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Role of tele-physical therapy in quality of life and satisfaction among patients with musculoskeletal disorders

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ABSTRACT

Objectives: Previous research has shown telephysical therapy to be highly efficient, but it has shown vague results in terms of quality of life and satisfaction improvement in patients with musculoskeletal disorders (MSD). Hence, this study aimed to find the role of telephysical therapy in improving the quality of life of patients with MSD.

Methods: The study was conducted using a pre- and post-study design, enrolling 327 patients with MSDs who contacted Marham for online physical therapy consultations. Participants filled out telehealth usability and European quality of life-5 dimensions questionnaires (EQ-5D-5L) in the priory. After tele-sessions, they were again requested to fill out questionnaires along with complete questionnaires and ten open-ended questions about their telephysical therapy experience. Any participant with cognitive dysfunction or inability to complete prescribed tele-sessions was excluded from the study.

Results: Participants had a mean age of 41.80 (±14.84) years. One hundred and fifty-three were male and 174 were female. Thirty-nine distinct MSDs were diagnosed, with low back pain being the most prevalent among the participants. The Marham's therapists prescribed a minimum of 3 and a maximum of 12 tele-sessions. The paired sample t-test showed statistically significant differences between pre- and post-scores of telehealth usability and EQ-5D-5L ($P < 0.001$). According to multiple regression analysis, age, sex, and number of sessions were the most influencing variables, with a 35% variance in quality of life and 35.4% in satisfaction. Most participants, that is, 83% reported excellent experiences.

Conclusion: The study concluded that telephysical therapy plays a positive role in improving the quality of life and satisfaction of MSD patients.

Keywords: Musculoskeletal disorders, Quality of life, Role, Satisfaction, Tele-therapy

INTRODUCTION

Musculoskeletal ailments comprise all the disorders that impact the components of the body related to movement and support, namely, bones, joints, and muscles.[1] Financially struggling individuals in underdeveloped countries are affected by musculoskeletal disorders (MSDs) 70 times more than in prosperous nations.[2] Professionals such as dentists, musicians, information technology specialists, bankers, and even nurses and surgeons are not spared

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and report suffering from MSDs.[3] Hence, MSDs present a significant amount of load not only on society but also on the entire health-care system.[4,5] The importance of quality of life cannot be overemphasized, especially because it has been proven to enhance compliance with treatment, produce better health, and decrease costs of care in the long run.[6] Telephysical therapy has proven effective in paving the way for patients toward a healthy life.[7] Telemedicine has undoubtedly a long history; however, the use of this alternate mode of treatment therapy has spiked markedly since the COVID-19 era.[8] It was the need of the hour to reduce exposure. Hence, the global health-care system stakeholders took action to control the outbreak.[9] It is a form of virtual treatment that can result in a reduction of ailments and improve patients' condition with better health outcomes. It aids in engaging patients with the intervention program and educates them from the comfort of their homes, saving time, and cost.[10]

Several previous studies conducted to check the efficacy and effectiveness of telephysical therapy[11] concluded that it could give equivalent results when compared to conventional physical therapy sessions in arthroplasties,[12] cardiopulmonary,[13] and even pediatric rehabilitation.[14] Telephysical therapy has reported pain reduction, improved range of motion, and increased ease of performing daily life activities. Physical therapists have also reported satisfaction and willingness to deliver treatment through online sessions.[9,15] Although the clinical evidence is in favor of telephysical therapy, some barriers need to be addressed for the commencement of fruitful sessions, for example, training programs for therapists, proper policy or legislation, and handling of network instability and technical issues.[16]

Modern advancements in telephysical therapy have shown the incorporation of new tools such as augmented reality, virtual reality (VR), and artificial intelligence tools in physical therapy processes for effective patient interaction and individualized approach. These technologies have provided success in the desired approaches, including compliance and the patient's benefit.[17] For example, VR interventions have been shown to work as beneficial, particularly in pain control and functional restoration in many MSDs.[18] Nevertheless, there are certain important gaps in the literature today. A particularly large space for telephysical therapy is the deficit of high-quality, large-scale randomized controlled trials (RCTs) demonstrate the efficacy of telephysical therapy versus typical face-to-face therapy in the long run.[17] Furthermore, the question of how sex, age, and other variables influence the possibility and efficiency of telephysical therapy is still mostly unanswered.

Many factors are involved in making any treatment or intervention successful, but the satisfaction of patients and the improvement in their quality of life are vital. Ambiguity is found in the literature regarding patients' satisfaction with telephysical therapy[19] compared to the quality of life. The previous studies regarding telephysical therapy have focused on isolated MSDs only, such as cerebrovascular accidents, low back pain (LBP),[20] and arthritis. There is a need for a comprehensive examination of telephysical therapy's role across the MSDs. Hence, this study aimed to investigate the role of telephysical therapy by including a broad spectrum of MSDs in patients' satisfaction and quality of life.

Moreover, the reason for choosing MSD patients for this study includes the high incidence and the effects of MSDs on the global and regional population. Almost 1.7 billion people across the globe are suffering from MSDs, out of which 568 million people are affected by LBP.[21] The previous studies stress the significant prevalence of MSDs in various groups of people in Pakistan.[22] The variations in the prevalence rates of adults in Pakistan range from 6.9% to 76.8%.[23] This emphasizes the global distribution and variety of these disorders.[4] Based on these considerations, MSDs remain an essential domain for research and, therefore, are suitable for evaluating the effectiveness and outcomes of telephysical therapy.

MATERIALS AND METHODS

Study design and setting

A pre-post-design was used to conduct the current research. This design helped to efficiently understand and report the changes produced by tele-sessions in patient satisfaction and quality of life. Participants aged 18 and above who used the platform of Marham for telephysical therapy sessions to receive intervention programs for MSDs were selected using a non-probability convenient sampling technique. This technique was selected to collect data based on participants' availability and willingness to participate in the study in a timely and cost-effective way.

Sample size calculation and participant recruitment

The sample size was calculated using G-power software. A two-tailed test with $\alpha = 0.05$, a power of 0.95 (1-β), and an effect size of 0.2 was used. With a critical t of 1.9672675 and a degree of freedom of 326, the sample size obtained for the current research was 327.

The platform of Marham was selected after the comparison of major telehealth platforms. The parameters considered were the number of consultants available, user rating, feedback/reviews, number of downloads, and availability in many cities of Pakistan. Marham was found to be the best among all major platforms. Participants were selected according to their availability and willingness to participate. Three hundred and twenty-seven patients using Marham, with age

18 years and above and having the ability to communicate and write in the English language, were contacted. Written consent was obtained from each participant who agreed to be part of this research project. If the patient had any cognitive impairment, was unable to attend the prescribed number of tele-sessions (by the assigned therapist of Marham after complete assessment), or was suffering from any serious comorbidity, he/she was excluded from the study.

Data collection procedure

Data collection permission was obtained through the authorities of Marham. The representative/agent of Marham helped filter out MSD patients. Whenever a query was sent for the online physical therapy consultation, the Marham team would ask a patient about the research. If the patient was willing to participate, his/her contact information was shared with the researcher. The researcher contacted the patient through email and smartphone applications, that is, WhatsApp, and explained the research protocol and its potential clinical implications. Signed consent was obtained and the participant was requested to fill out the telehealth usability questionnaire (TUQ) and European quality of life-5 dimensions questionnaire (EQ-5D-5L) before their tele-sessions. After completing the intervention program, each participant was contacted again and requested to fill out both questionnaires as well as answer ten open-ended questions about their experience with telephysical therapy. Marham's team shared all the information regarding patients' diagnoses, the prescribed number of sessions, and any change in the tele-session program with the researcher to keep a record.

Statistical analysis

The Statistical Package for the Social Sciences version 27 was used to conduct analysis with $P < 0.05$. Demographic variables recorded for each patient included age, sex, city, type of MSD, disease duration, and number of sessions. Descriptive statistics of mean, standard deviation, maximum, and minimum were calculated for age, disease duration, and number of sessions. Frequencies and percentages were calculated for sex, city, and type of MSDs. Values set developed for the Indian population[24] was used as a standard to report and analyze EQ-5D-5L scoring as no value set has been developed exclusively for the Pakistani population yet. The value set ranged from −0.923 to 1. In the case of TUQ, total scores were obtained by adding all the response values (1-strongly agree to 7-strongly disagree) and the average was calculated afterward. A paired sample *t*-test was used to identify significant differences in the numerical scores of EQ-5D-5L and TUQ for quality of life and patient satisfaction before and after the telephysical therapy session, respectively. To determine the effect of demographic variables on quality of life and patient satisfaction, multiple regression analysis was used.

RESULTS

Participants' characteristics

Three hundred and twenty-seven participants aged 19–80 years with MSDs participated in the research [Table 1]. Most of the participants belonged to Lahore; others were from Islamabad, Faisalabad, Karachi, and Peshawar. They were diagnosed with 39 distinct MSDs by Marham's assigned physical therapists. The most common MSD was found to be LBP with 24.16%, then neck pain at 12.54%, and muscular strain accounting for 7.64% of the total sample.

Paired sample *t*-test

The mean of participants' pre- and posts-scores of TUQ, that is, 5.53 (±0.82), 6.21 (±0.63), respectively, and EQ-5D-5L, that is, −0.35 (±0.04) and 0.63 (±0.16), respectively, depict that improvement was seen in patients' condition after telephysical therapy sessions. Overall, health scores recorded at the end of EQ-5D-5L, also known as visual analog scale score, aided in predicting patients' satisfaction levels and quality of life. Its mean pre- and post-values were 65.37 (±12.28) and 78.53 (±13.64), respectively. Paired sample *t*-tests of scores of both questionnaires also resulted in significant differences between pre- and post-treatment values [Table 2].

Regression analysis

The regression models for both dependent variables, quality of life, and satisfaction were statistically significant, $F(4, 322) = 44.186$, $P \leq 0.001$, $F(4, 322) = 43.285$, and $P \leq 0.001$, respectively. These were regressed on independent variables of age, sex, disease duration, and number of sessions prescribed. All the independent variables negatively affected telehealth usability scores. This explains that the older aged population with chronic diseases, prescribed with more tele-sessions, had lesser satisfaction. Similarly, the disease duration negatively affected EQ-5D scores, showing that the more chronic the disease, the lesser the quality of life. R^2 values depict that the model explains a 35.4% variance in patients' satisfaction and 35.0% in quality of life. For better-assessing change in patient's condition, the overall health score was also regressed, and it was found that independent variables caused a 54.2% variance in total health scores [Table 3].

Response to open-ended questions

The participants were requested to answer ten open-ended questions about their experience of telephysical therapy. Eighty-three percentages reported excellent experience and 85.3% reported improved satisfaction levels after tele-sessions. Almost 13% did not have a good experience, and 20% reported facing internet disruption issues between tele-sessions. The participants found tele-sessions to be cost-

effective. They suggested to have in-person initial assessment and follow-up sessions [Table 4].

DISCUSSION

The present study's findings reveal that telephysical therapy enhances patient satisfaction and quality of life. A total of 612 patients were contacted, and the first 327 who agreed to participate were selected for the research. Participants belonged to five major cities of Pakistan seeking telehealth services through the platform of Marham. The current research is the first of its kind to include a variety of MSDs with detailed responses from participants about their telehealth experience and their pre- and post-session quality of life and satisfaction levels. Moreover, each participant received individualized telephysical therapy sessions relevant to the need and type of MSD, hence avoiding performance bias.

Participants were diagnosed with 39 distinct MSDs by Marham's therapists, including LBP, neck pain, muscular strain, osteoarthritis, carpal tunnel syndrome, radiculopathies, frozen shoulder, rotator cuff tendonitis, sciatica, shin splints, and ankle sprains. LBP was the most prevalent condition. Interestingly, most of the neck pain and muscular strain were reported by young adults. The duration of the MSDs was found to be ranging from 1 month to 15 years. The minimum number of sessions prescribed was three and the maximum was 12 as prescribed by the therapist providing tele-sessions. Participants were requested to avoid any dietary change, take any medication such as non-steroidal anti-inflammatory drugs, or follow any exercise regime other than that recommended by physical therapists. This was done to ensure that the results obtained were purely due to the telephysical therapy sessions. However, the patients' and the sessions were online, and it was impossible to measure and keep records of these restrictions. Hence, these can be some confounding factors affecting research results. Paired sample *t*-tests revealed that satisfaction, quality of life, and overall health status of patients with MSDs improved significantly after telephysical therapy sessions ($P < 0.001$).

To examine the effect of demographic variables on quality of life, and patient satisfaction, multiple regression analyses were performed. The model included four independent variables: Age of participants, sex, duration of MSD, and number of tele-sessions. The overall fit of models was statistically significant, F (4, 322) = 44.186, $P < 0.001$, and F (4, 322) = 43.285, $P < 0.001$ for TUQ and EQ-5D, respectively. Age, number of sessions, and sex were the variables that significantly influenced quality of life and patient satisfaction. All the participants answered open-ended questions about telephysical therapy. The majority of them had excellent experiences and improved satisfaction.

Table 1: Characteristics of participants.

Demographic data	Mean (±SD)
Age	41.80 (±13.84)
Sex	Male=153 Female=174
Disease duration in years	3.00 (±2.84)
No. of Sessions	7.96 (±2.62)

SD: Standard deviation

Table 2: Paired sample *t*-tests for comparing pre- and post-scores of TUQ, EQ-5D-5L, and Health.

Pairs	Mean	SD	*t*	df	*P*-value
TUQ pre- and post-telephysical therapy scores	−14.31498	12.60570	−20.535	326	<0.001*
EQ-5D-5L pre- and post-telephysical therapy scores	4.34862	1.73758	45.256	326	<0.001*
Pre and post total health scores	−13.16514	7.49828	−31.750	326	<0.001*

*P<0.05, TUQ: Telehealth usability questionnaire, EQ-5D: European quality of life-5 dimensions, df: Degree of freedom, SD: Standard deviation

Table 3: Multiple regression analysis of patient satisfaction, QoL, and health scores with independent demographic variables.

Independent variables	TUQ			EQ-5D			Total health score		
	B	*t*	*P*-value	B	*t*	*P*-value	B	*t*	*P*-value
Age	−0.407	−4.382	<0.001*	0.004	0.193	0.847	−0.336	−4.134	<0.001*
Sex	−0.496	−0.418	0.676	−0.555	−1.975	0.049*	0.880	0.847	0.397
Disease duration	−0.375	−1.179	0.239	0.076	1.001	0.317	−0.422	−1.516	−0.971
No. of sessions	−0.836	−1.977	0.049*	0.616	6.153	<0.001*	−2.046	−5.532	<0.001*
	F (4, 322)=44.186 R^2=0.354			F (4, 322)=43.285 R^2=0.350			F (4, 322)=95.177 R^2=0.542		

*P<0.05, TUQ: Telehealth usability questionnaire, EQ-5D: European quality of life-5 dimensions questionnaire

Table 4: Patients' responses to open-ended questions.

Questions	Responses
1. Can you tell us about your experience with telephysical therapy for your musculoskeletal disorder?	83% of the participants reported excellent experience with telephysical therapy for musculoskeletal disorders.
2. How has telephysical therapy impacted your daily life and activities?	About 79% of participants were of the view that telephysical therapy sessions have made daily life activities easy for them.
3. In what ways do you think telephysical therapy is different from traditional physical therapy?	16.6% of the participants reported that telephysical therapy lacks therapists' direct manual contact for palpation and gliding. It is deficient if a manipulation is needed.
4. What challenges have you faced while receiving telephysical therapy?	20% of the respondents shared the problems of internet disruption, the need for an attendant while exercising and sometimes it was difficult to explain about the range of motion and pinpointing the exact painful region during an online session.
5. Do you feel that telephysical therapy has improved your overall satisfaction with your health-care experience?	85.33% of the respondents reported improved satisfaction with telephysical therapy.
6. In your opinion, what are the advantages and disadvantages of telephysical therapy compared to traditional physical therapy?	The participants reported advantages such as cost effectiveness, lesser traveling needs, and time management whereas dependency on peers/caregivers for technological use was reported as a disadvantage of telephysical therapy.
7. How has the use of technology impacted your experience with telephysical therapy?	The majority of the participants reported that they were impressed by the user friendly virtual session services provided by the Marham application. The technology has made tele-sessions accessible from the comfort of their homes.
8. How would you rate your overall satisfaction with telephysical therapy?	85.33% of the participants were highly satisfied with their overall experience with telephysical therapy.
9. What suggestions do you have to improve the quality and effectiveness of telephysical therapy for patients with musculoskeletal disorders?	21.4% of the participants suggested that initial evaluation and assessment should be made in person and afterward, tele-sessions can be implemented. They also suggested in-person follow-ups to determine the exact improvement in every patient.
10. Would you recommend telephysical therapy to other patients with musculoskeletal Disorders?	The majority of the participants said that they would recommend telephysical therapy to other patients with musculoskeletal disorders.

They reported that daily life activities were easy to perform after telephysical therapy sessions. More than 16% found it deficient if manual therapy or manipulation was needed. The participants suggested that there should be an in-person session for initial evaluation and follow-up sessions should also be a part of the intervention program.

Consistent with the present study results, Estebanez-Pérez *et al*. reported significant improvement in quality of life and high satisfaction among the participants. They used a mixed-method study design to conduct a clinical trial with 32 long COVID patients for four weeks, focusing on their perception, satisfaction, and quality of life, using a customizable digital intervention.[25] Researchers used a 12-item short-form survey, an EQ-5D for measuring the quality of life, and a telemedicine satisfaction questionnaire for measuring patient satisfaction. Regarding qualitative analysis, the participants suggested the inclusion of traditional face-to-face sessions, the introduction of an immediate contact chat feature, and a longer duration for intervention. On the contrary, in 2023, Mojica *et al*. conducted an RCT with 60 participants for rehabilitation after arthroscopic meniscectomy. The participants were allocated randomly to tele-rehabilitation and in-person rehabilitation groups. They also attended three-month follow-up sessions. They reported less patient satisfaction with tele-rehabilitation. The latter group showed 100% satisfaction, whereas the former reported 73% satisfaction with their post-operative course.[19]

The present study showed the effectiveness of telephysical therapy in enabling patients to get more satisfaction and improve their quality of life. This intervention method can be considered a suitable substitute for face-to-face physical therapy when patients have geographical, mobility, or time limitations. The findings of these studies support the adoption of telephysical therapy as one of the regular therapeutic procedures, which is why creating comprehensive guidelines and reimbursement models is crucial for the integration process. In addition, the study emphasizes the demand for future research, such as serial follow-ups for the outcomes, large sample size clinical trials, and further investigation of the opportunities and effects of different advanced technologies. Therefore, it is possible to reduce costs and promote the delivery of physical therapy to areas in which patients in need have limited access; by doing so, telephysical therapy can improve patient outcomes and the efficiency of the health-care system and promote patient rights.

Although the current research resulted in statistically significant values to prove that telephysical therapy shows a beneficial impact in reducing musculoskeletal ailments[26] and improving patients' satisfaction and quality of life,[27] yet with such a large sample size, longer-duration studies with follow-up sessions and comparisons with the control group could not be conducted due to time limitations and financial constraints.

CONCLUSION

Telephysical therapy has a positive and promising role in improving satisfaction and quality of life in patients with MSDs. The participants showed high satisfaction and reported excellent experiences after the commencement of their tele-sessions. They also suggested that an initial assessment should be made in person and a follow-up session should be held to increase satisfaction further.

RECOMMENDATIONS

Future researchers are recommended to conduct randomized control trials to compare patients' satisfaction and quality of life in tele-sessions and conventional physical therapy sessions. Special trials should also be conducted to identify factors that may act as barriers to implementing a successful tele-session to improve efficacy further and enhance patient satisfaction.

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AUTHORS' CONTRIBUTIONS

MC contributed to the conception of the study and the article's critical revision. MA contributed to the design, acquisition of data, and statistical analysis. All authors have critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

ETHICAL APPROVAL

This study was approved by the Research Ethics Review Committee for Research Involving Human Research Participants, Group 1, Chulalongkorn University before data collection. (COA No. 218/66). The research process and objectives were explained to each participant.

DECLARATION OF PARTICIPANT CONSENT

The authors certify that they have obtained all appropriate participant consent forms. In the form, the participants have given their consent for their images and other clinical information to be reported in the journal. The participants understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY FOR MANUSCRIPT PREPARATION

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

CONFLICTS OF INTEREST

There are no conflicting relationships or activities.

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