of a country [1].

There are approximately one billion disabled people worldwide and approximately 2.5 million in Turkey [2-3]. As resources are limited for a greater number of disabled individuals, and as there is a range and different levels of disability, the national authorities have established rules to determine the social, economic, and occupational support that these people will receive. In Turkey, these evaluations are made for individuals aged >18 years within the framework of the "Regulations for the Disability Assessment of Adults" guidelines [4].

Rather than evaluating each point of a disease directly, this guide was prepared for the evaluation of the effect on daily living activities of diseases and function loss caused by the diseases, to provide a disability level scored from 100 points. The guide has 15 subheadings such as the musculoskeletal system, the skin, and the digestive system, and allows specialist physicians in different branches to evaluate on a system basis, not on the disease basis. Thus

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the same disease can be evaluated by specialists in different branches.

Although this method allows a holistic evaluation of the individual, there are some disadvantages especially for musculoskeletal involvement, which constitutes about half of the content of the guide and about one-third of disabled individuals. The primary of these disadvantages is that although the patient may not be sufficiently cooperative in the examination, the approaches of orthopedics and traumatology specialists and physical medicine and rehabilitation specialists, as the two branches most often scoring the patient in this area, can be said to be different from each other. Despite the published numerical data, disabled individuals are distressed by these conflicting results from clinical observations and appeal against the results. In these cases, the patient is referred to another healthcare institution, is re-evaluated, and the disability rate is determined again. When the first and second report results are different, the patient is referred to a third institution, and the decision given there is the definitive disability rate [4]. There is a clear need for scientific investigation of the method of applying the aforementioned guidelines to be able to overcome this situation which increases the workload of the healthcare service and causes a significant loss of time and effort.

In the light of this information, this study aims to investigate the inter-observer agreement of physiatrists and orthopedists in the evaluation of patients who applied to the Disability Health Board because of musculoskeletal system pathologies.

Materials and Methods

This study included 10 individuals with specific musculoskeletal system disease evaluated by 4 physicians in a tertiary level training and research hospital. Approval for the study was granted by the Sivas Cumhuriyet University Clinical Research Ethical Committee (2021/12-03) and all procedures were applied in compliance with the Helsinki Declaration and the Good Clinical Practices guidelines.

Patients

The patients included in the study were selected from those who presented at the Disability Health Board unit applying for a disability report required for home carer's allowance, disability tax discount, or entry to the civil service-disabled personnel selection examination, who had musculoskeletal system problems which are frequently seen by the Disability Health Board such as shoulder lesions, bone fractures, amputations, joint prosthesis, arthrosis, joint dysplasia, or contractures and were willing to participate in the study. In the selection of these patients, consideration was shown to the frequency of disease, involvement of different parts of the musculoskeletal system, differences from the evaluation methods in the disability guidelines, and the presence of neurological problems closely related to the musculoskeletal problem.

Evaluators

The evaluations of the patients were made by one physiatrist and one orthopedist; an experienced specialist physician with more than 10 years of experience on the Disability Health Board (PMR1, O1) and one less experienced specialist physician, new to the profession with less than one year of experience on the Disability Health Board (PMR2, O2).

Evaluation

The patients were evaluated by the four physicians according to the provisions of the "Regulations for the Disability Assessment of Adults", published in the Official Gazette no. 30692, dated 20.02.2019 (4). The physicians evaluated the patients in random order in separate rooms on the same day but at different times, and were blinded to the examinations and disability points of the others.

Statistical Analysis

The data of the 10 patients obtained from the 4 evaluators were analyzed statistically using SPSSv.22 software. Data showing normal distribution were presented as mean±standard deviation values. In the inter-observer comparisons, the Wilcoxon Signed Ranks test and Friedman analysis were used. The interobserver agreement was examined between an experienced physiatrist and inexperienced physiatrist, between experienced orthopedist and inexperienced orthopedist, between experienced physiatrist and experienced orthopedist, between experienced physiatrist and inexperienced orthopedist, between inexperienced physiatrist and experienced orthopedist, between inexperienced physiatrist and inexperienced orthopedist, and between all the observers. The interobserver agreement coefficient was presented in a 95% confidence interval. The interclass correlation coefficient (ICC) score varies between 0 and 1, with values closer to 1 showing higher agreement. Type 1 error level was accepted as 0.05.

Results

The sociodemographic data of the patients, a short history, and clinical findings are shown in Table 1. The disability points given to the patients by the physicians are shown in Table 2. The mean disability points were found to be 19.4±14.8 for PMR1, 16.5±13.1 for PMR2, 17.9 ±14.9 for O1, and 18.7±15.9 for O2. No statistically significant difference was determined between the 4 physicians in respect of the points given (p=0.85).

The agreement between all 4 physicians was found to be 0.85 (95% CI:0.68-0.95). In the paired analyses, the ICC ranged from 0.73 to 0.96, with the lowest agreement between PMR2-O2, and the highest agreement between O1-O2 (Table 3).

Discussion

In this study, which investigated the agreement between physicians in respect of the disability rate of individuals with a specific musculoskeletal disease who applied to the Disability Health Board, there was seen to be an excellent agreement between the experienced physiatrist and the experienced orthopedist. There was a good level of agreement between the two physiatrists and between the inexperienced physiatrist and the experienced orthopedist, a moderate level of agreement between the inexperienced orthopedist and the inexperienced physiatrist, and a good level of agreement between all the physicians.

Previous studies related to disability health reports have been conducted with objectives such as the reasons for the patients applying to the Board, the distribution of disability rates according to systems, and the effect of the musculoskeletal system disability on the level of dependence of the disabled individual [5-15].

Table 1. Clinical characteristics of the patients

No.	Gender	Age	Diagnosis	Story	Physical Examination	Examination
1	**Female**	**57**	Supraspinatus partial rupture	Pain and limitation of movement in the right shoulder for 3 years, difficulty in overhead activities	Right shoulder abduction and external rotation ROM is limited, painful	Partial rupture of Type 3 acromion and supraspinatus tendon near the attachment site on MRI
2	**Male**	**33**	Radius lower end fracture	Fracture of the lower end of the left radius after a fall in childhood	Wrist flexion, abduction, and forearm supination ROM are limited	
3	**Male**	**29**	Humeral shaft fracture	6 months ago, he was operated on due to left clavicle and humerus fragmented shaft fracture as a result of TA, weakness in the left wrist and finger extension, and numbness on the back of the hand after surgery	Shoulder and elbow ROM is limited in all directions, brachioradialis, extensor carpi radialis, extensor carpi ulnaris muscle strength 3/5, extensor indisis proprius muscle strength 2/5, hypoesthesia in the radial superficial sensory area	Partial lesion of the brachioradialis muscle branch of the radial nerve proximal to the separation in ENMG examination
4	**Male**	**31**	hand finger amputation	1 year ago, as a result of a work accident, rupture of the fingers	Left hand 2-5. amputation of the fingers at the level of the proximal interphalangeal joint	
5	**Female**	**44**	Sequelae of poliomyelitis	Continuing muscle weakness and gait disturbance after poliomyelitis at the age of 3	Hip, knee, ankle ROM is limited, leg and thigh atrophy, short leg, muscle strength around the hip, knee and ankle 2/5, Ambulation with long leg walking device in long distances	
6	**Female**	**66**	Gonarthrosis	Followed up for 10 years with the diagnosis of primary gonarthrosis	Bilateral knee flexion limited end of ROM, varus deformity in both knees	Stage 4 gonarthrosis according to Kellgren-Lawrence stage on X-Ray
7	**Male**	**31**	Meniscopathy	Partial meniscectomy for grade 3 rupture of the medial meniscus 1 year ago	Normal	
8	**Male**	**71**	Below-knee amputation	Below-knee amputation from proximal leg due to peripheral vascular disease 5 years ago	Ambulation with the modular below-knee prosthesis in the right leg	
9	**Female**	**51**	Tibia shaft fracture	9 months ago, as a result of TA, tibial shaft fracture, difficulty in walking on the right foot, foot pain, burning, felting	There is atrophy of the thigh and leg, slight heat increase in the distal leg and foot, dysesthesia, and nail changes, antalgic gait in short distances, mobilization with crutches in long distances.	Internal fixator in distal tibia, no misalignment, mottled osteoporosis appearance in tarsal and metatarsal bones
10	**Female**	**75**	Total hip replacement	A patient without active symptoms who was operated on for right hip joint arthrosis and underwent total hip replacement 2 years ago	Natural lateral right hip excluding incision scar	Material compatible with total hip prosthesis on the right

TA: Traffic accident, ROM: Range of motion, ENMG: Electroneuromyography, MRI: Magnetic resonance imaging

Table 2. Disability scores of the patients from the evaluators

Patients	PMR1	PMR2	O1	O2
1	2nd	4	6	5
2	4	5	6	7
3	26	28	13	15
4	29	24	29	24
5	40	20	42	48
6	8	14	8	18
7	5	8	5	0
8	43	43	43	43
9	18	8	8	8
10	19	19	19	19
mean (SD)	19.4(14.8)	16.5(13.1)	17.9 (14.9)	18.7(15.9)

PMR1: Experienced Physiatrist, PMR2: Inexperienced Physiatrist, O1: Experienced Orthopedist, O2: Inexperienced Orthopedist

Table 3. Inter-rater reliability

	ICC	95% Confidence Interval
PMR1-PMR2	0.79	0.40-0.94
O1-O2	0.96	0.85-0.99
PMR1-O1	0.93	0.77-0.98
PMR1-O2	0.90	0.66-0.97
PMR2-O1	0.78	0.33-0.94
PMR2-O2	0.73	0.24-0.92
PMR1-PMR2-O1-O2	0.85	0.68-0.95

PMR1: Experienced Physiatrist, PMR2: Inexperienced Physiatrist, O1: Experienced Orthopedist, O2: Inexperienced Orthopedist, ICC: Intraclass correlation

In those studies, pathologies related to the musculoskeletal system are the most cause of disability [5,14,15]. In the current study, the agreement between physicians in determining the rate of disability was examined for the first time, and the musculoskeletal system was selected as it has the greatest range of disability.

As there are direct effects on the musculoskeletal system of both the primary disease itself and of systemic and other system diseases, it is a significant cause of disability. This also constitutes the longest and most detailed section of the "Regulations for the Disability Assessment of Adults", which are used to determine the disability level of disabled individuals in Turkey. Despite this detailed explanation, when individuals applying to the Disability Health Board are examined in orthopedic and physical medicine and rehabilitation polyclinics, they can receive different disability scores despite evaluations of the same disease. Moreover, when these patients reject the reported result of the Disability Health Board, they are evaluated at a different hospital and the disability rate can change. The scientific investigation of the reason for these differences in the disability points is of critical importance in improving the quality of service of the Disability Health Boards.

The agreement coefficient between all the physicians in the current study was 0.85, and the highest level of agreement was between the two orthopedists. The agreement between the physiatrists was at a good level and the lowest was between the inexperienced orthopedist and the inexperienced physiatrist. When these findings are evaluated together with the evaluation methods in the disability guide, the diagnosis and examination findings of the patients yield striking results.

Although most of the examination principles are stated as standard for the relevant regulations, the experience of the physician and approach to the patient may change the results. The clearest example of this is in diseases for which points are given according to joint range of movement (ROM). Active joint ROM (the patient can make the movement) and passive joint ROM (the movement is made by the physician) measurements are different, and the effect of patient cooperation in the active measurement can change the disability points. As it is not stated in the regulations which measurement will be accepted, this can make a difference to the approach of the physician. In contrast, the points to be given for amputation or total hip prosthesis are clear, and when there is no space for physician evidence, no interpersonal difference is found between the disability points.

Another possible reason for the lack of agreement between physicians is the use of some conversion tables within the framework of the regulations when scoring musculoskeletal system diseases, as complex methods may be used such as sometimes an arithmetic total and sometimes a total according to the Balthazard formula. With the increasing number of patients applying to the Disability Health Board, physicians have to deal not only with the polyclinic patients but also with the Disability Health Board patients within the same periods, which prevents sufficient time being able to be allocated for the evaluation of disabled individuals, and thus the risk of error is increased.

Another reason is that there is the possibility of simultaneous evaluation of some diseases from different sections of the relevant regulations. Although it is recommended in the regulations to award points in favor of the patient in such cases, the approach of the physician is predominant. For example, just as a patient with gonarthrosis can be evaluated from gait impairment alone, evaluation can also be made from the combination of joint ROM measurement and atrophy points. Or a patient with poliomyelitis can be scored from neurological system impairments as it is a muscular disease or may be scored with a combination of joint ROM and shortness, muscle strength and shortness, or according to the need for orthosis or an assistive walking device. The different areas selected in the regulations are close to each other, but the points may not be the same.

The musculoskeletal system section in the regulations not only calls upon orthopedists and physiatrists but also requires other branches such as neurology and plastic surgery. Which diseases of the musculoskeletal system are given points by which branches are not clearly defined in the regulations. Therefore, in a patient who develops a radial nerve lesion following humerus fracture surgery, the joint ROM measurement may be scored by the physician and the nerve lesion may be examined and scored by the neurologist. When there is a need for rehabilitation, in diseases where the disability rate will probably change after a short-term rehabilitation program, the different approach of physicians is another reason for the difference in the disability rate. For example, in a case of operated meniscopathy which has not led to impaired function, the physician may prefer not to give points to an individual with no active complaint as the regulation is based on functionality.

There were some limitations to this study, primarily the low number of patients included. The preference for specific and frequently encountered different diseases limited the sample number. Another limitation could be considered to be that the patients were used to going to physicians for examinations, so to minimize this risk, the

patients were examined by the physicians in random order.

Conclusion

In conclusion, the results of this study showed that there was no absolute agreement between physiatrists and orthopedists because of the complex structure in determining the disability rate of the musculoskeletal system, the fact that patient compliance is important, and that the approach of the physician can be different. For physicians participating in the Health Board to be able to provide standardization, there is a need for theoretical and patient-based training, an appropriate time to be allocated for patient evaluation, and the open points in the items of the regulation should be eliminated. Moreover, to avoid unjust treatment of disabled individuals, the chairmen of Health Boards should not overlook points that have not been given or duplicated points.

Conflict of interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical approval

The study was approved by the Sivas Cumhuriyet University Ethical Committee (2021/12-03).

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