Physical Ability and Quality of Life in Rheumatoid Arthritis and Systemic Lupus Erythematosus: A Brief Comparison

Körperliche Leistungsfähigkeit und Lebensqualität bei rheumatoider Arthritis und systemischem Lupus erythematodes: ein kurzer Vergleich

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Key words
muscle performance, physical activity, quality of life, rheumatoid arthritis, systemic lupus erythematosus

Schlüsselwörter
Muskelleistung, körperliche Aktivität, Lebensqualität, Rheumatoide Arthritis, systemischer Lupus erythematodes

online publiziert 11.09.2020

Bibliografie
Akt Rheumatol 2021; 46: 88–96
DOI 10.1055/a-1224-3540
ISSN 0034-3536

Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

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ABSTRACT

Background Patients with rheumatic disease are assumed to have low muscle performance, but few studies have been performed to prove this.

Objective To investigate and compare muscle performance in rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) patients and detect its correlation with disease activity, physical function level and quality of life.

Patients and Methods Fifty RA patients, 50 SLE patients and 50 healthy controls were recruited for this observational, cross-sectional study. Muscle performance tests for the upper and lower limbs and the fatigue severity score were recorded. Assessments of the physical activity level using the frequency intensity time index and quality of life using the SF36 questionnaire were performed. The study was conducted over 4 months from January to April 2019.

Results SLE patients showed better results of muscle performance than RA patients; however, both had lower results as compared to control. Disease activity was correlated to muscle performance tests in both diseases, except for the 30-second chair stand test in SLE ($p = 0.247$). All domains of SF36 had a significant correlation with the performance tests in SLE ($p \leq 0.05$); however, only domains of physical function correlated with the tests in the RA group.

Conclusion RA patients tend to have a lower muscle performance and physical activity level as compared to SLE patients and control.

ZUSAMMENFASSUNG

Hintergrund Es wird angenommen, dass Patienten mit rheumatischer Erkrankung eine geringe Muskelleistung aufweisen, es wurden jedoch nur wenige Studien durchgeführt, um dies zu beweisen.

Ziel der Arbeit Untersuchung und Vergleich der Muskelleistung bei Patienten mit rheumatoider Arthritis (RA) und systemischem Lupus (SLE) und Feststellung ihrer Korrelation mit der Krankheitsaktivität, dem körperlichen Funktionsniveau und der Lebensqualität.

Patienten und Methoden Für diese Beobachtungsquerschnittsstudie wurden 50 RA-Patienten, 50 SLE-Patienten und 50 gesunde Kontrollpersonen rekrutiert. Muskelleistungstests für die oberen und unteren Gliedmaßen und der Schweregrad der Ermüdung wurden aufgezeichnet. Die Bewertung des körperlichen Aktivitätsniveaus unter Verwendung des Frequenzintensitätszeitindex und der Lebensqualität unter Verwendung des SF36-Fragebogens wurde durchgeführt. Die Studie wurde über 4 Monate von Januar bis April 2019 durchgeführt.

Ergebnisse SLE-Patienten zeigten bessere Ergebnisse der Muskelleistung als RA-Patienten, jedoch hatten beide im Vergleich zur Kontrolle niedrigere Ergebnisse. Die Krankheitsaktivität korrelierte mit den Muskelleistungstests bei beiden Krankheiten mit Ausnahme des 30-Sekunden-Stuhlstandtests bei SLE (P = 0,247). Alle Domänen von SF36 korrelierten signifikant mit den Leistungstests bei SLE (P ≤ 0,05), jedoch korrelierten nur die Domänen der körperlichen Funktion mit den Tests in der RA-Gruppe.

Schlussfolgerung RA-Patienten weisen im Vergleich zu SLE-Patienten und -Kontrollen tendenziell eine geringere Muskelleistung und körperliche Aktivität auf.

Introduction

Although it is assumed that rheumatic diseases have a negative impact on musculoskeletal health and function, few studies have been conducted to prove this assumption.

Physical ability is a multicomponent term that includes muscle power, endurance, speed and flexibility. Physical ability and muscle performance are not routinely evaluated in rheumatic diseases and little is known about them in such diseases. Rheumatoid arthritis (RA) has a well-known influence on synovial joints with the end result of pain, deformity, and disability that lead to progressive impairment and activity limitations [1] Systemic lupus erythematosus (SLE) patients usually experience a decrease in muscle strength and physical activity, which may be due to pain, fatigue, and systemic inflammation [2].

In this study, we aimed to compare the physical ability in RA and SLE as common rheumatic diseases and find possible correlations of disease activity and quality of life (QOL) in both diseases.

Subjects and Method

Subjects

Fifty RA patients, 50 SLE patients, and 50 age- and sex-matched healthy controls were selected to participate in this clinical observational study. All rheumatoid patients fulfilled the 2010 American College of Rheumatology (ACR) classification criteria [3], and the SLE patients fulfilled the 2015 ACR/Systemic Lupus Collaborating Clinics revised criteria [4].

Patients enrolled in this study were randomly selected by quota sample from those who were regularly followed in the outpatient clinic and inpatient section of the Rheumatology and Rehabilitation Department, our University Hospitals, between January 2019 and April 2019.

The inclusion criterion was adult RA and SLE patients aged > 18 years who were taking regular medication in the last 3 months.

Subjects were excluded from the study if they were affected with an immunological disease other than RA and SLE including overlap syndrome. Patients with neurological problems, musculoskeletal disorders, or other systemic diseases that could interfere with their physical ability were also excluded.

Ethical Considerations

This study was approved by the local ethics committee of the Faculty of Medicine and conforms to the guidelines of the Declaration of Helsinki. The clinical trial registration number of the study is NCT03728231. All subjects consented to participate in the study.

Methods

Baseline demographic data were collected from the patients' files.

Patient laboratory data included CBC and ESR for all patients; immunological tests (RF, anti-CCP) for RA patients; and urinary 24-hour protein and immunological tests (ANA, anti-dsDNA, C3, C4) for SLE patients.

Disease activity was measured in RA patients using the Disease Activity Score-28 for Rheumatoid Arthritis with ESR (DAS28–ESR). Patients were allocated to 3 groups according to the DAS28-ESR as follows: remission (DAS28 < 2.6), low/moderate activity (DAS28 2.6–5.1), and high disease activity (DAS28 > 5.1) [5].

In SLE patients, disease activity was assessed using the SLE Disease Activity Index 2000 (SLEDAI-2K), which is a global index that evaluates disease activity over the previous 10 days. It includes 24 items that include specific manifestations in the following 9 organ systems: neurological, musculoskeletal, renal, mucocutaneous, general, heart, respiratory, vascular, and hematological. The maximum score is 105. Activity categories were defined on the basis of the SLEDAI scores as follows: no activity (SLEDAI = 0), mild activity (SLEDAI = 1–5), moderate activity (SLEDAI = 6–10), high activity (SLEDAI = 11–19), and very high activity (SLEDAI ≥ 20) [6].

Physical ability was measured using the following tests that are convenient to use in clinical practice: The 30-sec chair stand test assesses leg strength and endurance. The patient sits in the middle of a chair with arms crossed and each hand placed on the opposite shoulder. The patient is asked to stand fully and then sit down and repeat this exercise as many times as possible in 30 sec. The number of times the patient comes to a full standing position in 30 sec is the score that is recorded [7].

The 30-sec arm curl test measures upper body strength and endurance. Holding a weight in one hand, the patient is instructed to perform as many arm curls as possible in 30 seconds (The test is repeated on the opposite side as well). A 5-lb weight is used for women, and an 8-lb weight is used for men. The number of times the patient completes the curls in 30 sec is recorded as the score [8].

The hand grip strength test measures isometric hand strength using the Jamar hydraulic hand dynamometer (Medco Sports Medicine, Amherst, NY, USA). The results are measured as kilogram force (kgf) [9].

The sit and reach test is a common assessment of flexibility, specifically of the lower back and hamstring muscles. The tip of the toes is considered as zero level, and the score is based on the distance reached by the hands to the nearest centimeter [10].

Measurement of physical activity level was performed using the frequency intensity time (FIT) index of Kasari, which consists of 3 questions about the frequency, duration, and type of exercise performed by the patient. The score range is 1–100, with points < 36,

37–63, and > 64, indicating low, moderate, and high physical activity levels, respectively [11].

The severity of fatigue is measured using the Fatigue Severity Scale [12]. This instrument contains 9 items, and patients choose a score from 1–7 on a Likert scale, where 1 = strongly disagree and 7 = strongly agree. The total score is the mean of the scores of the 9 items, with a higher score indicating a higher degree of fatigue. A score of 4 or higher indicates fatigue [13].

Quality of life in the RA and SLE patients was assessed using the Short-Form Health Survey 36 (SF-36) [14]. This instrument consists of the following 8 subscales: physical functioning (10 items), role-physical (4 items), bodily pain (2 items), general health (5 items), vitality (4 items), social functioning (2 items), role-emotional (3 items), and mental health (5 items). Item scores are coded, summed, and transformed. The total score ranges from 0 to 100, with higher scores indicating better health status. Depending on the availability of SF36 norm values [15], we didn't apply the questionnaire on the healthy control group .

Statistical Analysis

Collected data were analyzed using Statistical Package for the Social Sciences (SPSS), version 15 (SPSS, Inc., Chicago, IL, USA). Descriptive analysis was performed using the mean and standard deviation for quantitative variables and frequency and percentage for non-numerical variables.

The comparison between 2 groups with parametric variables was performed using independent samples t-test (t), and Mann-Whitney U test was used to compare non-parametric variables between groups. Pearson's correlation coefficient was used to analyze correlations. The accepted level of significance was set at $P < 0.05$.

Results

Basic and demographic data of the study population are shown in ▶ **Table 1**.

The majority of our study population was female; 94 % of patient groups (both RA and SLE) and 92 % of the control group. There were no significant differences between the control group and both the RA and SLE groups for age and body mass index.

▶ **Table 2** demonstrates that patients with SLE showed better results of muscle performance tests than RA patients; however, both groups did not perform as well as the control group. Statistically significant differences ($P < 0.05$) were found for all the muscle performance tests both within groups and between groups (RA, SLE, and control). Regarding physical function level, most of the RA patients (98 %) had a low physical activity level compared to 76 % of the SLE group and 80 % of the control group. Fatigue was observed more frequently in patients with RA than in SLE patients, with highly significant differences between them and the control group.

The DAS28-ESR score was significantly correlated with the muscle performance tests, physical activity level, and fatigue score in the RA group (▶ **Table 3**).

▶ **Table 4** shows that in the SLE group, all muscle performance tests showed a statistically significant correlation with the SLEDAI score, except for the 30-sec chair stand test ($P = 0.247$). Physical function level and fatigue score were significantly correlated with the SLEDI score, with $P = 0.02$ and 0.035, respectively.

Our results showed that in RA patients, the mean SF-36 domains were less than 50, with the exception of emotional wellbeing and social function, with a mean (SD) of 62.6 (13.9) and 51.1(16.9), respectively. However, in SLE patients, the mean SF-36 domain scores were above 50, except for health change with a mean (SD) of 49 (25.2) (▶ **Fig. 1**).

▶ **Table 5** shows that physical function, role limitation (physical), and pain domains correlated significantly with all muscle performance tests. The fatigue domain only correlated with the 30-sec curl test.

However, ▶ **Table 6** shows that in the SLE group, all SF-36 domains correlated significantly with the 4 muscle tests at different significance levels.

Discussion

Rheumatoid arthritis and SLE are common examples of autoimmune diseases that exert negative effects on physical function and muscle performance in patients. Physical ability and muscle per-

▶ **Table 1** Basic and demographic data of the studied groups.

Variables		RA group (N = 50)	SLE group (N = 50)	Control group (N = 50)	P-value
Age (years)	**range**	20–74	20–62	34–59	P1 = 0.11
	Mean ± SD	46.1 ± 12.9	39.2 ± 12.5	42.8 ± 7.09	P2 = 0.079
Sex	**Male**	3 (6 %)	3 (6 %)	4 (8 %)	P1 = 0.695
	Female	47 (94 %)	47 (94 %)	46 (92 %)	P2 = 0.695
BMI (kg/m2)	**range**	16.3–37.5	17.9–43.3	20.4–37.7	P1 = 0.289
	Mean ± SD	28.3 ± 4.7	27.3 ± 6.1	29.2 ± 4.2	P2 = 0.065
Disease duration (months)	**range**	4–360	3–204	NA	NA
	Mean ± SD	115.8 ± 83.7	63.6 ± 42.4		

RA Rheumatoid arthritis, **SLE** Systemic Lupus Erythematosus, **BMI** body mass index, **P1** P-value between Rheumatoid patients and control, **P2** P-value between Systemic lupus patients and control, **SD** standard deviation, **NA** Not applicable.

▶ **Table 2** Muscle performance tests, levels of physical activity and fatigue score in the studied groups.

Variables	RA (N = 50)	SLE (N = 50)	Control (N = 50)	p-value
30 sec chair stand, mean ± SD	5.2 ± 3.2	7.3 ± 3.2	11.1 ± 3.1	P1 = < 0.001 P2 = < 0.001 P3 = 0.001
30 sec arm curl, mean ± SD	7.1 ± 4.4	10.6 ± 4.8	16.9 ± 4.9	P1 = < 0.001 P2 = < 0.001 P3 = < 0.001
Grip strength, mean ± SD	19.5 ± 11.5	30.9 ± 14.6	35.8 ± 10.5	P1 = < 0.001 P2 = < 0.001 P3 = 0.001
Sit& reach, mean ± SD	0.0 ± 8.03	2.9 ± 6.4	6.1 ± 3.6	P1 = 0.001 P2 = 0.036 P3 = 0.049
FIT Median(IQR) †	9 (6–12.7)	24 (11.25–39)	22 (15–36)	P1 = < 0.001 P2 = 0.488 P3 = < 0.001
FSS Median(IQR) †	44 (39–49)	39.5 (29.5–45)	26.5 (22–29)	P1 = < 0.001 P2 = < 0.001 P3 = 0.005

† Mann-Whitney Test. **RA** Rheumatoid arthritis, **SLE** Systemic Lupus Erythematosus, **SD** standard deviation, **FIT** Frequency Intensity Time, **FSS** fatigue severity scale, **P1** Comparison between the RA and the control groups, **P2** Comparison between the SLE and the control groups, **P3** Comparison between the RA and the SLE groups.

▶ **Table 3** Correlation between disease activity (DAS28 score) and muscle performance tests, level of physical activity and fatigue score in RA group.

RA group Variables N(50)	Low DAS28 (N = 3)	Moderate DAS28 (N = 29)	High DAS28 (N = 18)	p-value
30 sec chair stand, Mean ± SD	8.7 ± 6.02	5.5 ± 2.8	4.1 ± 2.9	0.057
30 sec arm curl, Mean ± SD	12.7 ± 4.04	8.7 ± 3.7	3.7 ± 3.3	< 0.001
Grip strength, Mean ± SD	35.0 ± 15.0	21.9 ± 11.3	13.1 ± 6.7	< 0.001
Sit & reach, Mean ± SD	7.7 ± 6.7	2.2 ± 6.5	4.8 ± 8.2	0.002
FIT, Mean ± SD	41.00 ± 12.12	15.59 ± 15.08	7.00 ± 3.40	< 0.001
FSS, Mean ± SD	33.67 ± 6.81	41.41 ± 6.42	47.56 ± 6.05	0.001

RA Rheumatoid Arthritis, **DAS** Disease Activity score, **SD** standard deviation, **FIT** Frequency Intensity Time, **FSS** fatigue severity scale, **IQR** Interquartile range. P-value < 0.001 is considered highly significant. P-value < 0.05 is considered significant.

formance are not routinely assessed in clinical practice in patients with autoimmune diseases; therefore, relatively little is known about the muscle performance in patients with RA and SLE. To our knowledge, this is the first study to compare physical ability in RA and SLE patients.

Muscle strength and endurance are determinants of muscle performance. In this study, muscle performance and physical abilities in RA and SLE patients were assessed using convenient tests to evaluate the endurance and power of the upper and lower limbs and the flexibility of the lower back. The level of physical activity, fatigue, and QOL were also assessed.

The present study was carried out on150 subjects; 50 RA, 50 SLE and 50 healthy controls and designed to compare between the physical ability, physical activity and quality of life in RA and SLE and investigate their possible relations with disease activity.

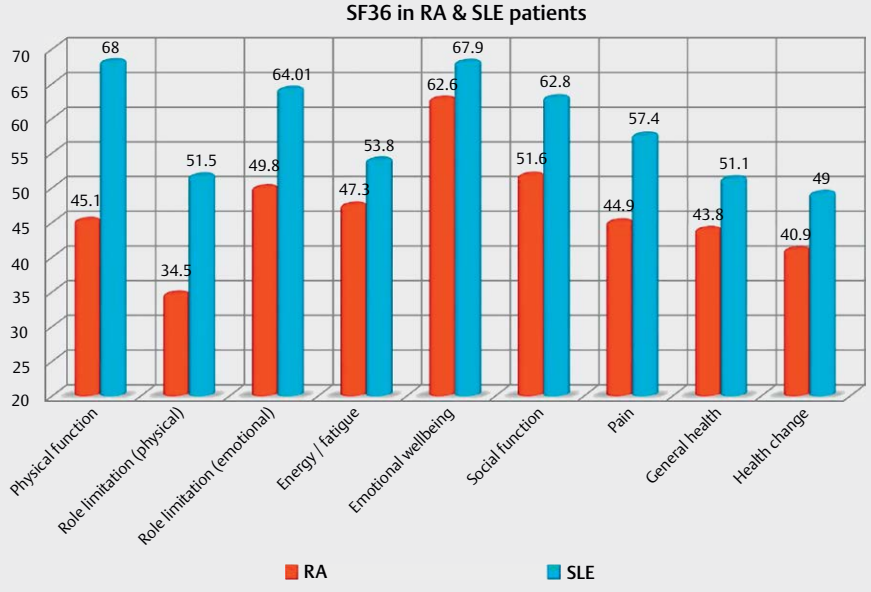
More than 90 % of the study population were females. The female predominance in rheumatic diseases like RA and SLE was previously documented [16].

In both RA and SLE groups of this study, physical abilities of the upper and lower limbs, hand grip strength, and spine flexibility were found to be lower than those recorded in the control group,

▶ **Table 4** Correlation between disease activity (SLEDAI score) and muscle performance tests, level of physical activity and fatigue score in SLE group.

	Mild SLEDAI N = 19	Moderate SLEDAI N = 24	Sever SLEDAI N = 7	P value
30 sec chair stand, mean(SD)	8.16 ± 2.01	13 ± 3.52	5.86 ± 4.45	0.247
30 sec arm curl, mean(SD)	12.05 ± 3.60	10.63 ± 5.19	6.43 ± 4.20	0.026
Grip strength, mean(SD)	35.9 ± 12.6	31.3 ± 14.7	16.4 ± 11.1	0.008
Sit & reach, mean(SD)	5.5 ± 3.6	2.5 ± 6.7	− 2.9 ± 7.9	0.01
FIT, mean(SD)	49.00 ± 25.23	38.16 ± 3.31	26.88 ± 21.05	0.02
FSS, mean(SD)	12.14 ± 7.22	29.10 ± 22.12	35.74 ± 6.88	0.035

SLE Systemic Lupus Erythematosus, **SLEDAI** Systemic Lupus Erythematosus disease activity index, **SD** standard deviation, **FIT** Frequency Intensity Time, **FSS** fatigue severity scale. P-value <0.05 is considered significant.



▶ **Fig. 1** SF36 in Rheumatoid arthritis (RA) & Systemic lupus (SLE) groups. This figure shows that quality of life in the studied disease groups (50 RA and 50 SLE patients) were tested using the SF-36 questionnaire and all domains of the questionnaire were compared between the 2 groups. In RA patients, the mean SF-36 domains were less than 50, with the exception of emotional wellbeing and social function, with a mean (SD) of 62.6 (13.9) and 51.1(16.9), respectively. However, in SLE patients, the mean SF-36 domain scores were above 50, except for health change with a mean (SD) of 49 (25.2).

although SLE group showed relatively better results than in the RA group.

A logical explanation could be the preferential impact of RA on synovial joints leading to joint pain, joint erosion, deformity, muscle weakness and disability. In contrast, SLE does not usually lead to structural joint damage, with relative preservation of joint function.

Similarly, Yenture et al. who compared grip strength of 51 RA patients, 46 SLE patients and 46 healthy controls, found impaired grip strength in both disease groups compared with the controls. Moreover they reported less impairment in SLE patients compared to the RA patients [17]. Grip strength in our RA and SLE patients was negatively correlated to disease activity. In agreement with our results, Sheehy and his colleagues in their retrospective study reported an inverse correlation between disease activity and grip strength in 90 RA patients [18].

In this study, all muscle performance tests in RA patients were inversely correlated to the DAS28-ESR, except for the 30-sec chair stand test where no correlation was found. This may be attributed to the fact that RA affects the lower limb joints less than the hands and upper limb joints. On the other hand, SLE patients showed a significant correlation between muscle performance tests and the SLEDAI score, except for the 30-sec arm curl test. A plausible cause

▶ **Table 5** Correlation study between muscle tests and SF36 in RA group.

RA group	30 sec chair stand		30 sec arm curl		hand grip		Sit & reach	
	r	p-value	r	p-value	r	p-value	r	p-value
Physical function	0.65	<0.001	0.65	<0.001	0.61	<0.001	0.54	< 0.001
Role limitation (physical)	0.43	0.002	0.47	0.001	0.35	0.013	0.32	0.023
Role limitation (emotional)	0.48	0.001	0.28	0.053	0.17	0.227	0.21	0.153
Energy/fatigue	0.31	0.031	0.59	<0.001	0.38	0.006	0.21	0.139
Emotional wellbeing	0.16	0.270	0.39	0.005	0.22	0.120	0.20	0.159
Social function	0.47	0.001	0.57	<0.001	0.49	<0.001	0.26	0.064
Pain	0.44	0.002	0.59	<0.001	0.48	<0.001	0.46	0.001
General health	0.28	0.052	0.55	<0.001	0.44	0.001	0.24	0.096
Health change	0.15	0.3	0.50	<0.001	0.17	0.227	0.29	0.039

RA Rheumatoid Arthritis, **(r)** Pearson correlation coefficient. P-value <0.001 is considered highly significant. P-value<0.05 is considered significant.

▶ **Table 6** Correlation study between muscle tests and SF36 in SLE group.

SLE group	30 sec chair stand		30 sec arm curl		hand grip		Sit & reach	
	r	p-value	r	p-value	r	p-value	r	p-value
Physical function	0.68	<0.001	0.69	<0.001	0.60	<0.001	0.67	<0.001
Role limitation (physical)	0.59	<0.001	0.77	<0.001	0.64	<0.001	0.61	<0.001
Role limitation (emotional)	0.37	0.008	0.55	<0.001	0.51	<0.001	0.54	<0.001
Energy/fatigue	0.60	<0.001	0.68	<0.001	0.60	<0.001	0.64	<0.001
Emotional wellbeing	0.53	<0.001	0.62	<0.001	0.54	<0.001	0.47	0.001
Social function	0.56	<0.001	0.58	<0.001	0.52	<0.001	0.59	<0.001
Pain	0.57	<0.001	0.67	<0.001	0.57	<0.001	0.64	<0.001
General health	0.54	<0.001	0.70	<0.001	0.58	<0.001	0.62	<0.001
Health change	0.40	0.004	0.59	<0.001	0.33	0.021	0.46	0.001

SLE Systemic Lupus Erythematosus. P-value<0.001 is considered highly significant. P-value<0.05 is considered significant.

could be the prominent fatigue exhibited in SLE patients, while there is little joint involvement in these patients.

In the light of our results, Low physical activity levels were reported in the both RA and SLE patients compared to healthy controls. However, the SLE group showed better results compared to the RA group.

In agreement with our results, what was reported by Eriksson et al. who compared the physical activity of 272 SLE patients against equal number of healthy controls .They stated that patients with SLE reported a lower frequency of exercise, lower exercise capacity, and had more limiting factors for exercise activities than controls [19].

A multicenter study (QUEST-RA study) investigated the physical activity level of RA patients and reported that only 13.8 % of the studied patients practiced physical activity more than 3 times a week [20]. Similarly, a systematic review of the literature concerning this issue, encompassing both objective and subjective methods for evaluating physical activity, suggests that physical activity levels among RA patients tend to be lower than that of healthy controls [21].

In their study, Margiotta et al. investigated the physical activity level in 93 SLE patients and reported that 60 % of them didn't meet the WHO recommendations for physical activity [22].

Pain, physical disability, depression, and fatigue are possible causes of low physical activity levels in RA patients [23]. Lack of knowledge and professional advice concerning the benefits of physical activity for RA patients may also be another factor [24]. Other factors that could force SLE patients to limit their physical activity, including constant fatigue, joint pain, depression, photosensitivity, production of inflammatory cytokines, including tumor necrosis factor [25].

The positive association between physical activity and disease activity in RA patients was reported by Larkin et al [26]. Muscle strength of 65 RA patients was measured by Stucki et al. and was reported to be low and associated with disease activity, radiological damage, and disability [27].

Likewise, Johnsson et al. [28] reported that SLE patients had more hand dysfunction and problems with performing daily activities than the general population. Furthermore, Margiotta et al. [29] found that proper control of SLE disease activity and improved management of fatigue along with more effective patient education could contribute to improvement in sedentary behavior.

An unexpected result in our study was that the control group had lower levels of physical activity compared to that of SLE patients. A possible explanation could be that the control group consisted mostly of health care providers with busy schedules that prevented them from participating in physical activities. Low vitamin D levels found in the control group could be another explanation.

In this study, both RA and SLE patients had a high fatigue score, which was significantly different from that of the control group. Fatigue is a common challenge for RA patients with an incidence of more than 50 %. [30], and it may be central or peripheral. [31] It is a prominent feature in SLE, where up to 90 % of patients suffer from constant fatigue, and as a result, they struggle to perform activities of daily living. [32] Physical inactivity was reported among other factors that influence the feeling of fatigue in SLE patients. [33]

In this study, fatigue was found to have significantly positive correlation with the DAS28-ESR and SLEDAI scores. Several studies have shown positive correlations between fatigue and activity scores in RA patients. In the cross sectional study of Thyberg et al, 276 RA patients were investigated for disease activity, physical activity, fatigue and mental health and reported the significant relation between DAS28 and fatigue [34].

Another cross sectional study [35] investigated 50 RA patients for the presence of fatigue. They reported high fatigue level and that fatigue was significantly correlated with DAS score with P value of <0.0001. Additionally, in the study of Abdel-Magied et al, 50 RA patients were investigated for the fatigue level. They reported the significant correlation between the VAS activity score and disease activity measures [36, 37]

Conflicting results were found regarding fatigue and disease activity in SLE patients.Jump et al. studied fatigue in 127 SLE patients by completing a psychosocial questionnaire and reported that disease activity measured by SLEDAI did not account for fatigue in the studied patients [38]. Da Costa et al. investigated the fatigue in his 130 SLE women using Multidimensional Fatigue Inventory (MFI-20), and found that high scores were detected in the general and physical fatigue domains and the disease activity correlates with physical but not mental fatigue domains [39].

Contrary, Wang et al. found no correlation between SLEDAI and Fatigue score measured by the Fatigue severity score (FSS) in his 100 SLE patients [40]. Likewise, Yilmaz-Oner and his colleagues enrolled 99 SLE Patients and 71 healthy controls in their cross sectional study. They found no significant correlation between SLEDAI and Multidimensional Assessment of Fatigue (MEF) [41].Furthermore, Du et al. surveyed 119 SLE patients for fatigue using the FSS scale and found no significant differences between fatigued and non- fatigued patients in the degree of disease activity ($P = 0.0881$) [42].

In this study, QOL was assessed using the most commonly used generic tool, the SF-36. Low QOL scores were recorded in both disease groups as compared to the SF36 norms, although SLE patients had relatively better scores than patients with RA. A great body of evidence had reported that RA causes deterioration of all domains of QOL. Goma et al. reported that all domains of SF36 were impaired in their 50 RA patients [43]. Moreover 464 RA patients were investigated by Katchamart and his colleagues for the quality of life using Thai version of EQ global health visual analogue scale (EQ VAS) and EuroQol five dimensional questionnaire (EQ-5D). They reported different degrees of deterioration in the physical and psychological elements of the assessment tools [44]. Nevertheless, a systematic review and meta-analysis done by Matcham et al. had included 31 studies which used SF36 questionnaire as an outcome. They concluded that RA exerted negative influence on both the physical and mental domains of the questionnaire [45]. Pain, fatigue, stiffness, and physical inactivity could be contributing factors of low QOL RA patients.

Likewise, SLE patients have reported a low QOL level, which is comparable to the QOL levels in patients with chronic diseases. Doria el al. reported low quality of life of 126 Italian SLE patients using SF36 [46]. As well, McElhone and his colleagues concluded in their review that SLE patients have low quality of life comparable to that found in severe medical illnesses like RA, Systemic sclerosis and AIDS [47].

In this study, the SF36 domains named physical function, role limitation (physical), and pain were significantly correlated with the four tests of muscle performance in the RA group. This could be due to the preferential impact of RA on the musculoskeletal system, including pain, joint deformity, and muscle weakness leading to physical impairment. However, in the SLE group, all the SF-36 domains were found to correlate significantly with the four muscle performance tests. This could be due to fatigue, which is a prominent feature of SLE and negatively impacts both the physical and mental status of SLE patients.

This study has some limitations, including the relatively small number of patients and control subjects and the cross-sectional nature of the study. We recommend further studies of predictors of low muscle performance in different rheumatic diseases. The results of this study suggest involving patients with Rheumatoid arthritis and systemic lupus into regular physical activity to help improving their physical abilities and quality of life.

In conclusion, physical abilities and muscle performance in RA and SLE patients were lower than that in healthy controls. However, SLE patients showed relatively better results compared to RA patients. Disease activity in RA and SLE correlated significantly with muscle performance, fatigue, and physical activity level. Lastly, QOL scores in both RA and SLE patients were correlated with the results of muscle performance tests.

Acknowledgements

Wir möchten Editage (www.editage.com) für die Bearbeitung in englischer Sprache danken.

Conflict of Interest

The authors declare that they have no conflict of interest.

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