



# Satisfaction and Reduction of Pain Following Tele-Physiotherapy of Patients with Musculoskeletal Disorders during the COVID- 19 Pandemic Disorders

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## Abstract

**Introduction:** This study aimed to investigate the rate of satisfaction and pain reduction in musculoskeletal patients by using tele-physiotherapy during the COVID-19 pandemic infection disease.

**Methods:** Eighteen patients with shoulder, knee, neck, and thoracic pain received some advice through video conferencing or video calls. All participants received different exercises based on the patient's pathology or using some accessible modalities such as cold or hot packs. Interventions were followed by online platforms such as chat/massage and video conferencing by WhatsApp or Telegram program. Pain intensity was assessed by the Numeric Rating Scale, and satisfaction was evaluated by the Telehealth Satisfaction Questionnaire.

**Results:** Statistical analysis showed a significant reduction of pain ( $p < 0.001$ ), with a high effect size = 2.9. The rate of satisfaction of patients was detected high about all questions.

**Conclusion:** This study suggests that tele-physiotherapy can effectively reduce pain and increase satisfaction during pandemic infected disease or for patients in remote areas.

**Keywords:** Telehealth; Remote Physical Therapy; Telemedicine; Musculoskeletal Disorders; Satisfaction; COVID-19 Infection

## Introduction

The most significant public health disaster has recently been severe acute respiratory syndrome caused by Coronavirus disease 2019 (COVID-19) [1]. In this situation staying at home and social distancing with limited outpatient

care have been recommended. Thus, an innovative method has been employed to provide physical therapy and rehabilitation for different patients [2,3]. Accordingly, using Information and Communication Technologies (ICT) for online management and digital-based physiotherapy is safe for patient's care [2]. Some services that can be

provided by tele-physiotherapy during this pandemic are remote assessment, prescription of exercise therapy, and monitoring of progress [3]. Self-management of patients in tele-physiotherapy leads to more patient involvement with positive impacts on the clinical outcomes. However, the lack of adequate skills to use tele Care safely and effectively by patients may be a barrier for some therapists [4].

Previous systematic reviews reported positive experiences, significant clinical outcomes, and high patient satisfaction using tele-physiotherapy [5,6], even compared to in-person care [7]. Some patients also preferred to receive tele-physiotherapy with a combination of office-based treatment [8]. As respects musculoskeletal disorders (MSDs) are common problems with costly affected both individual and society economic, hence physical functioning, mental status, and quality of life of these patients are also affected. In patients with MSDs, conservative treatment is considered the first-line approach [8]. During the pandemic infection disease, it seems virtual consultations and tele-physiotherapy can be helpful for these patients. Previous studies revealed acceptable results with positive efficiency of telerehabilitation in patients with MSDs, knee arthritis, and pediatric disorders [9-11]. According to the review article, there were only a few studies and knowledge gaps regarding patient satisfaction, perception, and effect size of telerehabilitation services during COVID-19 pandemic infection disease [12-14]. The purpose of this study was to evaluate the pain improvement and patient satisfaction after tele-physiotherapy in patients with musculoskeletal disorders.

## Materials and Methods

### Study Design

Eighteen patients with musculoskeletal disorders referred to the physiotherapy department volunteered to contribute to tele-physiotherapy sessions. This study was approved in Tehran University of Medical Sciences with ethical member IR.TUMS.FNM.REC.1401.015.

### Participants

Participants with aged between 15 to 40 years without problem in using videoconferencing at home volunteered to participation in this study. Participants with a history of surgery, neurological or vestibular disorders were excluded

from the study. Information about age, gender, systemic illness, specific joint disorders and painful function, the involved joint, pain intensity, and pain duration were collected. After clinical assessment, a customized treatment protocol includes exercises and some home accessible modalities such as heat/cold pack was designed for each patient based on their situation through WhatsApp or Telegram program.

Before starting physiotherapy, the main problems were discussed with each patient using a 3D anatomy model. Each patient identified their functional goals for the treatment plan. The therapist closely monitored patient movements and actively monitored patients during exercises performed. In some cases, the physiotherapist explained how to perform exercises, or sometimes available videos were sent to the patients. Available equipment at home was also recommended for exercise therapy and monitoring patients' clinical progress.

The first exercise session was conducted using a videoconferencing tool for all patients, and based on patient condition and convenience, the treatment sessions were conducted daily or every other day. Research Ethics Committee at the XXX University of Medical Sciences and followed the principles of the Declaration of Helsinki.

### Outcome measures

The outcome was measured based on two parameters – pain intensity and patient satisfaction. Pain intensity was assessed by the Numeric Pain Rating Scale (NPRS) at baseline and after 10 sessions by oral description of pain intensity experienced in the last 24 hours [15]. NPRS is an 11-point scale (0 being no pain and 10 being the worst imaginable pain) (Figure 1).

Patient satisfaction was evaluated by Telehealth Satisfaction Questionnaire. These questions were included in Table 2.

The patients answered questions based on 0 to 100% satisfaction. These questions evaluated the patient experience during the intervention sessions. Patient satisfaction and feedback of patients on various aspects of tele-physiotherapy were obtained by some questions designed on Google form questionnaire.

TELEHEALTH SATISFACTION SURVEY (FOR TELEREHABILITATION AND TELEVISITATION SESSIONS) FAX TO : 514-398-1531				
<input type="checkbox"/> Speech/language therapy		<input type="checkbox"/> Occupational therapy		<input type="checkbox"/> Physical therapy
<input type="checkbox"/> Televisitation				
Patient code: _____	Gender <input type="checkbox"/> Male <input type="checkbox"/> Female		Age <input type="checkbox"/> 0 - 20 <input type="checkbox"/> 21 - 40 <input type="checkbox"/> 41 - 60 <input type="checkbox"/> 61 - 80 <input type="checkbox"/> 80+	
<b>How satisfied were you with:</b>	<b>Poor</b>	<b>Fair</b>	<b>Good</b>	<b>Excellent</b>
• The voice quality of the equipment?				
• The visual quality of the equipment?				
• Your personal comfort in using the telehealth system?				
• The length of time to get an appointment in Fort Chip?				
• The ease of getting to the telehealth department (circle one: taxi, private, walked, CHR, staff)				
• The length of time with the therapist or family member you saw?				
• The explanation of your treatment by the telehealth staff?				
• The thoroughness, carefulness and skillfulness of the telehealth staff?				
• The courtesy, respect, sensitivity and friendliness of the telehealth staff?				
• How well the telehealth staff respected your privacy?				
• How well the staff answered your questions about the equipment?				
• Your overall treatment experience at using telehealth?				
Would you use Telehealth again? <input type="checkbox"/> No <input type="checkbox"/> Yes				Comments: _____ _____ _____
Would you recommend telehealth to another person? <input type="checkbox"/> No <input type="checkbox"/> Yes				

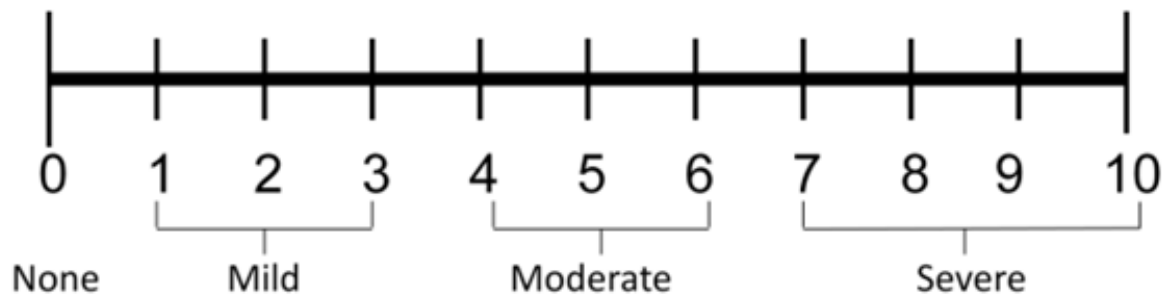


Figure 1: Numeric Pain Rating Scale.

### Statistical Analysis

SPSS software (Version 22.0) was used for data analysis. The Wilcoxon signed-rank test was employed to determine

NPRS changes. Effect size of pain reduction was calculated by Cohen's d effect size. Cohen's d scores equal to 0.20 indicate a small effect, d= 0.50 indicates a medium effect, and d= 0.80 indicates a large effect size [16].

Gender	Age (year)	Pathology	Pain before treatment	Pain after treatment
male	30	Low back pain	6	4
male	18	Knee pain (ACL partial rupture)	5	3
male	29	Shoulder pain (biceps tendinitis)	7	3
male	27	Shoulder pain (impingement)	7	3
male	28	Shoulder and cervical pain (myofascial pain)	5	3
female	27	Shoulder pain (impingement syndrome)	4	2
female	30	Knee pain: patellofemoral syndrome (pfps)	5	3
female	25	Shoulder pain (scapular dyskinesia)	4	3

female	22	Shoulder pain (subacromial pain syndrome)	5	2
female	25	Knee pain (pfps)	5	2
female	27	Knee pain (knee valgus & pfps)	4	2
Male	28	Thoracic spinal pain (hyper kyphosis)	5	3
female	25	Kyphotic posture + shoulder internal rot	5	2
female	25	Kyphotic posture + shoulder pain	5	2
male	32	Knee pain: patellofemoral syndrome (pfps)	5	2
female	38	Back pain	5	3
male	25	Kyphotic posture	6	2
male	28	Back pain	5	2

**Table 1:** Demographic characteristics of patients and pain score before and after treatment.

Question	Percentage
The voice quality of equipment?	85%
The visual quality of equipment?	85%
Your personal comfort in using the Telehealth system?	94%
The length of time to get an appointment in Fort Chip?	87%
The ease of getting to the Telehealth department?	90%
The length of time with the therapist or family member you saw?	89%
The explanation of your treatment by the Telehealth staff?	93%
The thoroughness, carefulness and skillfulness of the Telehealth staff?	85%
The courtesy, respect, sensitivity and friendliness of the Telehealth staff?	97%
How well the Telehealth staff respected your privacy?	89%
How well the staff answered your questions about the equipment?	99%
Your overall treatment experience of using Telehealth?	88%

**Table 2:** Of satisfaction (percentage) for different questions from the tele-health questionnaire.

## Results

Demographic characteristics, kind of pathologies, and pain intensity (9 males and 9 females with age  $27 \pm 0.5$ ) are listed in Table 1. Pain intensity significantly reduced after 10-session of tele-physiotherapy ( $2.8 \pm 0.1$ ) compared to before intervention ( $5.2 \pm 0.2$ ) ( $p < 0.001$ ). Effect size calculated with Cohen's d effect size of pain reduction was 2.9, indicating a very large effect size [16]. Table 2 presents patient satisfaction results showing high satisfaction results regarding received tele-physiotherapy.

## Discussion

Telehealth and tele-physiotherapy are recommended during pandemic infectious diseases, especially COVID-19 disease. Besides easy access and reduced travel and waiting time, access to high-quality and cost-effective care are other benefits of tele-physiotherapy [17-20]. Previous research

has shown positive effects of cardiac and neurological tele-rehabilitation and the management of patients with depression [21]. Moreover, previous studies confirmed the low to moderate positive effects of tele-physiotherapy in patients with musculoskeletal disorders [22,23]. A few studies reported significant pain reduction with tele-rehabilitation [24,25]. In line with previous results, the results of our study confirmed significant pain reduction after tele-physiotherapy and tele-consultation. The mean score of pain in patients at baseline was 5.2, indicating the presence of moderate pain in most of the patients.

Most of the patients suffered from chronic musculoskeletal pain, and treatment sessions ranged from 10 to 12 sessions. Despite various patient characteristics like age, gender, and pain duration, we found a significant pain reduction (mean = 2.8) at the end of treatment ( $p < 0.001$ ), with a high effect size equal to 15.2. This finding is comparable with previous results [26]. Mundhada (2021) revealed a

positive correlation between changes in pain intensity, patient-reported functional goals, and patient satisfaction [26]. Also, patient satisfaction in all questions was above 80%. Comfortable using an online system and quality of image and sound shown greater than 80% satisfaction. The patients also found the virtual interaction easy and useful. Satisfaction percentage regarding experience and treatment method, explanation of physiotherapist about disease and treatment was more than 90%.

Although our results revealed high satisfaction among the patients for tele-physiotherapy, we did not ask patients' points of view for a combination of hands-on and tele-physiotherapy. For example, parents in pediatric centers prefer a combination of hands-on and remote physiotherapy for their children [10]. There is a lack of evidence about standard ways for delivering telerehabilitation in musculoskeletal disorders. We suppose having one session of hands-on physiotherapy each week to receive some modalities may lead to better results. It seems that if tele-physiotherapy is executed efficiently and effectively, the patients/physiotherapists continue to demand it, and most of the previous barriers to virtual visits will be diminished. Further research for the standardization of tele-physiotherapy and teleconsultation is necessary, and even when the problems with the COVID-19 have ended, it can help and facilitate interventions for musculoskeletal and neurologic disorders.

### Limitations

There are several limitations to this paper. The sample size was rather small. There was no follow-up assessment to see if the results could last. Also, the data was gathered during a real-time public health crisis with different pathologies in different age groups; therefore, there was a lack of experimental control and standardized methods. In this study, there was no control group.

### Conclusion

In conclusion, it seems tele-physiotherapy effectively reduces pain intensity among patients with musculoskeletal disorders. Moreover, this method was acceptable since the patients ported high satisfaction levels.

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