Feasibility of Home-Based Rehabilitation on Body Composition, some Anthropometric Measures and Muscular Strength after interruption 4-5 years of Spinal Cord Injury: Serial Cases Study on ISIS War Survivors in Iraq

Summary

Background: The war in Mosul wrecked hospitals and rehab centers, leaving a gap in rehabilitation services. This resulted in a need for alternative solutions for rehabilitation. Objectives: This study aims to create a home-based rehabilitation program (HBRP) that fits the participant; surroundings, and also detect and evaluate how effective it is in improving body composition, some anthropometric measurements, and muscle strength after a (4-5) year break in rehabilitation.

Methods: This voluntary controlled trial included 18 volunteers split into three groups: 13 people with Spinal Cord Injury (SCI) their injuries time since (53.4-55) months. They joined voluntarily into Two groups, Eight in the experimental group (Exp.) and Five in the first control (1st Con.); while Five were healthy individuals in the second control (2nd Con.); all around (21.2) years old on average. The HBRP focused on muscles and whole-body joints by using the basic equipment and exercises right at the patient's homes. The program consisted of five weekly sessions with a gradually increasing achievement time of (45-120) minutes per session, participants were given rest time between exercises based on their level and severity of injury. The assessment was every three months.

Innovatively, this study stands out by introducing an HBRP tailored for individuals with SCI after interruption sustained (4 - 5) years ago. This unique approach not only addresses the challenges posed by the interruption of previous rehabilitation efforts but also seeks to uncover the efficacy of rehabilitation in these specific circumstances.

Conclusions: The study concluded that HBRP affected positively the muscles morphologically and functionally despite a stop in rehabilitation for a long period of (4-5) years for individuals with SCI.

Background

Spinal Cord Injury (SCI) is a complex pathology that requires skills in assessment, treatment, and rehabilitation, SCI is a large topic area. Approximately (90%) of SCI cases occur as a result of traumatic causes Globally, incidence varies from 40 to 80 cases per million population. So, people with injuries consequences are becoming more frequent due to conflicts and wars. In Iraq, the main reasons for the occurrence of this injury due to were the Islamic State in Iraq and Syria (ISIS) war, which is resulting in enormous unmet rehabilitation needs. Alarcon Cieza found in his study Rehabilitation the health strategy of the 21st Century that the rehabilitation stakeholders need to bring

together the distinct portraits of rehabilitation under the concept of functioning because much of these unmet needs are concentrated amongst the poorest populations in low- and middle-income countries and conflict-affected settings, which are often ill-equipped to cope with these increasing needs for rehabilitation services. Iraq is regarded as one of these countries its health sectors, including rehabilitation, have been exhausted due to wars and armed violence. However, rehabilitation can be effective across almost all conditions, therefore in some ways, we should have been so backwards about recognizing the effectiveness of rehabilitation for many years.

It is worth noting that healthcare problems are among the most complex problems faced by human beings, especially under conditions of war, armed conflicts, terrorist operations and post-war secretions. In low-middle income countries, so many people would die from SCI within a year, two years, or three years from infection, renal failure, and so on, and also people could not work, and they either were at home or in residential care, just waiting to die. One of the defining characteristics of rehabilitation is that there are many interventions; in contrast to most medical conditions, rehabilitation can take place in any setting as a process for problem-solving.

In Iraq, war-related destruction of health institutions and rehabilitation centers has led to a focus on home-based rehabilitation programs (HBRP) and new sporting activities as positive and alternative approaches for rehabilitating individuals with SCI. This article emphasizes the significance of home-based rehabilitation for individuals with SCI to prevent complications that arise from neglecting rehabilitation. Neglecting rehabilitation can result in complex health problems, a major concern observed among the study participants who discontinued rehabilitation due to ineffective and insufficient programs. Additionally, there was a notable mismatch between the participantscircumstances and the available rehabilitation systems and methods. To ensure continuous and successful rehabilitation for individuals with SCI, it is important to implement exercise regimes that intrinsically motivate them. Robert et al, confirmed that rehabilitation can occur at home, and it is a practical matter of what is the best way to organize it so that the patient is safe, the necessary equipment is available, and the therapists and other team members, time is used appropriately. The process is a standard problem-solving process individualized to the patient, which is necessary when solving any problem. Reconsidering rehabilitation at home by introducing new sporting activities has been recognized as a positive and desirable area of rehabilitation 8.

Objectives: Innovatively, this study stands out by introducing an HBRP tailored for individuals with SCI after interruption sustained between (4 - 5) years ago. This unique approach not only addresses the challenges posed by the interruption of previous rehabilitation efforts but also seeks to uncover the efficacy of rehabilitation in these specific circumstances.

The main contributions of this study are:

To the best of the authors' knowledge, this is the first study in Iraq that highlighted the surviving victims of ISIS with SCIs.

The preparation of a home-based rehabilitation program (HBRP) that lasted for six months and that was compatible with the participants' living and environmental conditions as an alternative solution for conditions after the war also, at the time of the COVID-19 pandemic when everything was under the closure.

Assessing the effectiveness of rehabilitation on some anthropometric and physical variables in participants with SCI following participants' stopping of rehabilitation for (4-5) years after SCI.

The study raises two questions

Does the home-based rehabilitation program (HBRP) affect people with spinal cord injury through interruption of rehabilitation for 4-5 years?

Is the HBRP effects on variables such as body composition (Weight, BMI); Anthropometric Measures, and Muscle strength?

Methods

This voluntary controlled trial included 18 volunteers split into three groups: 13 people with Spinal Cord Injury (SCI) their injuries time since (53.4-55) months. They joined voluntarily into Two groups, eight in the experimental group (Exp.) and Five in the first control (1st Con.); while five were healthy individuals in the second control (2nd Con.); all around (21.2) years old on average. As a first procedure, detailed interviews were conducted with each participant at the beginning of the study to gather information about their physical, psychological, and social well-being. This information helped the authors create personalized rehabilitation plans for each participant to ensure their

participation in the study for the entire 6 months period. Through our study objectives, the authors used body composition such as height, weight, BMI and some anthropometric measurements for body parts circumferences by using tape measurements, similar to a previous study by Akita et al. Also, muscle strength tests were performed on participants' lower and upper extremities, head, and trunk to measure various movements. The 2nd control group completed their measurements and tests at college. Additionally, a clinical test using the American Spinal Injury Association scale (ASIA) was conducted on each participant to assess sensory feeling and voluntary movement potential on both sides of the body.

The physical tests were conducted using a handheld muscle tester called MicroFET2 to evaluate the strength of participants' lower extremities, head, and trunk by using unit measure kilogram (kg) 11. The Exp. group underwent a 6-month intensive rehabilitation program that involved whole-body exercises, including stretching, strength, endurance, and aerobic training, which was prepared based on previous studies 12. The program included five weekly sessions of (45-120) minutes, gradually increasing in intensity. It encompassed various exercises like bed exercises, rubber ball exercises for strength and balance, trunk flexibility exercises, crawling, rolling, ball-related movements, and exercises on parallel bars. Also, aerobic exercises targeted cardiorespiratory fitness. While weight exercises focused on the upper limbs, shoulders, chest, and back. Rest periods were personalized based on injury severity and overall health. The authors updated the exercises based on regular assessments every 3 months, tracking muscle strength and endurance. The authors created a contact link for coordination among medical, rehabilitative teams, and participants, families, overcoming some challenges within the Iraqi healthcare system.

To address complex complications like bed sores, renal infections, and muscle atrophy, the authors followed the method of psychological support. This method aimed to stimulate patients, willpower, encouraging them to overcome complications and emphasizing the benefits of rehabilitation for improved overall health and independence, by made WhatsApp group was created to facilitate information sharing and provide visual evidence of successful cases, inspiring and encouraging participants. Furthermore, the participant weight and BMI were monitored due to the potential impact of factors such as limited movement and hormonal changes on weight fluctuations, as recommended in previous studies.

The study highlights the participants the participants fidelity to treatment, as evidenced by positive outcomes and sustained progress beyond the conclusion of the therapeutic experiment. The participants demonstrated loyalty through ongoing communication with the main author, seeking feedback on their rehabilitation stages who reach it. Notably, some participants achieved the significant milestone of walking by standard walker with the assistive device Knee-Ankle-Foot-Orthosis (KAFO).

Statistic Analyze

The study used Two-way ANOVA repeated measures as a statistical analysis method, with effect size and improvement percentage (IP) as measures, and (IBM-SPSS statistics processor version 20) for data analysis. A statistical significance level of $P \leq 0.05$ (alpha) was used.

Ministry Of Health
Nineveh Health Directorate
Training & Human Development Center

Decision number: (79/21)
Date: 2021/7/11

Form number
2021/03

Research committee decision

The research committee of Nineveh Health Directorate has discussed the research protocol number **(79/21)**

Entitled:

(Assessment of three years follow up to rehabilitative program for patients with Spinal Cord Injury from Sab-acute stage to Ambulation) .

Submitted by researchers:

(Munib Abdullah Fathe, Wassim Moalla, Saad Kazim Karim)

To the research and knowledge management unit at the training and human development center of Nineveh Health Directorate on Mosul /Iraq

The committee has decided to :

*Accept the above-mentioned research protocol as it meets the standards adopted by ministry of health for the implementation of research, and there is no objection to implementing it in the directorate's institution.

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Rapporteur of the committee
Dr. Marab Younis Abdullh Al-Fathi

Chairman of the committee
Dr. Muataz Abdul-Aljawad Al-Aani

Notes:

- The committee chairperson / committee rapporteur was authorized to sign this decision on behalf of the remaining members of the committee under the rules of procedure of the research committee.

-The Research Committee approval means that the research project submitted to the aforementioned committee has fulfilled the ethical and methodological standards adopted by the Ministry of Health for conducting a research. As for the Implementation of the research, it depends on the researcher's adherence to the Instructions of the health institution in which the research will be implemented as well as the laws, instructions and recommendations in force that govern the practice of medical and health action in Iraq.