



Implementation of telerehabilitation in Austrian outpatient physiotherapy – A qualitative study

Implementierung von Telerehabilitation in der ambulanten Physiotherapie in Österreich – Eine qualitative Studie

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Abstract

Background: New technologies, for example, telerehabilitation (TR) tools, can support physiotherapists' work. Even though studies have demonstrated their potential, TR is not yet fully implemented in Austrian outpatient physiotherapy. As a result of the Coronavirus pandemic and the associated lockdowns, physiotherapists in Austria were confronted with the challenge of offering therapies without physical contact. This study aims to investigate opinions and experiences of physiotherapists in Austria regarding TR and its implementation in different clinical fields. **Methods:** A qualitative research design with expert interviews and a focus group discussion were conducted. Data were analysed using content analysis. The categories were formed following a deductive-inductive approach.

Results: The interview partners considered opportunities for using synchronous TR in internal medicine as well as orthopaedics and traumatology, especially in later, exercise-dominated stages. In addition, using TR can be supportive for patient education. In the field of neurology, synchronous TR is viewed with some criticism, especially when used for people with severe neuropsychological disorders. Asynchronous TR is considered useful across all disciplines and could support physical therapy from the first therapy session and throughout the treatment. Important questions regarding liability, billing, or data protection still need to be clarified. Interdisciplinary approaches in TR should also be pursued to improve care. **Conclusion:** The use of asynchronous TR in addition to regular physiotherapy is seen as promising in all clinical fields. In general, when implementing TR, the needs and requirements of different fields should be considered. Moreover, various framework conditions still need to be clarified for further implementation of TR.

Abstract

Hintergrund: Neue Technologien, wie beispielsweise Telerehabilitationstools, können Physiotherapeutinnen und Physiotherapeuten in ihrer Tätigkeit unterstützen. Auch wenn Studien das Potential von Telerehabilitation (TR) aufzeigen, wurde diese in der ambulanten Physiotherapie in Österreich noch nicht vollständig implementiert. Durch die Corona-Pandemie und die damit einhergehenden Lockdowns, wurden Physiotherapeutinnen und Physiotherapeuten in Österreich mit der Herausforderung konfrontiert, auch ohne physischen Kontakt Therapien anzubieten. Auf Basis dieser Erkenntnisse untersucht diese Studie die Ansichten und Erfahrungen der Physiotherapeutinnen und Physiotherapeuten zu TR sowie den Einsatz in unterschiedlichen Fachbereichen in Österreich.

Methodik: Es wurde ein qualitatives Forschungsdesign mit Expertinnen- und Experteninterviews und einer Fokusgruppendifkussion gewählt. Die Daten wurden mit Hilfe qualitativer Inhaltsanalyse ausgewertet. Die Kategorienbildung erfolgte nach einem deduktiv-induktiven Ansatz.

Ergebnisse: Die Interviewpartner/-innen sehen in den Fachbereichen innere Medizin, Orthopädie und Traumatologie vor allem in einer späteren, übungsdominierten Phase Einsatzmöglichkeiten für synchrone TR. Darüber hinaus kann TR die Patientinnen- und Patientenedukation unterstützen. In der Neurologie wird der Einsatz synchroner TR speziell bei Menschen mit schweren neuropsychologischen Störungen kritisch gesehen. Die asynchrone TR wird über alle Fachbereiche hinweg als sinnvoll angesehen und könnte die Physiotherapie ab der ersten Therapieeinheit begleiten. Wesentliche Fragen zu Haftung, Abrechnung oder Datenschutz werden als unzureichend geklärt angesehen. Ebenfalls sollten für eine Verbesserung der Versorgung interdisziplinäre Ansätze in der TR weiterverfolgt werden.

Zusammenfassung: Der Einsatz asynchroner TR ergänzend zu regulärer Physiotherapie scheint in allen untersuchten Fachbereichen vielversprechend. Generell sollten bei der Implementierung von TR die Bedürfnisse der einzelnen Fachbereiche mitbedacht werden. Außerdem sind die Rahmenbedingungen für die weitere Implementierung von TR zu klären.

Keywords

Telerehabilitation – physiotherapy – Austria – qualitative study

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INTRODUCTION

In recent years, technological advances have led to new developments that provide possibilities to support physiotherapy treatment. The field of telerehabilitation (TR) in physiotherapy is developing rapidly, offering greater accessibility to therapy and a cost reduction for therapeutic services (Peretti et al., 2017).

Previous studies discussed various technological approaches (Baig et al., 2019; Christensen et al., 2016; van Egmond et al., 2018), ranging from low-level technological solutions, such as telephone calls, video consultations, or emailing (Cottrell et al., 2017; Huang et al., 2015) to more complex technologies, for example, sensor systems and mobile software applications to monitor falls or training sessions (Baig et al., 2019; Toelle et al., 2019). Besides technical aids, TR systems are also used to implement psychological concepts, such as gamification. The aim is to encourage patients to carry out exercises or activities through playful interventions (Christensen et al., 2016; Deacon et al., 2018). In addition to the technologies and concepts applied, TR tools can be divided into different groups depending on their use within the therapy setting. Therefore, a differentiation can be made between synchronous and asynchronous settings (Winters, 2002). While in synchronous TR, the communication and interaction between therapist and patient occur in real time; asynchronous settings, on the other hand, do not require any appointed time for patients and therapists to meet or to participate at the same time (Parmanto & Saptono, 2009). Besides synchronous and asynchronous approaches, so-called blended care can be offered, which is a combination of face-to-face therapy sessions with TR (Kloek et al., 2018; Kloek et al., 2019). The potential and effectiveness of diverse TR technologies has been highlighted in several systematic reviews. Pfeifer et al. (2020) conclude that small, but still significant, improvements in chronic pain patients could be reached with mobile app-based interventions. Cottrell et al. (2017) report, that synchronous telerehabilitation can be as effective as conventional therapy methods for improving musculoskeletal conditions. Furthermore, reviews highlight that the implementation of TR in therapy for orthopaedic and traumatological, neurological, and internal medicine patients show significant improvements in motor function- or exercise-related outcome measures (Agostini et al., 2015; Chen et al., 2020; Coorey et al., 2018). Concerning the costs of TR, recent studies show possible cost reductions due to the implementation of technologies by 20% to up to 75% compared to conventional approaches (Ekman et al., 2020; Pastora-Bernal et al., 2018).

Despite the increasing number of studies, TR interventions do not seem to be fully established yet in

physiotherapy. As a result of the coronavirus crisis and the associated lockdowns since spring of 2020, therapists have been facing the question of how to treat their patients appropriately using digital tools. Austrian therapists report a relatively high level of positivity towards TR; however, there is a need to clarify appropriate reimbursement for TR and which software solutions might work best (Rettinger et al., 2021). Comparable findings, such as lack of education and training programs for TR and unclear reimbursement, were highlighted by Rausch et al. (2021) in a study on remote physiotherapy in Switzerland. To address those barriers and following the conclusion by Pfeifer et al. (2020), more research on the use of digital technologies to help patients in the best way is needed. This study aims to investigate how TR can be applied in different clinical fields relevant to physiotherapy. In addition, the experience and expectation of Austrian physiotherapists regarding the use of TR is analysed.

METHODS

Study design

A qualitative research design with expert interviews, as described by Meuser and Nagel (2009) and a focus group discussion, as outlined by Krueger and Casey (2015), was chosen.

Sampling

According to Meuser and Nagel (2009), experts are persons who are in some way responsible for the design, elaboration, implementation, and/or control of a problem solution and thus have privileged access to information about groups of people or decision-making processes. This study aims to gather attitudes of physiotherapists towards implementing TR in Austria. Therefore, physiotherapists are included as experts.

Expert interviews and a focus group discussion were conducted that included physiotherapists from different clinical fields. For this purpose, eight therapists were recruited for the interviews and six therapists for the focus group, in which five of them participated. The inclusion criterion was at least one year of professional experience in the respective clinical area. Other important criteria for the study were to cover a broad spectrum of clinical fields and to include at least one participant each from the fields of orthopaedics and traumatology, internal medicine, and neurology. The participants were recruited by contacting several networks at the FH JOANNEUM, University of Applied Sciences (Graz, Austria). The participants signed an informed consent form about the purpose of the study and its procedure and data protection.



Table 1: Interview and focus group data.

ID	Number of participants (N) / Gender	Qualification/clinical fields	Interview type, duration, and documentation
11	1/male	Physiotherapist (orthopaedics and traumatology)	Video conference, 58 min, audio-record
12	1/female	Physiotherapist (orthopaedics and traumatology)	Video conference, 63 min, audio-record
13	1/female	Physiotherapist (orthopaedics and traumatology)	Face-to-face, 22 min, audio-record
14	1/male	Physiotherapist (orthopaedics and traumatology)	Video conference, 34 min, audio-record
15	1/female	Physiotherapist (neurology)	Face-to-face, 36 min, audio-record
16	1/male	Physiotherapist (neurology)	Face-to-face, 33 min, audio-record
17	1/male	Physiotherapist (neurology)	Video conference, 43 min, audio-record
18	1/female	Physiotherapist (internal medicine)	Face-to-face, 41 min, audio-record
FG	5 (FG1-FG5) 2 female/3 male	Physiotherapists (orthopaedics and traumatology, n=3; neurology, n=2)	Video conference, 120 min, audio-record

Data collection

Semi-structured interviews were conducted in August 2020. The selection of interview partners was non-randomised, and a closed recruitment based on specialization and clinical fields was chosen. Design, structure, and implementation of the interviews followed the guidelines presented by Wengraf (2001). An interview guide was developed covering the topics 'experience with TR', 'infrastructure for TR', 'treatment plans' and 'challenges in implementing TR'.

The focus group discussion was conducted online via a video conferencing tool in September 2020. Because one of the aims of this study is to explore possible TR applications for different clinical fields, patient examples (personas) were used as a basis for the focus group discussion. The personas represent common pathologic conditions in the corresponding clinical fields (anterior cruciate ligament rupture, chronic pain, adolescent scoliosis, stroke, multiple sclerosis, chronic obstructive pulmonary disease, and metabolic syndrome). The focus group discussion aimed to identify treatment plans and framework conditions for TR.

Both expert interviews and focus group discussions were audio-recorded and transcribed verbatim.

Data analysis

Qualitative content analysis (content structuring approach) according to Kuckartz (2018) was conducted using MAXQDA Plus 2020 Release 20.1.0 (VERBI – Software. Consult. Sozialforschung GmbH, Germany, Berlin). The categories are formed on the basis of a deductive-inductive approach. In the first step, categories were deductively derived from the interview guidelines. Further in the process, categories were inductively formed for the material by means of focussed summarisation.

Cross-tabulations were used to show and summarise connections to different clinical fields. To ensure the reliability of this process, the execution and analysis was conducted by two researchers (BG, LM) who have an educational background in physiotherapy. The results and interpretations were reflected and discussed within the research team.

RESULTS

Eight interviews were conducted with experts (4 women, 4 men) in the fields of orthopaedics and traumatology (4), neurology (3) and internal medicine (1). The interviews lasted from 22 to 63 minutes (mean 41 min). Five physiotherapists participated in the focus group discussion, which lasted 120 minutes. Detailed information is documented in Table 1.

Three main categories resulted from the analysis. The categories reflect the perspective of experts regarding implementation of TR technology, and its application as well as the challenges in implementing TR. As the first category can be further divided into subcategories, those are additionally shown in Figure 1.

Implementation of telerehabilitation

In general, participants considered application of TR in the clinical field of orthopaedics and traumatology, as well as in internal medicine as feasible. For the field of neurology, use of TR was discussed more controversial, and implementation was seen more critically. Nevertheless, benefits, such as reducing therapy costs were discussed.

'Chronic rehabilitation also means chronically high costs for rehabilitation expenses and that perhaps these costs can be minimized by telerehabilitation'.



- Implementation of telerehabilitation
 - Synchronous
 - Clinical fields
 - Implementation within a series of interventions
 - Asynchronous
 - Clinical fields
 - Implementation within a series of interventions
 - Blended care
- Technology and application
- Challenges on the implementation of telerehabilitation

Figure 1: Categories and subcategories of findings.

(17)

Synchronous

Participants indicated that synchronous TR is suitable for initial interventions in acute phases when working with orthopaedic and traumatology patients. This includes information transmitted by phone before the first therapy session. When working with pain patients, it was discussed that taking the patient’s history and initially clarifying symptoms can be done using TR. However, it was stated that it is important to start the therapeutic process with face-to-face sessions. On the one hand, assessments can be performed and hands-on techniques applied during this initial face-to-face appointment. On the other hand, a patient-therapist rapport can be established.

Because often there is also information about correct positioning of extremities, [...] or how they should treat the scar. All this information is given over the phone when the appointment is made. (FG4)

I still believe, when it comes to chronic pain patients in particular, I need the face-to-face sessions because, yes, I still want to conduct a neuromusculoskeletal assessment and that’s where I need some hands-on tools. (I8)

At a later stage, it is conceivable that therapists can effectively give feedback on the patient’s execution of exercises in a synchronous TR setting. However, new exercises should be explained and practiced in face-to-face sessions. For a therapy phase in which the focus is set on muscular function and strength, an equal distribution between face-to-face and synchronous TR sessions would be feasible.

Overall, for orthopaedic and traumatology patients, it was seen as useful to have a final face-to-face session to conduct reassessments and give the patient the opportunity to address unanswered questions in person. As patients with chronic neurological diseases, such as multiple sclerosis, are confronted with long-term therapy needs, extensive care supported by TR was discussed.

These individuals may benefit from a synchronous TR session when acute conditions arise.

Asynchronous

Using asynchronous TR tools for orthopaedic and traumatology patients to control and assist home training is viewed positively by interview partners as well as focus group participants. It is recommended to start supportive, asynchronous home-training programs from the first therapy session on. In addition, the participants emphasize that TR is beneficial for the patients’ self-efficacy and personal responsibility during home exercise program phases.

I also think that this could be a good add-on. Especially regarding the patients’ self-efficacy and personal responsibility. And this is particularly supported and strengthened by asynchronous exercise content. (FG5)

For chronic orthopaedic diseases, for example, adolescent scoliosis, the participants suggested that it would be appropriate to use asynchronous TR in addition to treatment. However, face-to-face sessions after at least three weeks would be important in order to identify any deviations due to growth at an early stage, so that the therapist can adjust exercises and perform hands-on techniques.

Well, my combination would be ideal if he comes to my practice every two or three weeks. Then I practice everything with him. And then he goes home and does his special exercises via an app or whatever [...]. (I2)

When working with neurological patients, the interview partners emphasized that asynchronous TR could be applied, especially with patients suffering from primary motor disorders. A major challenge when treating these patients, however, is balance and postural control. It was pointed out that patients with severe neuropsychological disorders would need further support when using TR interventions.

Patients who have neuropsychological or cognitive disorders in addition to motor disorders will certainly also need support when they use telerehabilitation. (I7)

Chronic obstructive pulmonary disease (COPD) patients in post-acute situations, e.g. after recovering from an exacerbation, may benefit from treatment with TR. Patient education and therapeutic follow-up are described



as important elements that could be implemented by means of TR. After an exacerbation, only limited time is available for therapeutic interventions or patient education within the hospital. However, asynchronous TR could be used to continue interventions and education after patient discharge.

[...] the length of stay is usually so short, as a physiotherapist in acute care you have to accommodate so many things in a short time [...] and it would be a very good solution for the transition that you simply add some information in moderation again and again later on. (I5)

Blended care

For patients suffering from chronic pain, further treatment in combination with TR could be considered, especially in the second half of a therapy series (a therapy series in Austria usually includes 7 to 10 sessions). The physiotherapist can counsel and coach the patient during TR sessions. Interventions conducted via TR are also conceivable, especially for long-term patients, for example, if symptoms become aggravated suddenly and need a location-independent, short-term intervention.

[...] with chronic pain patients, especially in the second half of the therapy series. [...] I can very well imagine this via Synchronous. (I8)

For neurological patients, based on a therapy series with seven therapy sessions, it was stated that it is important to start with face-to-face sessions, to perform an examination and conduct the first therapy interventions. If neuropsychological disorders and the overall state of the patient allows it, both synchronous and asynchronous TR are conceivable. Synchronous TR could be used to clarify questions about therapeutic exercises in a later stage of the therapy series. Asynchronous TR could be used to support home exercise programs. In general, the combination of face-to-face therapy and asynchronous TR is seen as an alternative if, for example, inpatient rehabilitation is not possible or not desired.

I would certainly like to have the first appointment at the practice. (FG5)

No, so for one week there would have to be 3 sessions at my practice, I would suggest, and then the remaining 4 days at home with telerehabilitation asynchronously. (FG1)

An exemplary treatment plan for COPD patients based on seven therapy sessions, after an initial diagnosis or after

an exacerbation, could consist of face-to-face sessions at the beginning and at the end of the therapy intervention and in between TR sessions, which can be implemented synchronously accompanied asynchronously.

Technology and application

Overall, gamification was seen as an aspect of TR that has the potential to increase motivation in patients. Furthermore, additional information, pain scales, or self-measurements were seen as advantageous. Self-measurements and self-assessments also have the advantage to provide frequent progress reports in addition to the information collected during therapy sessions. Personal monitoring of, for example, blood glucose values can further be facilitated by means of TR. Thus, these measures can also increase the patients' self-responsibility. Furthermore, interdisciplinary collaboration through TR could enhance the outcome for patients.

It would also be intelligent not only think in terms of physiotherapy, but also to include dietology, for example, or psychology / psychotherapy [...]. (I4)

Motion analysis approaches seem suitable for giving patients adequate feedback on exercise execution in their home environment. Participants also noted that motion analysis with TR tools may be challenging if patients show neurological movement anomalies such as tremor or ataxia. In that case, it can be demotivating for patients when movement analysis is applied for giving feedback, which does not work properly because of specific movement issues.

Challenges of implementation

In addition to the treatment strategies, information was collected on barriers and challenges that are obstructing the widespread use of TR in physiotherapy in Austria. Barriers mentioned by the interview partners were the limited options for receiving haptic feedback and the lack of possibilities for applying hands-on techniques via TR. Furthermore, it was perceived as challenging that both patients and therapists need appropriate equipment and infrastructure. Therapists report a lack in TR education and refer to sparse offerings in specific training courses. They also feel inadequately trained in data protection issues and subjectively feel insecure regarding this topic. Additionally, the interviewed therapists also feel subjectively insecure about liability. Furthermore, there are unresolved concerns regarding regulatory guidelines and billing that need to be clarified before widespread use of TR is adopted in Austria.



DISCUSSION

All interview partners, no matter which clinical field they work in, were in favour of working with asynchronous tools, which are intended to be used throughout the entire therapeutic process. The participants agreed that these tools can be used from the very beginning in addition to conventional therapy. Therefore, asynchronous TR is generally considered to be useful in blended care because it continuously supports the execution of exercises and helps with self-monitoring. Studies also show positive results for asynchronous TR for ACL rehabilitation (Dunphy et al., 2017). For chronic neurological patients in general and for acute or subacute neurological patients in later stages of the rehabilitation process, regular independent training is a central component of the therapy, which can be usefully supplemented by asynchronous tools (Ellis et al., 2019; Grau-Pellicer et al., 2020; Wu et al., 2020). In terms of internal medicine, studies show that outcome parameters such as physical activity or weight loss can be additionally improved by therapy accompanied by asynchronous TR (Recio-Rodriguez et al., 2018). It could also be shown that asynchronous TR has the potential to encourage and motivate patients to complete their home-based training (Grau-Pellicer et al., 2020; Wu et al., 2020). Besides exercise monitoring and providing health-related content, asynchronous TR could support patients with self-assessments, exercise programmes, or with a pain diary (Shebib et al., 2019; Toelle et al., 2019).

Otherwise, synchronous TR was discussed as a controversial issue in different clinical fields. There was agreement that synchronous TR sessions cannot completely replace face-to-face sessions. Therefore, TR should serve as a supplemental therapy option. This finding coincides with those of Dunphy and Gardner (2020). In general, the interview partners can imagine using synchronous TR tools for orthopaedic and traumatological patients. They reported, however, that they would be more hesitant to use synchronous tools than asynchronous TR. An initial face-to-face phase appears to be essential for most patients. In the second half of the therapy process, face-to-face sessions alternating with synchronous TR could be used. Studies highlight comparable outcomes for both traditional as well as blended-care therapy approaches (Kloek et al., 2018; Lambert et al., 2017). Synchronous TR sessions for ACL rehabilitation are considered inadvisable because hands-on techniques cannot be used in TR therapy. Therefore, interviewees recommended starting with face-to-face sessions and adding a synchronous TR setting only at a later stage of therapy. The situation was discussed in a similar manner for pain patients. For those patients, TR is considered beneficial at a later stage of

therapy. An exception was the statement that a social history could be taken first in a synchronous setting. This initial TR anamnesis can help to gather important psychosocial information as a basis for the treatment of chronic pain patients (Turk, 1999). A predominant role for hands-on techniques are also considered appropriate in the early phase of therapy, which contradicts the use of synchronous TR at this point. In later stages, the use of synchronous TR sessions would be quite conceivable, as therapists also impersonate a coaching role for this patient group. Studies underline the importance of coaching chronic pain patients, whereas manual therapy should also be used, but not be the sole focus (Moffett & McLean, 2006; Semmons, 2016).

Similar to working with orthopaedic and traumatological injury patients, therapists interviewed could also imagine synchronous therapy sessions for supervising already learned exercises for scoliosis patients. In addition to hands-on techniques, the therapeutic treatment consists mainly of training therapy exercises. However, it was noted that there is an urgent need for face-to-face therapy sessions at regular intervals, as this disorder may progress during adolescence, and exercises need to be adjusted accordingly (Negrini et al., 2018). The interview partners stated that performing these exercise adjustments using TR tools does not seem to be feasible with the currently available technical possibilities. Thus, a treatment plan with initial face-to-face sessions followed by alternating synchronous sessions for exercise repetition and face-to-face sessions for adapting the exercises or implementing hands-on techniques is advised.

In neurological patients, neuropsychological disorders are identified as a hurdle for the applicability of both asynchronous and synchronous TR. These include, for example, impairments of speech or speed of processing, which may impact the overall outcome of the rehabilitation (Barker-Collo & Feigin, 2006). For this reason, the use of TR is only considered useful for patients not affected by neuropsychological disorders. Moreover, the interview partners were sceptical about synchronous TR for neurologic patients. They stated that neurological physiotherapy often uses hands-on techniques, that cannot be replaced by TR. Nevertheless, studies promoting therapy in neurological patients, which is supported by exercise-focused TR, show that these applications can help to improve adherence as well as recovery in this patient group (Grau-Pellicer et al., 2020; Wu et al., 2020).

In the clinical field of internal medicine, experts view the use of TR as beneficial and advocate its use primarily for patient education and monitoring of training or vital parameters. The duration of COPD patient hospitalization, in case of acute exacerbation, is often short, thus limited time for physiotherapy treatment is available. Extending



the duration of treatment with TR could be particularly beneficial for this group. Studies yielded positive results when TR was applied in this clinical field, especially through telephone consultations (Huang et al., 2015). In addition to therapeutic interventions, a high-quality TR program should include elements of telemonitoring, e-learning, telecoaching, and social networking (Frederix et al., 2015). Therapists may act as coaches who repeatedly provide input and support the patient to become more autonomous. According to the therapists interviewed, it would be useful to have a conclusive face-to-face session after a TR phase to conduct a final examination and clarify any open questions. In addition, interdisciplinary therapy approaches could also be facilitated with the help of TR, as those are stated as impact goals by the Austrian diabetes report (Schmutterer et al., 2017).

Respondents also believe that adding content, such as telemonitoring or assessments (e.g. pain scales), to TR programs would be helpful. Within the framework of this study, it was not possible to analyse these topics in further detail. Nevertheless, studies lead to the conclusion that TR has a beneficial impact if education and intensive telemonitoring are combined (McLean et al., 2013). Monitoring data can further be used for tailor-made therapy interventions. Besides these positive aspects of TR, it is necessary to always evaluate benefits in contrast to privacy and data protection. These aspects should be addressed in further studies.

Besides telemonitoring, gamification was frequently discussed in the interviews. Gamification uses game-related content, for example, feedback, rewards, or social connections to enhance motivation (Pereira et al., 2014). These incentives may be used in supporting patients to complete home exercise programs. During interviews, some participants questioned whether gamification primarily enhances extrinsic motivation and therefore does not increase intrinsic motivation. Although it is true that gamification primarily uses extrinsic motivation, there are approaches that can also raise internal motivation (Chan et al., 2018). In the development of TR tools, all aspects of gamification and motivation should be considered, as motivation-enhancing content and direct feedback seem to improve outcomes (Wibmer et al., 2016).

Participants were also interested in how to appropriately select patients for TR. One approach to assessing patients' suitability for TR could be to develop standardised checklists. However, careful consideration of administrative, clinical, technical, and ethical issues as well as the types of motivation mentioned above is needed (Brennan et al., 2010; Kloek et al., 2020). Even therapists who have little experience with TR could use checklists to determine whether their patients are suitable for TR. Furthermore, TR should not be limited to a small


group of patients but be accessible to people of all ages and social groups. Therefore, it is important to develop TR tools and products that are, on the one hand, easy to use and accepted by the users and, on the other hand, cost-effective in order to facilitate access.

Especially for the clinical field of neurology, interview partners stated that patients are facing high costs for physiotherapy and TR may ease this burden. Studies show tendencies that TR could lead to a reduction in costs, but the evidence has not yet been fully established (Petersen et al., 2021; Tchero et al., 2018). In order to establish TR, it is necessary that probable costs are known and cost-effectiveness investigated thoroughly. It would be a questionable approach to posit that the primary benefit of TR will be cost reduction.

One possible benefit mentioned was a potential collaboration among health professions using TR. During the first national coronavirus-related lockdown in spring 2020, other professions, such as occupational or speech therapists, gathered positive experience with TR (Rettinger et al., 2021). For example, research was conducted using an app-based approach to prevent type 2 diabetes mellitus. By combining exercise and dietary recommendations, weight loss was significantly increased among the patients in the study (Muralidharan et al., 2019). Patient care can often be improved by considering interdisciplinary approaches for developing TR tools.

One barrier for TR is the limitation in therapeutic strategies that can be applied. Currently, TR is mainly focused on exercise, monitoring, information, and education (Huang et al., 2015; van Egmond et al., 2018). Moreover, TR is particularly applicable when more exercises and fewer hands-on techniques are used. To enable hands-on assessments and techniques, blended care scenarios could be a solution. Therefore, different roles and competencies of physiotherapists need to be considered (Eckler et al., 2017). Regarding TR, physiotherapists act as managers, communicators, and innovators, which could also lead to changes in the way the profession of physiotherapy is perceived.

Another challenge mentioned was infrastructure availability to therapists and patients. In addition, the therapists interviewed do not feel sufficiently trained in using TR yet. Recent TR developments require different types of equipment. This can range from telephones to complex sensor systems (Baig et al., 2019; van Egmond et al., 2018). More extensive training of therapists leads to better knowledge about available systems, which would prevent unnecessary investments and finally provide patients with appropriate tools. If patients have to use internet-capable tools for TR, the question of how these devices are provided and who should bear the costs is still unclear. An approach enabling the use of existing equipment would be reasonable and would also avoid



purchasing new infrastructure for all involved parties. Those barriers and challenges should be clarified in further studies and/or be defined in legal regulations.

Probably the largest barrier for applying TR currently is the therapists' subjective feeling of insecurity in the context of various related factors, such as having technical questions, clarifying legal parameters, and how to ensure patient safety. Recent studies assessed these issues and, for example, Grau-Pellicer et al. (2020) report in their study that no adverse events occurred during their intervention. Hasenöhl et al. (2020) conducted semi-structured interviews with patients using TR tools, and among the patient group, home-based exercise training was perceived as safe. Questions regarding the legal situation, reimbursement, and documentation of TR are not completely clarified. In addition, a broader range of training courses may give therapists the confidence they require for practical application. These courses should provide information about liability and the legal framework, but also about data protection and correct use of TR tools.

We were able to gather initial experience and attitudes towards the use of TR in Austria from the experts interviewed. The legal situation, which was still unclear at the time of data collection, renders applying TR difficult. Currently, the Federal Ministry for Social Affairs, Health, Care and Consumer Protection has issued a clear statement on the use of synchronous TR (Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz, 2020). For the use of asynchronous TR, details are not yet known.

In summary, open questions still remain regarding liability, regulatory guidelines, and billing for both forms of application—synchronous and asynchronous—that need to be clarified before widespread use of TR can be adopted.

LIMITATIONS

While considering the results and findings discussed, a variety of limitations have to be taken into account. As described in the methods section, therapists were recruited from the fields of orthopaedics and traumatology, neurology, and internal medicine. Since the focus of the qualitative survey was on these areas, experiences and attitudes of experts in other clinical fields could not be gathered.

Another limiting factor of this study is that the clinical fields investigated could only be discussed on the basis of a limited number of pathologies. Therefore, the results cannot be generalized across the entire range of clinical fields, even though literature does show potential for the use of TR beyond the conditions discussed in this study (Agostini et al., 2015; Grau-Pellicer et al., 2020; Wu et al., 2020).

Interviews were conducted separately for each clinical field. During focus group discussion, the division in clinical fields was maintained. Breaking up this structure during the focus group discussion might have led to different content and thus a different inductive category formation.

In addition to these limitations, the focus of this study was on outpatient one-on-one therapy settings. For this reason, other relevant settings, such as group therapy or preventive physiotherapy, were not investigated. Additionally, scenarios with patient transfer, like for instance changing from outpatient to inpatient physiotherapy, or vice versa, were not examined.

The aim of this study was not to analyse and discuss the relevant issues concerning cost structures, remuneration, regulatory issues, liability claims, and data protection. These were perceived as important topics but could not be investigated in further detail.

CONCLUSION

Within the framework of this qualitative study, information on TR was gathered in different clinical fields relevant to physiotherapy. The attitude of experts towards blended care approaches and asynchronous TR was consistently positive. The therapists interviewed highlighted the necessity for initial face-to-face therapy sessions to establish patient–therapist rapport, conduct assessments, and apply manual techniques. From the information derived from the interview surveys and the focus group, it appears that TR approaches are currently seen to be more suitable for orthopaedic and traumatology patients and internal medicine patients than for patients suffering from neurological diseases. This should be considered when using TR in physiotherapy. Reported barriers for TR are insecurities concerning the legal situation, billing, or perceived security, which should be resolved for widespread implementation of TR in Austria. Within the framework of this study, it was not possible to analyse these opportunities and obstacles in more detail. Further research should provide a more detailed investigation of opportunities and barriers, as well as a detailed investigation of blended care TR scenarios.

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ETHICAL APPROVAL

This study was conducted in adherence to the Declaration of Helsinki (WMA, 2013). The data has been processed



in compliance with the European Union's General Data Protection Regulation. All experts interviewed gave verbal and written informed consent to participate. There was no contact with patients in this study. The data collection was carried out in consultation with the data protection department and the legal department of the Joanneum University of Applied Sciences.

CONFLICT OF INTEREST

The interview surveys and focus group were conducted as part of a commissioned project by room4Softwareentwicklung GmbH. At the time of data collection, none of the authors was employed by room4Softwareentwicklung GmbH. The authors report no conflict of interest.

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