T.C.

PAMUKKALE UNIVERSITY

Non-Interventional Clinical Research Ethics Committee

Number: E-60116787-020-406048 **Date: 16.08.2023**

Subject: Regarding Your Application

Dear Prof. Dr. Bilge BAŞAKCI ÇALIK

Reference: Your petition dated 08.08.2023.

Your study titled **"The Effect of Telerehabilitation-Based Single and Dual-Task Training Combined with Physical Activity Education on Physical and Cognitive Functions in Individuals with Primary Sjögren's Syndrome: A Randomized Controlled Double-Blind Study,"** which was submitted with the reference petition, was reviewed at our committee meeting dated 15.08.2023, numbered 13.

Following the deliberations; it has been decided unanimously that **THERE IS NO ETHICAL OBJECTION** to conducting the aforementioned study, and that our Committee must be informed of any modifications regarding the study.

Kindly submitted for your information.

Prof. Dr. Hülya ÇETİN
Head of the Committee

This document has been signed with a secure electronic signature. Document Date and Number: 16.08.2023-E.406048

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The Effect of Telerehabilitation Based Physical Activity Training Associated with Single And Dual Task Training on Physical and Cognitive Functions in Individuals with Primary Sjögren's Syndrome: A Randomized Double-Blind Controlled Trial

Background:

Studies investigating internet-based exercise applications in individuals with rheumatic diseases are limited; furthermore, it is observed that no such exercise method has been implemented in individuals with Primary Sjögren's Syndrome (pSS). In existing literature, individuals were encouraged to engage in physical activity through internet-based applications, and the benefits of remaining active were delivered within the scope of patient education, which has been reported to effectively improve physical activity levels. Additionally, it has been documented that this approach can enhance endurance and is both safe and feasible.

Objective:

This study aims to investigate the effectiveness of telerehabilitation-based single and dual-task training, combined with physical activity training, on symptom severity, functional status, fatigue, quality of life, cognitive level, sleep, self-efficacy, and satisfaction levels in individuals with Primary Sjögren's Syndrome.

Methods:

A minimum of 36 individuals aged 18–65 diagnosed with Primary Sjögren's Syndrome (pSS) based on the American-European Consensus Group (AECG) classification criteria and followed up at the Pamukkale University Rheumatology Clinic will be enrolled, provided they exhibit no concomitant functional-limiting diseases. Participants will be allocated into either the Single-Task Training Group (n=18) or the Dual-Task Training Group (n=18). Demographic attributes (e.g., name, gender, educational background), clinical parameters (e.g., age, anthropometric measurements, comorbidities), and perspectives regarding physical activity derived from a literature-based questionnaire will be documented via a baseline registration form.Symptom severity will be quantified using the EULAR Sjögren's Syndrome Patient Reported Index (ESSPRI). Dual-task performance will be operationalized as a motor-cognitive paradigm by integrating a backward counting task into the Timed Up and Go (TUG) test. Secondary clinical endpoints include physical activity levels via the International Physical Activity Questionnaire Short Form (IPAQ-SF), lower extremity musculature strength via the Sit-to-Stand Test, fatigue severity via the Multidimensional Fatigue Inventory (MFI-20), cognitive status via the Montreal Cognitive Assessment (MoCA), self-efficacy via the General Self-Efficacy Scale, health-related quality of life via the Short Form 36 (SF-36) Health Survey, sleep quality via the Pittsburgh Sleep Quality Index (PSQI), and motivation via the Social Support Scale.Outcome measures will be administered longitudinally by a blinded assessor at baseline and at the 8-week post-

intervention follow-up. Following initial screening, participants will be randomly allocated into the respective treatment arms. Methodological blinding will be rigorously maintained by ensuring the intervention provider remains masked to all outcome assessment data, while the statistician remains blinded to group allocation.

Educational Approaches and Interventions:

Self-Management and Physical Activity Education:Prior to initiating the telerehabilitation-based single-task or dual-task exercise interventions, participants will undergo a comprehensive educational curriculum. This module will encompass the pathophysiology of the immune system, the clinical definition and symptom complex of pSS (including symptom interrelationships), chronic pain management strategies, relaxation and respiratory training, joint protection principles, and energy conservation techniques. Subsequently, detailed instruction will be provided on the conceptual definition and typologies of physical activity, its systemic impacts on physical and cognitive health, facilitators and barriers to adherence, and behavioral strategies to enhance physical activity levels. Self-management support will be longitudinally reinforced across subsequent sessions via structured motivational interviewing techniques alongside the physical training.

Telerehabilitation-Based Single-Task Training:

Participants allocated to this intervention arm will receive the identical self-management and physical activity education delivered via synchronous online sessions. The physical training protocol comprises core stabilization-focused functional exercises, including standardized warm-up and cool-down periods, administered online by a physical therapist 3 times a week for 8 weeks. Each 60-minute session will consist of a 10-minute warm-up, followed by 40 minutes of upper and lower extremity functional exercises executed while maintaining precise core stabilization, and will conclude with a 10-minute flexibility-focused cool-down protocol. Progression of the exercise workload will be tailored dynamically based on individual performance, operationalized through incremental increases in repetition volume and exercise difficulty levels.

Telerehabilitation-Based Dual-Task Training:

Participants in this arm will receive the same synchronous online self-management and physical activity education. The foundational physical exercise protocol remains identical in frequency, duration, and structure (a 60-minute session administered 3 times a week for 8 weeks, comprising a 10-minute warm-up, 40 minutes of core-stabilized upper/lower extremity functional exercises, and a 10-minute flexibility cool-down supervised online by a physical therapist). However, the single-task functional movements will be strictly integrated with simultaneous cognitive paradigms. Cognitive workload progression will be systematically advanced as follows: reciting the immediate preceding digit (\(n-1\)) from a given number within

the 0–100 range, progressing to \(n-2\) and \(n-3\) backward sequencing; increasing the place value complexity during continuous single-digit addition tasks; working memory recall of a 4-digit sequence, scaled up incrementally to a 9-digit span; and reciting the immediate succeeding digit (\(n+1\)) from a given number within the 0–100 range, progressing to \(n+2\) and \(n+3\) forward sequencing.

Statistical Analysis:

A priori power analysis was conducted based on the total physical component summary score of the SF-36 from a reference study (31), which yielded an effect size of \(d = 0.862\). Under the assumption of achieving a comparable effect size, the power analysis indicated that a minimum sample size of 36 participants (18 per group) would provide 80% statistical power at a 95% confidence interval.All statistical analyses will be performed using the SPSS software package. Descriptive statistics will be computed, reporting frequencies and percentages for categorical variables, and means and standard deviations for continuous variables. Inter-group comparisons of discrete categorical variables will be analyzed using the Chi-square test. The normality of data distribution will be evaluated using the Kolmogorov–Smirnov test. For inter-group comparisons of continuous variables, the independent samples t-test will be employed when parametric assumptions are met; otherwise, the Mann–Whitney U test will be utilized. For intra-group longitudinal comparisons, the paired samples t-test will be applied if parametric assumptions are satisfied; if not, the Wilcoxon signed-rank test will be used. For all statistical tests, the level of significance will be set a priori at \(p \le 0.05\).

Study Location / Research Site(s):

Pamukkale University Rheumatology Clinic and Pamukkale University Faculty of Physical Therapy and Rehabilitation, Denizli, Türkiye.

Clinical and Laboratory Examinations / Interventions to be Performed:

Clinical assessments and digital telerehabilitation interventions will be jointly administered at the Pamukkale University Rheumatology Clinic and the Pamukkale University Faculty of Physical Therapy and Rehabilitation.

Other Information Regarding Volunteers:

Anticipated Number of Volunteers / Patients: A minimum of 36 individuals with Primary Sjögren's Syndrome (Single-Task Training Group: n=18, Dual-Task Training Group: n=18)Age Range: 18–65 years.

Inclusion Criteria for Volunteers:

- Diagnosis of Primary Sjögren's Syndrome based on the 2016 ACR/EULAR classification criteria,

- Minor salivary gland incisional biopsy graded as Grade 3 or 4 according to the Chisholm-Mason classification,
- Being between 18 and 65 years of age,
- Having no concomitant functional-limiting diseases other than Primary Sjögren's Syndrome,
- Maintaining a stable medication regimen for at least 3 months or longer,
- Providing voluntary informed consent to participate in the study,
- Having stable internet access and the proficiency to use a smartphone.
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Exclusion Criteria for Volunteers:

- Refusal to participate in the study,Severe psychiatric conditions that preclude participation (e.g., psychotic disorders),
- Cognitive impairment severe enough to compromise cooperation,
- Psychiatric illness severe enough to compromise cooperation,
- Pregnancy,
- Inability to understand or speak Turkish,
- Use of an assistive walking device,
- Concomitant neurological disorders affecting the central nervous system (e.g., multiple sclerosis, Parkinson's disease),
- Heart failure or pulmonary pathology at a severity that impacts activities of daily living,
- Any musculoskeletal, orthopedic, neurological, or psychological pathology that restricts participation in an exercise program,
- Presence of an additional overlapping or secondary rheumatic disease,
- Undergoing major surgical or arthroscopic intervention within the last 1 year,
- Presence or history of malignancy,
- Active tobacco or alcohol consumption.

Expected Benefits / Significance of the Study:

The 2021 EULAR (European Alliance of Associations for Rheumatology) recommendations emphasize that empowering individuals to better understand their diseases and improving their ability to effectively cope with the physical and psychological impacts of the condition are critical facets of patient care. However, standard clinical management often proves insufficient in this regard, prompting researchers to suggest that strengthening self-management skills could address these limitations. Furthermore, contemporary literature underscores that digital healthcare is crucial for supporting and optimizing self-management.Driven by these recommendations and given the expanding utilization of telerehabilitation methods across diverse populations in recent years, we hypothesize that telerehabilitation could enhance exercise adherence in individuals with Primary Sjögren's Syndrome (pSS). Consequently, we believe that delivering self-management and physical activity education via a telerehabilitation framework—combined with single and dual-task exercise training—will be highly beneficial in alleviating

disease symptoms and keeping individuals physically active. Since no prior study in the literature has incorporated single and dual-task training aimed at increasing physical activity within this specific population, this trial—integrating both self-management/physical activity education and single/dual-task exercise protocols via telerehabilitation—will provide novel insights to the literature and illuminate clinical practice for healthcare professionals working in this field.

PAMUKKALE UNIVERSITY

NON-INTERVENTIONAL CLINICAL RESEARCH ETHICS COMMITTEE

INFORMED VOLUNTARY CONSENT FORM

(For the Experimental)

You have been invited to participate in a research study titled **"The Effect of Telerehabilitation-Based Single and Dual-Task Training Combined with Physical Activity Education on Physical and Cognitive Functions in Individuals with Primary Sjögren's Syndrome: A Randomized Controlled Double-Blind Study"**, for which Prof. Dr. Bilge BAŞAKCI ÇALIK is the principal investigator. This study is being conducted for research purposes. We recommend your participation in this study. Participation is entirely voluntary. Before deciding whether to participate, it is important for you to understand why the research is being conducted, how it will be performed, how your information will be used, and what the study entails. Please read the following information carefully and feel free to ask for clear answers to any questions you may have. If you wish to participate after being fully informed and after all your questions have been answered, you will be asked to sign this form.

• What are the objectives and rationale of the study, and how many people besides me will participate?

When previous studies are reviewed, it is observed that internet-based self-management and physical activity education methods are utilized in different disease groups. Within these education programs, individuals are supported in physical activity, and efforts are made to identify barriers to exercise. However, there is no study in the literature conducted with individuals with Primary Sjögren's Syndrome (pSS) regarding single and dual-task training applications combined with internet-based physical activity education.

This study aims to investigate the effectiveness of telerehabilitation-based single and dual-task training, combined with physical activity training, on symptom severity, functional status, fatigue, quality of life, cognitive level, sleep, self-efficacy, and satisfaction levels in individuals with Primary Sjögren's Syndrome.

Our study is planned to be completed within 2 years after receiving ethics committee approval.

It is planned to enroll at least 17 other individuals besides you in the study.

• Should I participate in this study?

Whether or not to take part in this study is entirely up to you. If you decide to participate, you will be given this written informed consent form to sign. Even if you sign this form now, you are free to withdraw from the study at any time without giving any reason. If you choose not to participate or if you leave the study, there will be no change in the treatment provided to you by your doctor. You also have the right to withdraw your consent at any stage of the study.

• What expects me if I participate in this study?

Participants' demographic data (name, gender, years of education, etc.), clinical data (age, height, weight, chronic diseases, etc.), and their perspectives on physical activity, obtained through questions derived from a literature review, will be recorded in the demographic registration form. You will be expected to fill out scales evaluating symptom severity using the EULAR Sjögren's Syndrome Patient Reported Index (ESSPRI), physical activity levels with the International Physical Activity Questionnaire Short Form (IPAQ-SF), fatigue with the Multidimensional Fatigue Inventory (MFI-20), cognitive level with the Montreal Cognitive Assessment (MoCA), self-efficacy with the General Self-Efficacy Scale, quality of life with the Short Form 36 (SF-36) Health Survey, sleep quality with the Pittsburgh Sleep Quality Index (PSQI), and motivation level with the Social Support Scale. Additionally, for the dual-task assessment, you will be asked to perform a motor-cognitive task by adding a backward counting task during the Timed Up and Go (TUG) Test, and the Sit-to-Stand Test for lower extremity muscle strength.

• What are the benefits of my participation in the study?

The importance of physical activity combined with self-management education is emphasized in the treatment of rheumatic diseases. In recent years, with increasing interest, it has been observed that telerehabilitation methods enable the remote delivery of self-management and exercise training. Therefore, we believe that self-management and physical activity education implemented via telerehabilitation may be beneficial in improving your symptoms and keeping you physically active by increasing compliance with the single and dual exercise training program.

• What is the cost of my participation in this study?

By participating in the study, you will not incur any financial liability, and no payment will be made to you.

• How will my personal information be used?

Your investigator will use your personal information to conduct the research and statistical analyses, and your identity credentials will be kept strictly confidential by your investigator throughout the study. At the end of the study, you have the right to request information regarding the research results. Without your written permission, your information cannot be viewed or disclosed by anyone else. The study results may be used in scientific publications when the study is completed, but your identity will remain strictly confidential.

• Whom can I contact for further information, help, and communication?

When you have a problem related to the study or require additional information, please contact the following person:
NAME: Aylin KESKİN
POSITION: PhD Student
PHONE: 05547475748

(Statement of the Volunteer/Patient)

I have been informed about the medical research to be conducted in the Department of Physical Therapy and Rehabilitation by Prof. Dr. Bilge BAŞAKCI ÇALIK, and I have read the relevant text. Following this

information, I have been invited as a 'participant' to this research.
I fully understand all the explanations made to me in detail. Under these conditions, I agree to participate in the clinical research in question voluntarily, with my own consent, without any pressure or coercion.

a. I have been informed that I have the right to refuse to participate in the research. I also know that this situation will not cause any harm to my medical care and my relationship with the physician.

b. I am aware that I can withdraw from this study at any time without showing any justification, provided that I inform the principal investigator/physician. I know that if I refuse to participate or withdraw later, I will not incur any liability and this situation will not affect the medical care I need now or in the future in any way. (However, I am aware that it would be appropriate to inform them in advance that I will withdraw from the research so as to not leave the investigators in a difficult position).

c. The investigator/physician who is the coordinator of the study may exclude me from the scope of the study without my consent, provided that no harm is caused to my medical condition due to my negligence in fulfilling the requirements of the study program.

d. The results of the study may be presented at scientific meetings or in publications. However, in such cases, my identity will be kept strictly confidential.

e. I do not incur any monetary responsibility regarding the expenditures to be made for the research. No payment will be made to me either.

f. A signed copy of this form will be given to me.

Participant
Name, Surname:
Address:
Tel:
Signature:
Date:

Interview Witness
Name Surname, Title: Bilge BAŞAKCI ÇALIK, Prof. Dr.
Address: Pamukkale University
Faculty of Physical Therapy and Rehabilitation
Tel: (505) 406 12 87
Signature:
Date:

Informing Investigator
Name Surname, Title: Aylin KESKİN, MSc PT
Address: Pamukkale University
Faculty of Physical Therapy and Rehabilitation
Tel: (554) 747 57 48
Signature:
Date:

PAMUKKALE UNIVERSITY
NON-INTERVENTIONAL CLINICAL RESEARCH ETHICS COMMITTEE

INFORMED VOLUNTARY CONSENT FORM
(for the Active Comparator**)**

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Participant
Name, Surname:
Address:
Tel:
Signature:
Date:

Interview Witness
Name Surname, Title: Bilge BAŞAKCI ÇALIK, Prof. Dr.
Address: Pamukkale University
Faculty of Physical Therapy and Rehabilitation
Tel: (505) 406 12 87
Signature:
Date:

Informing Investigator
Name Surname, Title: Aylin KESKİN, MSc PT
Address: Pamukkale University
Faculty of Physical Therapy and Rehabilitation
Tel: (554) 747 57 48
Signature:
Date:

PAMUKKALE UNIVERSITY NON-INTERVENTIONAL CLINICAL RESEARCH ETHICS COMMITTEE

VOLUNTEER PROTECTION COMMITMENT LETTER

16/08/2023

We hereby commit that the personal information of the patients participating in the study titled **"The Effect of Telerehabilitation-Based Single and Dual-Task Training Combined with Physical Activity Education on Physical and Cognitive Functions in Individuals with Primary Sjögren's Syndrome: A Randomized Controlled Double-Blind Study"** will be kept strictly confidential, and any expenses arising from non-routine examinations will not be billed to the patients or the institutions.

Principal Investigator Name, Surname

MSc. PT. Aylin Keskin

Pamukkale University

Faculty of Physical Therapy and Rehabilitation