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Investigation of Physiotherapists' Awareness and Opinions on Telerehabilitation in Türkiye

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ABSTRACT

Background: Physiotherapists (PTs)' awareness are important factors for both the successful implementation and development of telerehabilitation (TR).

Objective: To investigate the awareness and opinions of PTs in Türkiye about TR.

Methods: In this cross-sectional study, a web-based survey created by researching the literature was administered to PTs in Türkiye. The survey consisted of 3 sections: demographic information, awareness, and opinions, and contained 24 questions in total.

Results: 237 PTs with an average age of 33.37 ± 9.36 years participated in the study. 76.26% (n=151) of PTs reported that they were aware of TR. The main ways to awareness were scientific meetings (64.90%) and lessons (64.24%). The leading reasons for unaware of TR were that it wasn't included in the curriculum (85.11%) and wasn't used at all in the institutions where they worked and/or did their internships (80.85%). It was observed that the majority of PTs (65.7%) never used TR in their clinical practice. The factors limiting the use of TR were mainly reported as lack of knowledge about information and communication technologies (ICT) (87.88%) and patient compliance (82.32%).

Conclusion: It was determined that most of the PTs in Türkiye were aware of TR but didn't use TR in their clinical practices. Lack of knowledge about ICT and patient compliance were found to be the main factors limiting the use of TR. We think that the findings of this study may be important for the future of TR in Türkiye.

Keywords:

physiotherapist, telerehabilitation, telerehabilitation awareness, telerehabilitation opinions.

1. INTRODUCTION

Today, new information and communication technologies (ICT) and developments in digital communication have led to innovation and transformation in many areas of healthcare systems, from electronic health records to patient assessment and treatment (1-3). In parallel with these innovations and transformations in healthcare systems, the American Telemedicine Association (ATA) has defined telerehabilitation (TR) as a new approach to the delivery of rehabilitation services using ICT (4). TR encompasses services provided by a range of healthcare disciplines such as physiotherapy, speech and language therapy, occupational therapy, and biomedical engineering, and comprises all rehabilitation activities including diagnostic patient assessment, therapeutic intervention, patient performance monitoring and education (5). In recent years, TR services have developed rapidly, attracting attention for their ability to reach people in remote areas or at home, and for their potential to be a more cost-effective alternative to clinic-based assessment and treatment (6).

It has been successfully used in preventive health

services and chronic disease management because telerehabilitation (TR) removes travel barriers for patients, provides flexible exercise sessions, and allows skills to be better integrated into daily life (6). It is also used in the treatment of neurological, cardiorespiratory, and musculoskeletal conditions and facilitates access to rehabilitation services regardless of geographical location (7). Despite its advantages, there are challenges related to reimbursement, privacy, and the technological literacy of recipients. In addition, the lack of physical contact affects the ability to perform some assessments and specific tests related to movement disorders. The treatment environment, interaction with other patients and the healing effect of a physiotherapist (PT)'s touch is also absent in TR (8).

With the COVID-19 pandemic, healthcare providers had to adapt to the new situation by restricting outpatient services due to safety concerns and prioritising the care and treatment of patients affected by COVID-19 (9,10). During this period, the inability to provide or maintain treatment for patients requiring rehabilitation and/or physiotherapy with traditional (face-to-face) methods has brought the need for innovative methods such as TR to the forefront (10,11). In addition, the use of TR during the COVID-19 pandemic was also promoted by the World Confederation of Physiotherapy (WCPT) (12).

In the future, it is predicted that TR will become a standard way of working in physiotherapy and rehabilitation (PTR) (10). For this reason, it will be useful not to ignore the trends related to TR in terms of the future of the physiotherapy profession. However, it should be remembered that TR is discussed in the context of improving and diversifying the service delivery process, not replacing the usual care model in PTR (8). The success of TR, which is a relatively new discipline that has developed rapidly in recent years, depends on its acceptance by both patients and PTs. Furthermore, it has been reported in the literature that PTs' awareness, attitudes, and expectations towards TR are important factors for both the successful implementation and development of TR (1,3,13). However, to the best of our knowledge, there is no study in the literature in Türkiye that has investigated PTs' awareness and opinions about TR.

The aim of this study was to investigate the awareness and opinions of PTs in Türkiye on TR.

2. MATERIALS AND METHODS

2.1. Study design

This study was designed as a descriptive epidemiological web-based cross-sectional study and ethical approval was obtained from Pamukkale University Ethics Committee for Non-Invasive Clinical Research (number: E-60116787-020-400018).

2.2. Participants

PTs living in the Republic of Türkiye were invited to participate in this study. Participation in the study was voluntary and participants did not receive any incentives. The link to the online format of the survey, which was prepared in advance using "Google FormsTM", was sent to the participants via "WhatsAppTM". The link included the contact details of the relevant researcher (A. S.) as well as the informed consent document. PTs who ticked the option "I agree to participate in the aforementioned research with my own consent, without any pressure and coercion" were included in the study.

As a result of the power analysis based on the reference study (13), it was calculated that 80% power would be obtained with 95% confidence when at least 109 people were included in the study.

2.3. Survey form

The first draft of the survey form was developed by the researcher by reviewing previous studies in the literature (2,3,8,14) on demographic information, awareness, and opinions of PTs on TR. The first draft of the survey form was reviewed by a group of experts and some questions were modified according to the feedback, some questions were removed, and new questions were added, and the final version of the survey form was prepared. The survey form consists of 3 sections as demographic information, awareness and opinion and includes a total of 24 questions.

2.3. Statistical analysis

Data were analyzed using IBM SPSS Statistics 25 (IBM Corp., Armonk, New York, USA). Continuous variables were expressed as mean ± standard deviation and categorical variables as number of units (n) and percentage (%).

3. RESULT

3.1. Demographic characteristics

A total of 237 PTs, 67.09% (n=159) female and 32.91% (n=78) male, participated in the study. The mean age of the participants was 33.37 ± 9.36 years. 64.14% (n=152) of the participants had less than 10 years of professional experience and 18.14% (n=43) had more than 20 years of professional experience. 51.48% (n=122) of the participants had a bachelor's degree, 28.69% (n=68) had a master's degree and 19.83% (n=47) had a doctoral degree. In addition, 51.05% (n=121) of the participants were clinicians and 32.49% (n=77) were academicians, but 16.46% (n=39) were not practising. It was observed that 20.66% (n=25) of the clinician PTs who participated in the study worked in their own clinic, 15.70% (n=19) in a private hospital, 14.05% (n=17) in a public hospital, 14.05% (n=17) in an exercise counselling center and 13.22% (n=16) in a special education and rehabilitation center.

In our study, there were academician PTs from all academic titles. Of the academician PTs, 58.33% (n=21) were routinely performing clinical practice and/or patient follow-up. It was found that PTs who participated in our study worked in many different fields, especially orthopaedics [69.70% (n=138)] and neurology [51.52% (n=102)] (Figure 1). Exercise therapy (96.46%) was the most preferred method by PTs in clinical practice, followed by manual therapy (55.56%) and electro-physical agents (38.38%).

3.2. Awareness

It was found that 76.26% (n=151) of the PTs who participated in our study were aware of TR, while 23.74% (n=47) were not aware of TR. The ways in which PTs were aware of TR were mainly scientific meetings (64.90%) and lectures (64.24%) (Figure 2). Awareness of TR was 100% among academician and doctoral level PTs (Figure 3). The leading reasons for unaware of TR were that it wasn't included in the

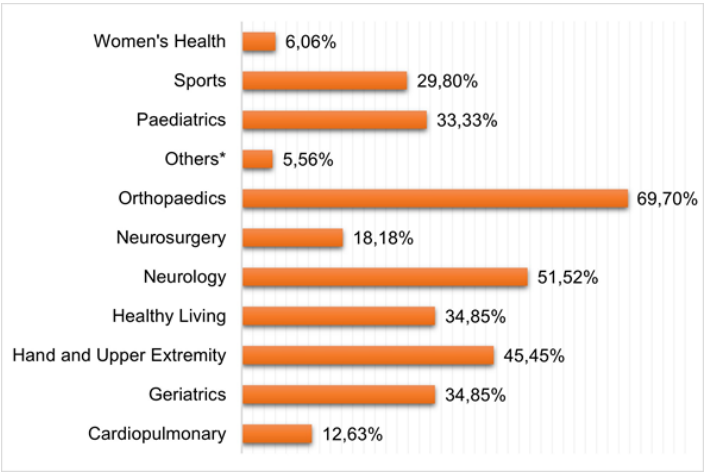

Figure 1: Participants' fields of practice, n=198, *: Men's Health, Oncology, Osteopathy, Rheumatology, Spine Health (%: percentage).

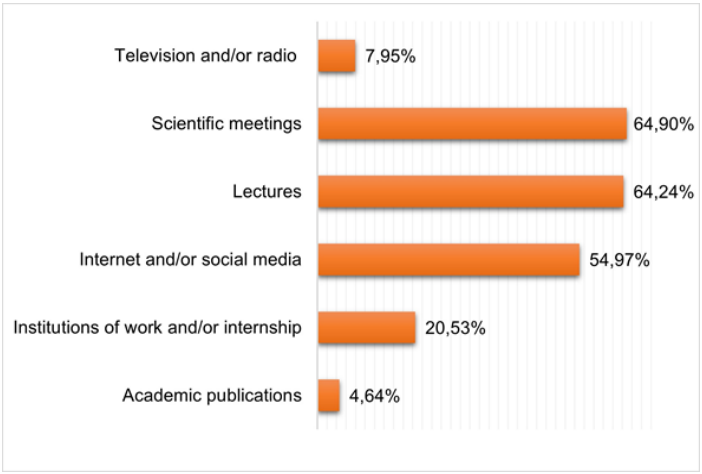

Figure 2: Participants' ways of awareness of telerehabilitation, n=151 (%: percentage).

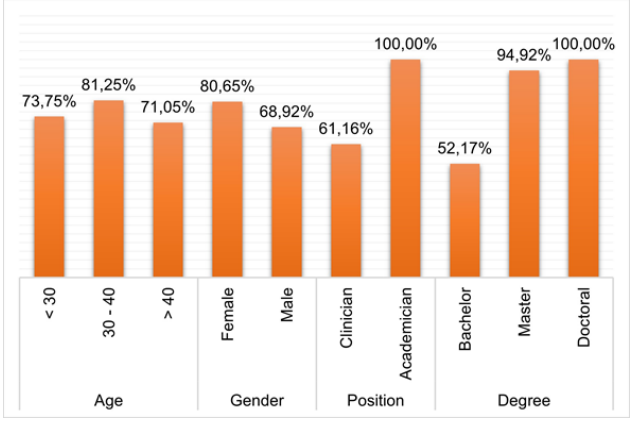

Figure 3: Participants' awareness of telerehabilitation according to demographic information, n=198 (%: percentage).

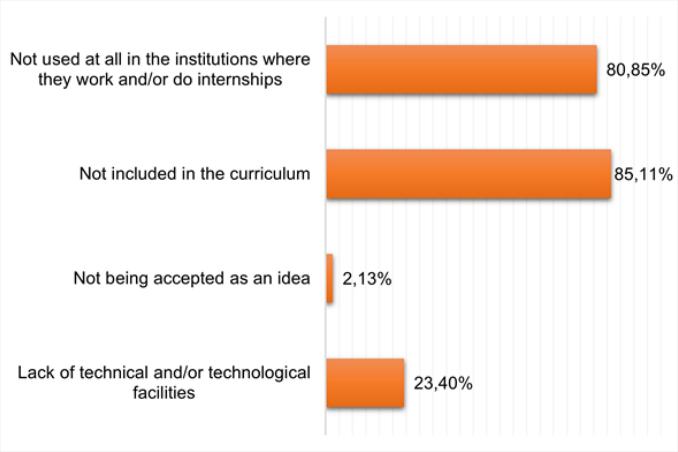

Figure 4: Reasons for participants unaware of telerehabilitation, n=47 (%: percentage).

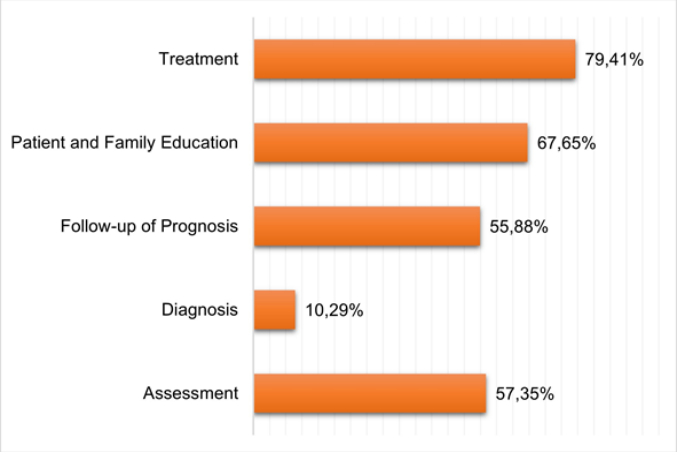

Figure 5: Purposes of uses of telerehabilitation in clinical practice, n=68 (%: percentage).

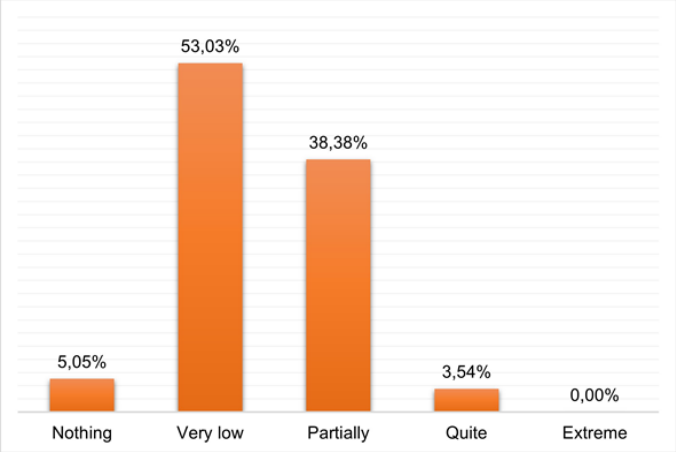

Figure 6: Acceptance level of telerehabilitation use in healthcare in Türkiye, n=198 (%: percentage).

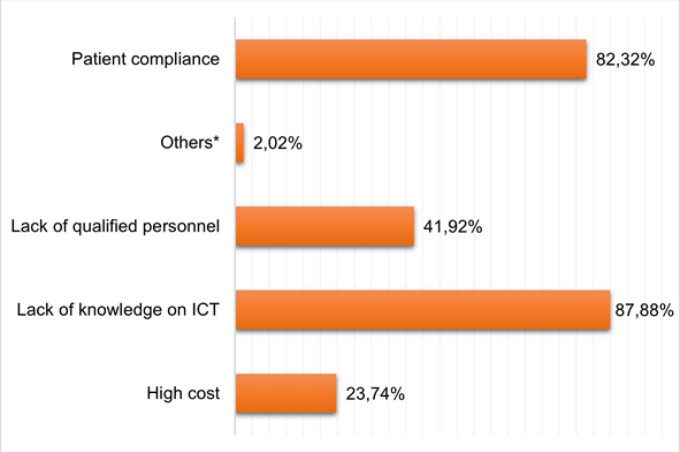

Figure 7: Factors limiting the use of telerehabilitation in Türkiye, n=198, *: concern for safety, distrust of telerehabilitation, lack of therapeutic touch with the patient (%: percentage, ICT: information and communication technologies).

curriculum (85.11%) and wasn't used at all in the institutions where they worked and/or did their internships (80.85%) (Figure 4). It was that the majority of PTs (65.7%) never used TR in their clinical practice. Treatment (79.41%) was the most prominent among the purposes of use of TR in clinical practice (Figure 5). Videoconference-based TR was found to be the form of TR used by all PTs who used TR in their clinical practice. Telephone-based (1.47%), sensor-based (2.94%) and virtual reality -based (5.88%) TR are other forms of TR used in clinical practice.

The level of acceptance of the use of TR in healthcare in Türkiye by the PTs participating in our study was mainly stated as very low (53.03%) and partially (38.38%) (Figure 6). The factors limiting the use of TR by the participants were mainly reported as lack of knowledge about information and communication technologies (ICT) (87.88%) and patient compliance (82.32%) (Figure 7).

3.3. Opinions

Regarding the 8 different statements in which we questioned PTs' opinions about different aspects of TR, it was seen that most of the participants' answers were "neither agree nor disagree" for the statement "TR will become a standard way of working in the future" and "agree" for all other statements (Table 1).

4. DISCUSSION

The aim of this study was to investigate the awareness and opinions of PTs in Türkiye on TR.

Most of the PTs who participated in our study stated that they were aware of TR. It was found that the ways in which PTs were aware of TR were mainly through scientific meetings and lectures, but the fact that it was not included in the curriculum and that it was never used in the institutions where they worked or did internships were the situations that prevented them from being aware of TR. It was observed that

Table 1: Physiotherapists' opinions about various aspects of telerehabilitation.

Statements	Answers	n=198	%
TR is a sub-discipline of telemedicine.	Strongly disagree	8	4.04
	Disagree	16	8.08
	Neither agree nor disagree	44	22.22
	Agree	92	46.46
	Strongly agree	38	19.19
TR is the remote delivery of rehabilitation services using telecommunication technologies.	Strongly disagree	2	1.01
	Disagree	5	2.53
	Neither agree nor disagree	32	16.16
	Agree	106	53.54
	Strongly agree	53	26.77
TR is used for diagnosis, assessment, treatment, prognosis monitoring and patient and family education.	Strongly disagree	5	2.53
	Disagree	10	5.05
	Neither agree nor disagree	31	15.66
	Agree	96	48.48
	Strongly agree	56	28.28
Depending on the technology used, TR can be classified as videoconference-based, sensor-based or virtual reality-based.	Strongly disagree	1	0.51
	Disagree	3	1.52
	Neither agree nor disagree	28	14.14
	Agree	110	55.56
	Strongly agree	56	28.28
TR has advantages for patients such as facilitating access to rehabilitation services, reducing transport costs and time.	Strongly disagree	1	0.51
	Disagree	5	2.53
	Neither agree nor disagree	22	11.11
	Agree	95	47.98
	Strongly agree	75	37.88
TR enables clinicians to deliver rehabilitation services remotely, outside the clinical environment.	Strongly disagree	2	1.01
	Disagree	8	4.04
	Neither agree nor disagree	22	11.11
	Agree	98	49.49
	Strongly agree	68	34.34
TR presents challenges in terms of the quality of service of the telecommunications network, the installation and use of the necessary equipment and ensuring patient safety.	Strongly disagree	1	0.51
	Disagree	5	2.53
	Neither agree nor disagree	27	13.64
	Agree	116	58.59
	Strongly agree	49	24.75
TR will become a standard way of working in the future.	Strongly disagree	4	2.02
	Disagree	34	17.17
	Neither agree nor disagree	71	35.86
	Agree	58	29.29
	Strongly agree	31	15.66

TR, telerehabilitation; %, Percentage; n=number of persons.

most of the PTs never used TR in their clinical practice. A small proportion of PTs who used TR in their clinical practice mostly used TR for treatment purposes. Videoconference-based TR, which is one of the several forms of TR, was found to be used by all PTs using TR in clinical practice. The PTs included in our study stated that the level of acceptance of the use of TR in Türkiye is very low and partial, and that the factors limiting the use of TR are lack of knowledge about ICT and patient compliance. It was also noted that PTs did not believe that TR would become a standard way of working in the field of PTR in the future.

Awareness of TR among PTs and physiotherapy students has been reported in previous studies (3,15). Most of the PTs who participated in our study were also aware of TR. In addition, approximately 80% of the PTs participating in our study were under 40 years of age, and the awareness of TR was higher in this age group. We believe that this situation can be explained by the view that members of "Generation Y", defined by Marc Prensky as "digital natives" (16), have a deep understanding of how to use technology (17) because they have never known a world without the internet and technological change. In addition, as in a previous study, awareness of TR was found to be higher among academicians in our study than among clinicians (15). However, in contrast to these findings regarding TR technology, it has also been reported that clinicians have more positive attitudes than academicians (1). In relation to educational status, although our study found that awareness of TR was higher among PTs with a doctoral and master's degree compared to those with a bachelor's degree, a study conducted in Ethiopia in 2023 reported that positive and negative attitudes towards TR were similar among health professionals with different educational status (18).

In our study, PTs most reported sources of awareness of TR as scientific meetings (congresses, conferences, seminars, courses, etc.), courses (undergraduate, master, doctoral) and internet and/or social media. However, in studies conducted with health professionals and physiotherapy students, the source of awareness of TR was mostly reported as internet and digital platforms rather than classroom or lecture (3,18). Considering our current findings and the results reported in the literature, to increase awareness of TR among PTs, health professionals and physiotherapy students, it may be useful to include TR-related courses and/or training in curriculum and scientific meetings, and to produce informative content for the internet and/or social media.

PTs reported that the reasons for not being aware of TR were that TR was not included in the curriculum and TR was never used in the institutions where they worked or did their internship. In this regard, it has been reported that despite the increasing evidence on TR worldwide, the integration of TR-related technologies into academic curriculum has been slow due to various challenges and that appropriate education and training is required for both current and future healthcare providers to acquire knowledge, skills and experience related to TR (19). However, specific training for PTs who are or will be working in the field of TR is recommended, both for the initial comfort of the PT and to offset the disappointments that may arise due to unfamiliarity with the technology and method (20). In addition, the fact that TR is not used in clinical practice, which was reported as one of the main reasons for PTs' lack of knowledge of TR in our study, has also been highlighted in various studies (3,21). This shows that PTs are familiar with traditional (face-to-face) rehabilitation and have not yet adopted TR.

It can be said that PTs use TR at every stage of rehabilitation (2). In Türkiye, it was observed that PTs used TR for treatment, prognosis follow-up, assessment, and patient/family education. However, all PTs who use TR in their clinical practice use videoconference-based (image-based) TR in their clinical practice and very few of them also use virtual reality-based, sensor-based, and telephone-based TR. It has been reported that the videoconference-based form of TR can facilitate communication

between healthcare professionals and patients (22). It is also well known that videoconference-based TR is a method that allows the participant to exercise in the comfort of their own home while receiving real-time supervision from a PT (23). Meanwhile, the fact that videoconference-based TR does not require any additional tools and equipment compared to other forms of TR, and that it allows TR sessions to be conducted using only a smartphone and internet access, may lead to it being preferred mainly by PTs.

According to the 2023 Household Information Technology Usage Research, the rate of internet usage among individuals aged 16-74 in Türkiye is 87.1% and the rate of WhatsApp (instant messaging, calling and communication application) usage is 84.9% (24). Considering these data, the fact that both the rate of internet usage and the rate of usage of a smartphone application that enables videoconference-based TR sessions are quite high in Türkiye may be another reason why videoconference -based TR is mostly preferred by PTs in clinical applications.

From the current findings of our study, it can be said that the level of acceptance of TR in Türkiye is low. In a study conducted in 2022 with Brazilian PTs on the acceptability of TR, it was reported that approximately half of the PTs felt confident in using TR and that the level of acceptance of TR was high (25). Similarly, in another study in which most participants were from the United States of America, the level of acceptance of TR was reported to be high (26). It can be said that the level of acceptance of TR in Türkiye is lower than in different parts of the world. This may be due to the factors limiting the use of TR, which are highlighted in the literature as inadequate infrastructure, equipment and area, limited resources, insufficient level of knowledge, awareness, and culture of individuals (27,28), and the fact that almost ¾ of PTs in our study have never used TR in clinical practice. Indeed, the factors limiting the use of TR in our study were reported by PTs as patient compliance, lack of knowledge about ICT, lack of qualified personnel related to TR and high cost.

On the other hand, regarding the future of TR, it was observed that more than half of the physiotherapists participating in our study disagreed or abstained from the opinion that "TR will become a standard way of working in the future" (29,30), which is supported in the literature. One of the reasons why the opinions of physiotherapists in our country about the future of TR differ from the literature may be the familiar nature of physiotherapy services. Physiotherapy is generally considered to be a health service that involves face-to-face interaction between the patient and the PT, with the patient present in the clinic. In addition, the fact that TR eliminates the physical interaction between the patient and the PT may be perceived by many as a lower quality physiotherapy service (3,21) and this may be another reason for the low acceptance of TR in Türkiye. Another reason for PTs' opinions about the future of TR may be a concern that TR will replace the face-to-face care model in physiotherapy. It should be noted that the future of TR is discussed in the context of improving the service delivery process, not replacing the face-to-face care model in physiotherapy (8,31). We believe that these concerns can be addressed by providing PTs with adequate training in TR and by increasing evidence-based positive outcomes.

The fact that the data collection process was carried out online can be seen as a methodological limitation of this study. There may also be response bias as participants in our study self-reported their awareness and opinions about TR.

4. CONCLUSION

It will be beneficial for the future of the physiotherapy profession and rehabilitation services not to ignore the trends related to TR, which we have observed to be developing rapidly in recent years. It should not be forgotten that the success of TR, which is a relatively new discipline, depends on its acceptance by both PTs and patients. Our study found that most PTs in Türkiye were aware of TR but did not use it in their clinical practice. However, it was observed that the level of acceptance of TR in Türkiye is very low and

lack of knowledge about ICT and patient compliance are the main factors limiting the use of TR. In addition, it was found that PTs in Türkiye do not think that TR will become a standard way of working in the future. We believe that the results of this study may be important for the future of TR applications in Türkiye.

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REFERENCES

1. Movahedazarhouligh S, Vameghi R, Hatamizadeh N, et al. Feasibility of Telerehabilitation Implementation as a Novel Experience in Rehabilitation Academic Centers and Affiliated Clinics in Tehran: Assessment of Rehabilitation Professionals' Attitudes. Int J Telemed Appl 2015;2015:468560; doi: 10.1155/2015/468560.

2. Aloyuni S, Alharbi R, Kashoo F, et al. Knowledge, attitude, and barriers to telerehabilitation-based physical therapy practice in Saudi Arabia. Healthc 2020;8(4); doi: 10.3390/healthcare8040460.

3. C E M, T A B, C T S, et al. Awareness, Attitude and Expectations of Physiotherapy Students on Telerehabilitation. Med Sci Educ 2021;31(2):627–636; doi: 10.1007/s40670-021-01234-w.

4. Brennan D, Tindall L, Theodoros D, et al. A blueprint for telerehabilitation guidelines. Int J telerehabilitation 2010;2(2):31–34; doi: 10.5195/ijt.2010.6063.

5. Russell TG. Physical rehabilitation using telemedicine. J Telemed Telecare 2007;13(5):217–220; doi: 10.1258/135763307781458886.

6. van Egmond MA, van der Schaaf M, Vredeveld T, et al. Effectiveness of physiotherapy with telerehabilitation in surgical patients: a systematic review and meta-analysis. Physiotherapy 2018;104(3):277–298; doi: 10.1016/j.physio.2018.04.004.

7. Suso-Martí L, La Touche R, Herranz-Gómez A, et al. Effectiveness of Telerehabilitation in Physical Therapist Practice: An Umbrella and Mapping Review With Meta-Meta-Analysis. Phys Ther 2021;101(5); doi: 10.1093/ptj/pzab075.

8. Saaei F, Klappa SG. Rethinking Telerehabilitation: Attitudes of Physical Therapists and Patients. J patient Exp 2021;8:23743735211034336; doi: 10.1177/23743735211034335.

9. Prvu Bettger J, Resnik LJ. Telerehabilitation in the Age of COVID-19: An Opportunity for Learning Health System Research. Phys Ther 2020;100(11):1913–1916; doi: 10.1093/ptj/pzaa151.

10. Seron P, Oliveros M-J, Gutierrez-Arias R, et al. Effectiveness of Telerehabilitation in Physical Therapy: A Rapid Overview. Phys Ther 2021;101(6); doi: 10.1093/ptj/pzab053.

11. Turolla A, Rossettini G, Viceconti A, et al. Musculoskeletal Physical Therapy During the COVID-19 Pandemic: Is Telerehabilitation the Answer? Phys Ther 2020;100(8):1260–1264; doi: 10.1093/ptj/pzaa093.

12. Therapy WC for P. No Title. 2020. Available from: https://world.physio/news/report-sets-out-future-digital-physical-therapy-practice.

13. Cho H-M, Kim H, Jang J, et al. Attitude Toward Telerehabilitation Among Physical and Occupational Therapists in Korea: A Brief Descriptive Report. Brain & NeuroRehabilitation 2023;16(1):e8; doi: 10.12786/bn.2023.16.e8.

14. Ullah S, Maghazil AM, Qureshi AZ, et al. Knowledge and Attitudes of Rehabilitation Professional Toward Telerehabilitation in Saudi Arabia: A Cross-Sectional Survey. Telemed J e-health Off J Am Telemed Assoc 2021;27(5):587–591; doi: 10.1089/tmj.2020.0016.

15. Shah B, Thakrar G. Awareness and Expectations of Telerehabilitation among Physiotherapists of Ahmedabad. Int J Sci Healthc Res 2022;7:35–40; doi: 10.52403/ijshr.20220406.

16. Prensky M. Digital Natives, Digital Immigrants Part 1. Horiz 2001;9:1–6; doi: 10.1108/10748120110424816.

17. Combes B. Generation Y: Are they reaslly digital natives or more like digital refugees? ECU Publ 2009.

18. Sidelil H, Demissie A, Demissie GD, et al. Attitude towards tele rehabilitation-based therapy services and its associated factors among health professional working in specialized teaching hospitals in Amhara region, Northwest Ethiopia. Informatics Med Unlocked 2023;36:101145; doi: https://doi.org/10.1016/j.imu.2022.101145.

19. Leochico CFD. Chapter 27 - Educating Health Care Professionals About Telerehabilitation: Developing a Curriculum Map for High- and Low-Resource Settings. In: Telerehabilitation. (Alexander M. ed) Elsevier: New Delhi; 2022; pp. 391–403; doi: https://doi.org/10.1016/B978-0-323-82486-6.00027-7.

20. Scheideman-Miller C, Clark PG, Moorad A, et al. Efficacy and Sustainability of a Telerehabilitation Program. In: Hawaii International Conference on System Sciences 2003; p. 11 pp.; doi: 10.1109/HICSS.2003.1174380.

21. Başer Seçer M, Çeliker Tosun Ö. Examination of Telerehabilitation Knowledge, Awareness, and Opinions of Physical Therapy and Rehabilitation Students. Med Sci Educ 2022;32(6):1355–1365; doi: 10.1007/s40670-022-01649-z.

22. Naeemabadi Mr, Dinesen B, Andersen OK, et al. Developing a

telerehabilitation programme for postoperative recovery from knee surgery: specifications and requirements. BMJ Heal care informatics 2019;26(1); doi: 10.1136/bmjhci-2019-000022.

23. Hansen H, Bieler T, Beyer N, et al. Supervised pulmonary tele-rehabilitation versus pulmonary rehabilitation in severe COPD: a randomised multicentre trial. Thorax 2020;75(5):413–421; doi: 10.1136/thoraxjnl-2019-214246.

24. Turkish Statistical Institute. Household Information Technology Usage Research. 2023. Available from: https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanim-Arastirmasi-2023-49407#:~:text=Hanehalk%C4%B1%20bili%C5%9Fim%20teknolojileri%20kullan%C4%B1m%20ara%C5%9Ft%C4%B1rmas%C4%B1,artarak%20%95%2C5%20oldu.&text=%C4%B0nternet%20kullan%C4%B1m%20oran%C4%B1%2C%2016%2D74,y%C4%B1l%C4%B1nda%20%87%2C1%20oldu. [Last accessed: 10/02/2023].

25. Fernandes LG, Oliveira RFF, Barros PM, et al. Physical therapists and public perceptions of telerehabilitation: An online open survey on acceptability, preferences, and needs. Brazilian J Phys Ther 2022;26(6):100464; doi: 10.1016/j.bjpt.2022.100464.

26. Almojaibel AA, Munk N, Goodfellow LT, et al. Determinants of Telerehabilitation Acceptance among Patients Attending Pulmonary Rehabilitation Programs in the United States. Saudi J Med Med Sci 2021;9(3):230–234; doi: 10.4103/sjmms.sjmms_10_21.

27. Munce S, Andreoli A, Bayley M, et al. Clinicians' Experiences of Implementing a Telerehabilitation Toolkit During the COVID-19 Pandemic: Qualitative Descriptive Study. JMIR Rehabil Assist Technol 2023;10:e44591; doi: 10.2196/44591.

28. Rabanifar N, Hoseini MA, Abdi K. Exploring Barriers to Implementing Telerehabilitation from experiences of managers, policymakers, and providers of rehabilitation services in Iran: A Qualitative Study. Med J Islam Repub Iran 2022;36:157; doi: 10.47176/mjiri.36.157.

29. Quigley A, Johnson H, McArthur C. Transforming the Provision of Physiotherapy in the Time of COVID-19: A Call to Action for Telerehabilitation. Physiother Can 2021;73(1):1–2; doi: 10.3138/ptc-2020-0031-gee.

30. Alpalhão V, Alpalhão M. Impact of COVID-19 on Physical Therapist Practice in Portugal. Phys Ther 2020;100(7):1052–1053; doi: 10.1093/ptj/pzaa071.

31. Fairman AD, Dicianno BE, Datt N, et al. Outcomes of Clinicians, Caregivers, Family Members and Adults with Spina Bifida Regarding Receptivity to use of the iMHere mHealth Solution to Promote Wellness. Int J telerehabilitation 2013;5(1):3–16; doi: 10.5195/ijt.2013.6116.