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An evaluation of a physical therapy app for home rehabilitation

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Abstract

Introduction and Objective. In recent years, digital tools such as mobile rehabilitation applications have been introduced to support motivation and improve patient involvement in therapy. However, the additional benefits of such tools in structured rehabilitation progrmmes remain uncertain. The aim of this study is to evaluate the effect of a rehabilitation programme supported by a mobile application on patient motivation and functional outcomes compared with standard rehabilitation.
Materials and Method. The study included 60 participants undergoing rehabilitation. Functional performance was assessed using the TINETTI scale, and independence in daily activities evaluated with the ADL scale. Patient motivation toward physical activity was measured using a 5-point Likert scale before and after completion of rehabilitation. Statistical analysis included Wilcoxon signed-rank tests for within-group comparisons and Mann–Whitney U tests for between-group comparisons. A significance level of $p < 0.05$ was adopted.
Results. Significant improvements in TINETTI scores were observed in both groups ($p < 0.001$), indicating substantial functional improvement in balance. Motivation levels increased after rehabilitation in both groups. The motivation score increased from 3.23–3.77 in the control group and from 3.40–3.93 in the research group. However, no statistically significant differences between groups were observed. ADL results showed minimal variability, suggesting a ceiling effect and limited sensitivity of the scale for detecting functional changes.
Conclusions. Structured rehabilitation resulted in significant improvements in functional performance and patient motivation. The rehabilitation programme supported by a mobile application did not demonstrate superior outcomes compared with standard rehabilitation in this study.

Key words

physitrack, telerehabilitation, digital solutions In physiotherapy

INTRODUCTION

Innovation and digitalization is a combination that perfectly captures the spirit of the 21st century – a time of dynamic transformations, in which technology increasingly permeates all aspects of life, including healthcare [1]. When analysing the use of applications in daily practice, it is worth mentioning that the development in technology is significantly affecting the way physiotherapy is practiced and perceived by patients and therapists. However, as with advanced physiotherapy practices, challenges arise due to the lack of a universally accepted definition and standardized applications, which leads to confusion among practitioners and users [2]. In the context of evidence-based practice (EBP), it becomes critical to understand how these tools can support both therapists and patients to provide effective and ethical care [3].

Rehabilitation is a complex, multi-stage, and patient-centred process aimed at achieving optimal levels of functioning for people affected by disability, at risk of developing a disability, or requiring supportive interventions due to their health condition [4]. According to the definition developed by Cochrane Rehabilitation and adapted to the Polish context, rehabilitation is a multimodal and collaborative process that includes medical, psychological, and social interventions tailored to the individual needs and context of the patient's life [5].

Physiotherapy applications are becoming an increasingly popular tool. Their tasks are not only to remind about regular exercises, measurements, or medication intake, but also real-time monitoring of physiological functions, data storage, and, in some cases, performing measurements independently without the need for additional devices. In many cases, these applications constitute an integral part of larger e-health systems, supporting not only rehabilitation, but also patient registration, visit tracking, and communication with medical staff [6].

Therefore, the aim of this study is to evaluate the impact of the simultaneous use of physiotherapy applications on the effectiveness of the rehabilitation process, taking into account technological, medical, and social aspects. The analysis will include application functions, therapeutic potential, as well as user opinions. These considerations will provide a better understanding of the role of digital tools in modern rehabilitation and help determine their place in the future vision of healthcare.

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MATERIALS AND METHOD

Benefits of using physiotherapy applications. Physiotherapy apps have grown in popularity in recent years with benefits for both patients and physiotherapists. Such applications not only support the rehabilitation process by providing personalized exercise progrmmes, but also enable the monitoring of patients' individual needs, which is particularly important for those requiring comprehensive physiotherapy support [7]. In practice, these applications can serve as communication tools, making it easier for patients to contact physiotherapists and support regular consultations which contributes to the efficiency of the treatment process [2]. In summary, the use of applications can significantly reduce the time required for rehabilitation.

Increased patient engagement and adherence to treatment plans. As technology gains prominence in healthcare, physiotherapy applications are emerging as key tools for enhancing patient engagement and adherence to treatment plans. These applications not only allow for progress monitoring, but also facilitate communication between patients and physiotherapists. Mobile applications transform the patient–therapist relationship, as confirmed by studies on their role in improving patient engagement and treatment outcomes [8, 9].

Challenges and limitations of physiotherapy applications. In the field of physiotherapy, applications are gradually gaining popularity, offering new opportunities in rehabilitation and monitoring patient progress. However, their use brings with it a number of challenges and limitations that can affect the effectiveness of therapy. The innovative approach that apps like Physitrack offer to rehabilitation can hinder widespread implementation and effectiveness One example is the insufficient use of available features by both therapists and patients. Studies indicates that neither group takes full advantage of all the functionalities provided by these applications, which significantly reduces the potential for delivering personalized rehabilitation [10].

Moreover, reliance on technology may exacerbate barriers to access, particularly for those unfamiliar with digital tools or lacking mobile devices necessary for using such applications. Proper utilization of applications has shown improvement when it comes to exercise adherence, but also underscores the need to adapt apps and patients motivation strategies to effectively engage app users [11].

The therapeutic impact of these applications has not been definitively confirmed by clinical studies, raising questions about their overall effectiveness in promoting long-term rehabilitation outcomes. These challenges highlight the necessity of ongoing research and continuous refinement in the use of physiotherapy applications.

OBJECTIVE

The aim of the study is to evaluate the impact of the simultaneous use of a physiotherapy application on the effectiveness of the rehabilitation process carried out at the patient's home. A crucial factor in the use of the application is its transparency and accessibility on mobile devices, as well as a well-chosen group of target users.

The main aims of the research included:

- Comparing motivation and commitment to the rehabilitation process of patients in the study and control groups.
- Comparing the rehabilitation effects of both groups in terms of activities of daily living (ADL) and balance (TINETTI).
- Verifying whether the use of the application by the study group increases motivation for regular exercise, based on data collected from the application and survey responses declared by participants.
- Additionally, identifying which age group most frequently used the application and whether the application was able to maintain motivation throughout the study period.

MATERIALS AND METHOD

Characteristics of the study group. The study was conducted with the participation of 60 volunteer patients using rehabilitation at home. The participants included patients with various health conditions, those able to use the application independently, as well as those assisted by their caregivers.

Inclusion criteria. The inclusion criteria were: patients requiring regular rehabilitation whose health condition allows the performance of exercises at home, with chronic diseases requiring long-term rehabilitation, with a significant degree of disability, ownership of a mobile phone and capable of handling the application, presence of a caregiver with a phone. If the patient is unable to personally use the application, or simply does not have a smartphone, patients in a stable health condition, who are able to safety perform the exercises, absence of acute health conditions that could pose a risk to the patient during home rehabilitation, ability to independently understand instructions provided by the application and to monitor rehabilitation progress, patients willing and ready to use the application and perform the prescribed exercises at home, informed consent of the patient to participate in the study, including consent for the use of technology and monitoring of outcomes by the researcher.

Exclusion criteria. The exclusion criteria included the following factors:

– *Health conditions and medical contraindications:* acute health conditions requiring immediate medical intervention (e.g., myocardial infarction), severe neurological diseases, uncontrolled chronic illnesses (e.g., uncontrolled hypertension), recent surgery necessitating absolute avoidance of strain of the musculoskeletal system.
– *Physical and cognitive limitations:* significant mobility limitations that prevent independent exercise at home, diagnosed cognitive impairments hindering comprehension of application instructions (e.g., dementia, advanced Alzheimer's disease), balance or coordination disorders that could increase the risk of falls during exercise.
– *Problems with technology access:* lack of access to appropriate equipment (smartphone, tablet) or internet, lack of basic technology skills (e.g., inability to operate mobile applications).
– *Lack of motivation or cooperation:* patients unwilling to use the application independently or to exercise

regularly, persistent issues with adherence to therapeutic recommendations in the past.
– *Participation in other rehabilitation programmes:* patients simultaneously involved in another form of organized rehabilitation that could affect study outcomes.
– *Mental disorders:* mental health conditions such as severe depression, schizophrenia, or others that could affect the ability to participate in the study.

Study procedure. The study was conducted with 60 volunteer patients undergoing rehabilitation in home settings. The participants included patients at various stages of illness, those able to operate the application, or their caregivers. The research was carried out between April 2025 – January 2026. Each patient participated in the study for a period of two weeks. The goal was to compare whether the group using the Physitrack application achieved different rehabilitation outcomes compared to patients who did not use this solution.

Patients were informed about the study procedure and volunteered to participate after learning the characteristics. The initial stage of the study involved a preliminary survey for both the control and experimental groups (depending on patient qualification). Next, participants were assessed using functional tests such as TINETTI and ADL. After completing the diagnostic form, the first stage of the study was ended.

The second stage involved conducting a two-week cycle of traditional rehabilitation exercises for the control group. As for the study group, patients were set up with a profile in the Physitrack app, provided with a personalized exercise programme, and instructed on its use. They subsequently participated in a two-week rehabilitation programme guided by the application. In addition to therapy sessions, patients were required to use the application independently. Participants in the study group-maintained contact with the therapist by sending feedback on exercises performed from within the app. While performing the exercises, patients were asked by the application about the difficulty and level of pain they experienced while performing the exercise.

In the third stage, results were collected for both the control and study groups. Patients completed a final questionnaire and were reassessed using the same functional tests as in the initial stage.

Rehabilitation cycle procedure. Patients were divided into two groups: the control and study groups, both of which participated in identical physiotherapy sessions. After the initial examination and goal of the therapy had been set, the main phase of the study commenced. Patients in the study group, after receiving prior instruction on the use of the application, participated in a rehabilitation programme incorporating the application. The individualized exercise programme provided within the application aimed to help patients remember and replicate exercises without direct contact with a physiotherapist. The therapy lasted two weeks. Techniques such as PNF, MTG, patient-assisted exercises, and verticalization were applied during rehabilitation. At the end of the programme, patients were reassessed with the same tests to determine whether therapeutic goals had been achieved, and whether there were improvements in the patient's condition.

For the control group, the programme also lasted two weeks, but without the use of the application. Patients were initially evaluated with diagnostic tests and assigned therapeutic goals. After two weeks, outcomes were measured in the same manner as in the experimental group.

Ethical considerations. The study was conducted with the approval of the Bioethics Committee of the Institute of Rural Health in Lublin, Poland (Decision No. 6/2025/IMW). Participation was voluntary, and each patient could opt out of the study at any time was free to withdraw at any time. Prior to participation, each patient read the study rules and regulations, then signed a consent form to participate in the study. The Physitrack application used in the study is compliant with security management regulations ISO 27001 and ISO 27018.

RESULTS

Comparison of TINETTI test results – before and after rehabilitation (Fig. 1)

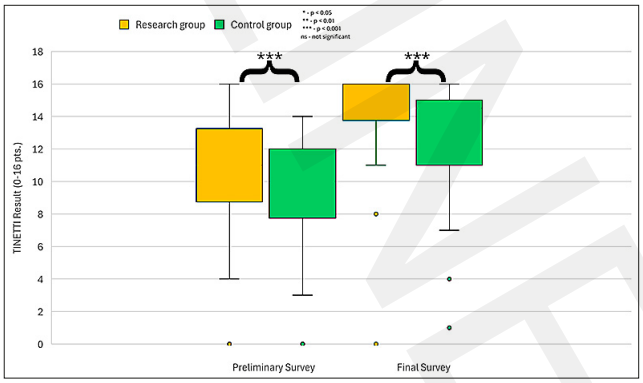

Figure 1. Comparison of TINETTI test results – before and after rehabilitation

Analysis of TINETTI test results before and after rehabilitation demonstrate a clear improvement in TINETTI scores. The research group initially achieved slightly higher scores than the control group, although the differences were not pronounced. After completing the rehabilitation programme, however, the difference became more evident – the median score in the research group shifted toward maximum values (14–16 points), whereas in the control group, the median improved but remained slightly lower. These findings suggest that the intervention applied in the experimental group had a marked effect on improving patients' balance and stability. Significant improvements were observed in both the study and control groups (Wilcoxon signed-rank test; ***$p < 0.001$).

Comparison of ADL test results – before and after rehabilitation (Fig. 2, Tab. 1)

Although statically significant changes were observed in both groups ($p < 0.05$), median ADL scores remained at the maximum level (6 points) before and after the rehabilitation. This indicates a celling effect of the ADL scale. No statistically significant difference in changes magnitude was found between the research and control groups ($p = 0.545$).

Analysis of exercise frequency (Fig. 3)

Analysis of exercise frequency during the rehabilitation programme was comparable between groups. A slightly higher proportion of patients in the study group exercised

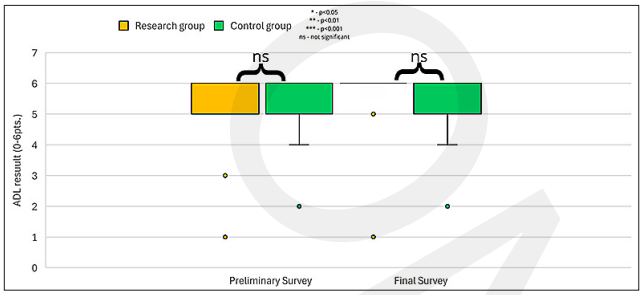

Figure 2. Comparison of ADL test results – before and after rehabilitation

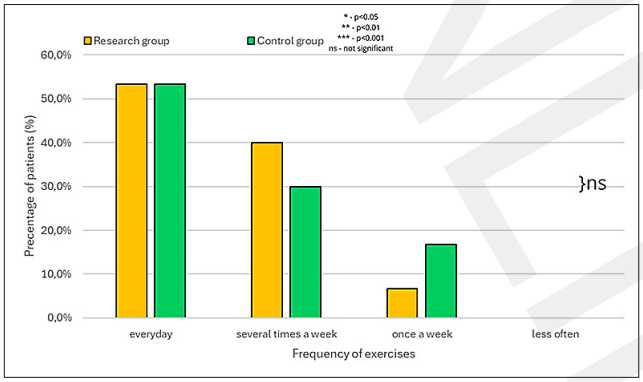

Figure 3. Comparison of exercise frequency in the study and control groups

several times per week (40% vs 30%), whereas weekly exercise was more frequent in the control group (16.7 vs 6.7%). No one reported exercising less often. Overall, the distribution of exercise frequency was similar between the groups.

Analysis of patient motivation. To evaluate the effect of using the Physitrack application on patients' motivation to perform physical exercises, a comparison was made between the study and control groups. In both groups, motivation levels were measured before and after the rehabilitation programme (Fig. 4).

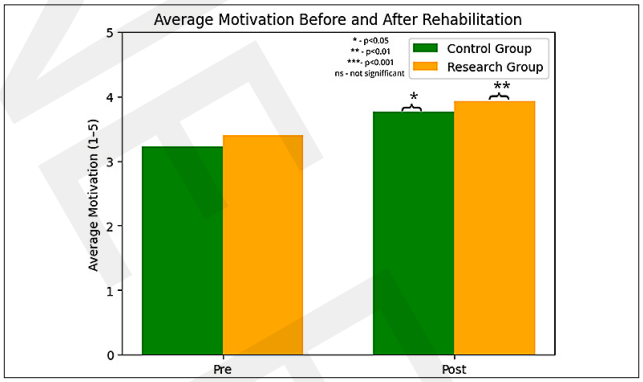

Figure 4. Average motivation before and after the rehabilitation programme

The average motivation level increased in both groups. In the control group, the motivation score rose from 3.23 to 3.77. In the study group, the mean score increased from 3.40 to 3.93, although the they demonstrated slightly higher motivation levels both before and after the survey. The magnitude of improvement was identical in both groups (+0.53 points). These findings suggest that participation in the rehabilitation programme was associated with a moderate increase in patient-reported motivation, independent of

Table 1. Comparison of ADL test results – before and after rehabilitation

ADL Scale result			
Research group Preliminary	Research group Finall	Control group Preliminary	Control group Finall
6	6	5	6
6	6	6	6
6	6	6	6
5	5	6	6
6	6	4	6
6	6	6	6
6	6	6	6
6	6	6	6
6	6	6	6
5	6	6	6
6	6	6	6
6	6	5	5
6	6	6	6
6	6	5	6
6	6	6	6
6	6	6	6
5	5	2	2
6	6	6	6
1	1	6	6
6	6	2	2
6	6	4	4
6	6	4	5
6	6	6	6
6	6	5	6
5	6	6	6
6	6	5	6
3	5	6	6
5	6	5	5
6	6	5	5
5	6	5	5
6	6	5	6

group allocation. Motivation increased significantly in both groups. The improvement was statistically significant in the control group (*$p < 0.05$) and highly significant in the research group (**$p < 0.01$) (Fig. 5).

In the control group, 16 participants demonstrated increased motivation, 11 showed no change, and three experienced a

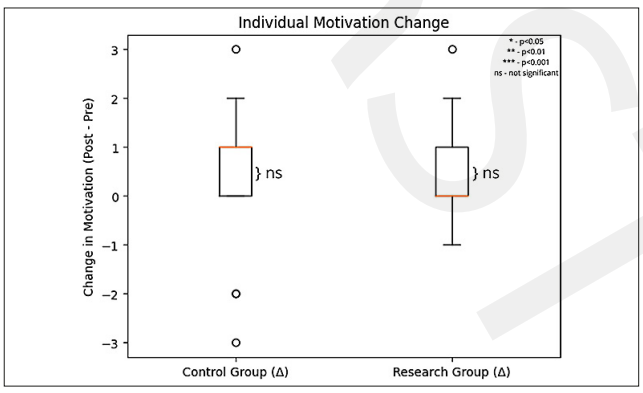

Figure 5. Increase in motivation (post – pre)

decrease. The median change was +1 (p = 0.046). In the study group, 14 participants improved, 15 showed no change, and only one participant experienced a decrease. The median change was 0, although the overall improvement was statistically significant (p = 0.001).

Between-group comparison of change scores revealed no statistically significant difference (p = 0.579), indicating comparable motivational improvement in both groups.

DISCUSSION

This study showed an increase in motivation in both the control group and the study group using the Physitrack app after completing the rehabilitation programme. In the study group, the percentage of participants reporting high or very high motivation increased significantly. A similar trend was observed in the control group. Although the study group showed slightly higher levels of motivation, the scale of improvement was identical in both groups (+0.53 points). This suggests that participation in a structured rehabilitation programme may be the main factor in increasing motivation.

Recent studies indicate that digital health and tele-rehabilitation interventions can improve patient engagement, adherence to recommendations, and self-motivated behaviours [12, 13]. Mobile applications that offer structured exercise plans, monitoring tools, and feedback mechanisms have been shown to increase perceived autonomy and self-efficacy (14). However, evidence suggests that the additional benefits of using digital tools may be more pronounced in home settings or without supervision [12, 13, 14]. In supervised rehabilitation progrmmes, the gradual motivational effect of digital support may be weakened, which is consistent with the results of the current study. Both groups showed significant and clinically relevant improvements in TINETTI scores. The large effect sizes indicate that the rehabilitation programme effectively improved balance.

These results are consistent with recent studies showing that structured, task-oriented rehabilitation significantly reduces the risk of falls and improves mobility in older patients [15]. Exercise-based fall prevention progrmmes have been shown to improve balance and gait stability, especially when progressive and functional training elements are incorporated [16].

It is important that no statistically significant differences were observed between the study group and the control group in terms of the scale of functional improvement. This suggests that the structured rehabilitation programme itself was the main factor determining functional improvement, while the digital application did not bring any additional, measurable benefits.

In contrast to the results obtained in the TINETTI study, the ADL scale showed limited variability and a clear ceiling effect. The median scores remained at or near the maximum value before and after rehabilitation. Although statistically significant changes were found, the limited range of responses indicates the limited sensitivity of the tool in this relatively well-functioning patient population.

Recent methodological discussions emphasize the importance of selecting outcome measures with sufficient responsiveness and discriminative power in rehabilitation studies [15]. When the baseline level of independence is already high, basic ADL scales may fail to detect subtle but clinically meaningful improvements. Digital tools can therefore primarily serve to facilitate access, monitoring, and continuity of care, rather than as independent enhancers of treatment outcomes. Future studies should examine whether longer intervention duration, exclusively remote delivery, or lower adherence at the beginning of therapy can increase the measurable added value of such applications.

Several limitations of the study should be noted. Firstly, the sample size was small, which may have limited the statistical power to detect small differences between groups. Secondly, motivation was assessed using a single-item ordinal scale, which potentially limited the depth of the construct. Thirdly, the ADL tool showed a ceiling effect, limiting sensitivity to change.

CONCLUSIONS

1) Structured rehabilitation resulted in significant functional improvement, as confirmed by the large effect size in the TINETTI scores in both groups, indicating clinically significant improvement in balance.
2) Patient motivation increased in both groups, with comparable mean improvement and no statistically significant differences between the study group and the control group.
3) Use of the rehabilitation app did not result in better clinical or motivational outcomes compared to standard rehabilitation, suggesting that the rehabilitation programme itself was the main factor determining the observed improvement.

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