

# Examining the Attitude, Knowledge, and Awareness of Professionals Towards Telerehabilitation, A Systematic Review

## Abstract

**Aims:** Telerehabilitation is a branch of telemedicine and an emerging method of providing rehabilitation services through information and communication technology between patients and doctors. This systematic review aimed to examine health professionals' attitudes, knowledge, and awareness of telerehabilitation.

**Instrument & Methods:** On May 27, 2024, a systematic search was conducted without a time limit in PubMed, Embase, Scopus, and Web of Science databases. We followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for reporting on the evidence from the studies that were a part of this systematic review. Titles and abstracts were independently screened based on eligibility criteria. The checklist was used for data extraction. The Joanna Briggs Institute Critical Appraisal Checklist for analytical cross-sectional studies was used to assess the quality of the studies entering this study.

**Findings:** Totally, 33 eligible articles were found through this review. Out of 33 studies, 25 studies investigated the attitude of health professionals towards telerehabilitation. In addition, 15 studies evaluated the knowledge of health professionals in the field of telerehabilitation. On the other hand, out of 10 studies investigated the awareness of health professionals about telerehabilitation.

**Conclusion:** The evidence from this study shows that all health professionals had a positive and promising attitude toward the use of telerehabilitation, but half of the specialists had insufficient knowledge and limited experience in telerehabilitation. Therefore, the need for comprehensive training to fully exploit the capabilities of telerehabilitation in improving patient care for healthcare professionals seems essential.

**Keywords:** Telerehabilitation, professionals, attitude, awareness, knowledge

## Introduction

Telerehabilitation, a branch of telemedicine, is an emerging method of providing rehabilitation services through information and communication technology to establish communication between patients and clinicians and minimize the barriers of distance, time, and cost (1, 2). In 1950, for the first time, telerehabilitation was implemented between two hospitals located 35 km apart (3). In the 1960s, clinicians began using telerehabilitation to diagnosis and treatment of patients (4).

Specific telerehabilitation interventions using various computer-based applications vary based on the patient's rehabilitation needs and resources and may include telephone consultation, video conferencing, use of wearable technologies, teleconsultation with specialists, Teletherapy services (such as virtual exercise programs, home sports) or tele physiological monitoring using body sensor technology (3, 5). Normally, telerehabilitation services are provided for people who live in distant geographical places or people who are unable to go to the rehabilitation center due to disability and financial limitations (6), and this is an economic alternative for this category of patients and people (7).

With the advancement of technology, the provision of telerehabilitation services has become more accessible and more clinicians and patients are using this method to provide healthcare (8). Telerehabilitation is an innovative approach that aims to limit outpatient medical services, reduce waiting lists, increase safe continuity of care, save time and cost of health care services, and reduce the workload of physicians by various health care providers, including speech therapists, occupational therapists, physiotherapists, and other rehabilitation specialists are used (4, 9, 10). Through telerehabilitation, patients can receive counseling and treatment in the comfort of their own homes, while also having real access to the various services of this technology (11). In addition, telerehabilitation is preferred due to

its ability to facilitate better communication between patients and physicians, increase the duration of treatment sessions, provide feedback on prognosis, and its applicability in countries with different income levels (12).

Evidence shows that healthcare professionals have a positive attitude toward the provision of telerehabilitation services. In Lawford et al.'s (13) study, physiotherapists expressed concern about the lack of physical and visual contact with patients during telephone consultations and believed that their relationship with patients would be damaged, while after providing telerehabilitation intervention, found that they experienced fewer problems than they had anticipated and were able to establish stronger relationships with patients and found greater enthusiasm for the care provided over the phone (13). Also, according to Mahmood et al. (14), more than 80% of the participants accepted the benefits of the mobile phone-based home exercise program, 72% agreed that this method leads to a reduction in costs, and 70% believed that the confidentiality of information Guarantees. Most of the participants (82%-94.2%) believed that the mobile phone-based home exercise program helps to reduce the time spent using post-stroke care services. Most of the studies in the field of telerehabilitation have focused on its benefits, applications, and methods of providing services. However, there is a limited number of studies on the importance of success/failure factors affecting health professionals. The results of a systematic review show that there are three success factors and nine failure factors in the field of telerehabilitation that can be considered important. Success factors include satisfaction and willingness, cost/financial benefits, and knowledge of e-healthcare. Failure factors include resistance to change, lack of knowledge, financial constraints, lack of awareness, less use of hardware and software, lack of skill optimization, connectivity issues, less participation in planning, and less training (15).

Considering the widespread emergence of information and communication technology tools and the importance of telerehabilitation as a user-friendly and cost-effective technology in providing services to patients, conducting a study that examines the attitude, knowledge, and awareness of professionals in telerehabilitation seems necessary to pay. Considering that, according to the surveys, no study has been done in this field, the researchers decided to investigate professionals' attitudes, knowledge, or awareness about telerehabilitation.

## **Instrument & Methods**

### **Study design**

This study followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to report the evidence obtained from studies included in this systematic review (16). The PRISMA checklist is shown in Appendix A. We conducted a literature search on the PubMed, Embase, Scopus, and Web of Science databases on May 27, 2024. The below Medical Subject Headings and Emtree keywords and terms were used to search the databases:

(Attitude OR View OR Attitudes OR Sentiment OR Sentiments OR Opinions OR Opinion OR utilization OR Knowledge OR Awareness OR Use OR Skill) AND ("Mobile Application" OR "Mobile App" OR "Smartphone Apps" OR "mHealth" OR "Telemedicine" OR "telehealth" OR "Mobile Health" OR "eHealth") AND "Rehabilitation") OR ("Telerehabilitation" OR "Telerehabilitations" OR "Virtual Rehabilitation" OR "Tele-rehabilitation" OR "Tele Rehabilitation").

### **Eligibility criteria**

The studies were entered into the review if they possessed the following inclusion criteria: (1) cross-sectional studies investigating attitude, knowledge, and awareness of health professionals towards telerehabilitation; on the other hand, the exclusion criteria were: (1) other than journal articles, type of publication (e.g., books, review papers, and letters); (2) lack of availability of full text in English; and (3) scarcity of title relating to the abstract or full text of papers to the aim of the study.

### **Data extraction and synthesis**

All articles were collected from the literature search, and duplicate articles were excluded from this review. Titles and abstracts were independently screened based on eligibility criteria. Articles that did not meet the inclusion criteria were excluded from this review. After that, the complete texts were retrieved and screened by two separate researchers based on the eligibility criteria. Disputes were resolved by discussion, and in the event of disagreement, the third author would give the final opinion. The same checklist was used for data extraction. The data items in this form include the following:

reference, a country under study, publication year, participants' characteristics, the telerehabilitation approach that was used, the attitude toward telerehabilitation, the knowledge toward telerehabilitation, and awareness toward telerehabilitation, study goals, and main study findings

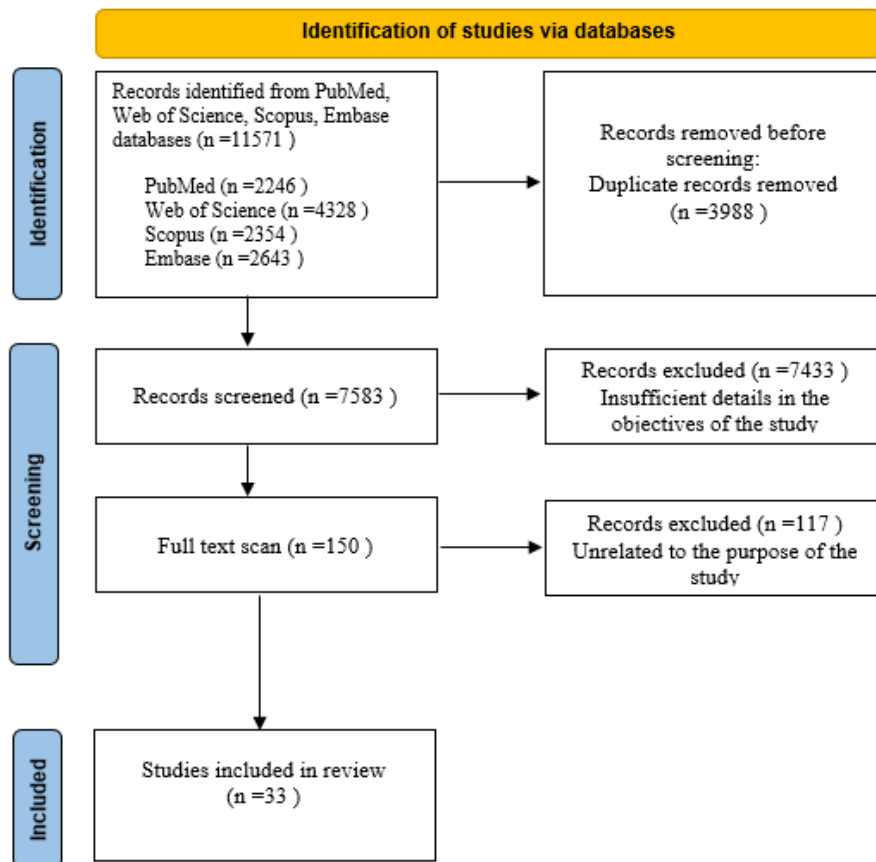
### Quality assessment

To assess the quality of the studies entering this study, the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for analytical cross-sectional studies was used (17). The study specifically obtained eight questions to evaluate the quality of these studies and categorized the questions into two categories: yes, and no. If the answer to a question was yes, it was indicated as 1, and no was marked as 0. Therefore, the maximum quality score that each study could obtain was 8, and exclusion only takes effect if the study quality score was less than 5.

### Findings

#### Study Selection

The search strategy for this review has been consolidated into a Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) diagram shown in Figure 1. For database screening, two authors searched the databases on May 29, 2024, with a yield of 11571 articles. After the removal of duplicates (3988) and articles with other languages, 7583 remained and were evaluated based on title and abstract. Of these, 7433 were discarded as not meeting the inclusion criteria, and 150 records were selected for full-text screening. Finally, 33 eligible articles were found through this review. Figure 1 shows the steps of searching and selecting studies.



**Figure 1.** The steps of searching and selecting studies

### Quality assessment

The quality assessment results shown in Table 1 show that there was no significant bias in the studies and that all quality studies were included in our study.

**Table 1. Summary of the quality assessment of articles using the JBI critical appraisal checklist.**

References	Questions								Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	
Ken Erbvvin <sup>32</sup> Philippines 2024	Y	Y	N	N	Y	Y	Y	Y	6
Joanna Apps <sup>33</sup> United Kingdom 2024	Y	Y	Y	N	Y	Y	Y	Y	7
Hee-Mun Cho <sup>43</sup> Korea 2023	Y	Y	N	Y	Y	Y	Y	Y	7
Naif Q. Aljabri <sup>24</sup> Saudi Arabia 2023	Y	Y	Y	N	N	Y	Y	Y	6
Sinem Erturan <sup>4</sup> Ireland 2023	Y	Y	N	N	Y	Y	Y	Y	6
Warda Saeed <sup>45</sup> Pakistan 2024	Y	Y	N	N	N	Y	Y	Y	5
Akın Suzer <sup>41</sup> Türkiye 2023	Y	Y	Y	N	Y	N	Y	Y	6
Gurman Kaur <sup>21</sup> India 2023	Y	Y	Y	N	Y	Y	Y	Y	7
Leochico <sup>30</sup> Philippines 2022	Y	Y	Y	N	Y	Y	N	Y	6
Bhavya H. Shah <sup>22</sup> india 2022	Y	Y	Y	N	Y	Y	Y	Y	7
Nazreen Nihara <sup>19</sup> India 2022	Y	Y	N	N	Y	Y	Y	Y	6
Vivek Ramanandi <sup>20</sup> India 2022	Y	Y	Y	N	Y	Y	Y	Y	7
Parisa Arzani <sup>27</sup> Iran 2022	Y	Y	Y	N	Y	Y	Y	Y	7
Leochico <sup>31</sup> Philippines 2022	Y	Y	Y	N	Y	N	N	Y	5
Baran Bayati <sup>28</sup> Iran 2021	Y	Y	Y	N	N	Y	Y	Y	6
Al Maliki <sup>23</sup> Saudi 2021	Y	Y	N	N	Y	Y	Y	Y	6
Gagan Bajaj <sup>1</sup>	Y	Y	Y	N	Y	Y	Y	N	6

References	Questions								Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	
India 2021									
Sarah Ibraheem Albahrouh <sup>42</sup> Kuwait 2021	Y	Y	Y	N	Y	Y	Y	Y	7
Luisa Cacciante <sup>40</sup> Poland 2021	Y	Y	Y	N	Y	Y	Y	Y	7
Hooshang Dadgar <sup>29</sup> Iran 2021	Y	Y	Y	N	Y	N	Y	N	5
Bairapareddy <sup>18</sup> India 2021	Y	Y	Y	N	Y	Y	Y	Y	7
Rebecca Farah <sup>44</sup> 2021 Lebanon	Y	Y	N	Y	Y	Y	Y	Y	7
Sami Ullah <sup>25</sup> Saudi 2021	Y	Y	N	N	Y	Y	Y	Y	6
Banafshe Mansuri <sup>26</sup> Iran 2021	Y	Y	Y	N	Y	N	Y	Y	6
Johanna Theresia Biebl <sup>39</sup> Germany 2020	Y	Y	Y	N	N	Y	Y	Y	6
Helen Morse <sup>34</sup> UK 2020	Y	Y	Y	Y	Y	Y	Y	Y	8
Saleh Aloyuni <sup>6</sup> 2020 Saudi Arabia	Y	Y	Y	N	N	Y	Y	Y	6
Lawford, Belinda <sup>35</sup> Australia 2019	Y	Y	Y	N	Y	Y	Y	Y	7
Amreen Mahmood <sup>14</sup> India 2019	Y	Y	Y	N	Y	Y	Y	Y	7
Marika Demers <sup>38</sup> Canada 2018	Y	Y	Y	Y	Y	Y	Y	Y	8
Lawford <sup>13</sup> 2018 Australia	Y	Y	Y	N	Y	N	Y	Y	6
Rob Argent <sup>36</sup> Ireland	Y	Y	Y	N	N	Y	Y	N	5

References	Questions								Score
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	
2018									
Suzanne H. Kimball <sup>37</sup> United States 2017	Y	Y	Y	N	Y	Y	N	Y	6

### General Characteristics

Table 2 shows the characteristics of all included studies. Of the 33 studies included in this article, seven studies in India (23.5%), (1, 14, 18-22) four studies in Saudi Arabia (11.7%) (6, 23-26), four studies in Iran (11.7%) (27-29), three studies in the Philippines (8.8%) (30-32), two studies in England (5.8%) (33, 34), two studies in Australia (5.8%) (13, 35), and two studies in Ireland (5.8 %) (4, 36). Other studies have been conducted in the United States (37), Canada (38), Germany (39), Poland (40), Turkey (41), Kuwait (42), South Korea (43), Lebanon (44), and Pakistan (45) was done. Different telerehabilitation approaches include virtual reality, telephonic exercise therapy, internet service delivery models, rehabilitation applications, computerized exercise therapy, video conference/webinars, mobile-based home exercise programs, and telerehabilitation virtual training, telerehabilitation is based on phones, websites, online courses, telecommunications, Facebook Messenger application, Google Meet, SMS communication, Viber application, Zoom, OPD physiotherapy, wearable sensors, and video calling (6, 13, 14, 18, 21, 26, 29, 31-39, 43, 45). The field of study of the specialists participating in the studies included nine categories: physiotherapy, speech therapy, lung specialist, orthopedics, medicine, occupational therapy, audiology, surgery, and cardiology. The total sample size of the studies was 6086 participants and the sample size varied from 6 people (34) to 1111 people (23). According to "The State and Outlook of the World Economy" by Belzi (2022), 10 of the studies were conducted in developed countries (4, 13, 33-39, 43) and 23 of the studies were conducted in developing countries (1, 6, 14, 18-32, 40-42, 44, 45).

### Professionals attituded toward telerehabilitation

Out of the 33 present studies, 25 studies investigated the attitude of professionals towards telerehabilitation (1, 4, 6, 13, 14, 19, 20, 23, 24, 26, 27, 29, 30, 32-39, 42-45). In all studies, professionals had a positive and promising attitude towards telerehabilitation in the clinical profession and its use in the future. Among these, 10 studies were conducted in developed countries (4, 13, 33-39, 43) and 15 studies were conducted in developing countries (1, 6, 14, 18-20, 23, 24, 26-30, 40, 42). In Albahrouh et al's study, most physiotherapists agreed that telerehabilitation offers a practical solution for providing physiotherapy services to patients, especially during the COVID-19 pandemic (42). Also, Demers et al., in the review of the integration of virtual reality intervention on cognitive-telerehabilitation of the upper limb in people with acute stroke, states that all physicians were very satisfied with the VR intervention and they stated that the intervention simultaneously addresses the motor, and cognitive and perceptual injuries of the patients (38). Lawford et al. also states in his study that 81% of physicians have a positive attitude towards the use of telephone and Internet-based exercise therapy methods for people with knee and hip arthritis and believe that the use of rehabilitation services in the form of video care for the patient is useful, is effective and easy (13). In another study conducted by Lawford et al, in the investigation of the provision of telephone services for patients with knee arthritis, physiotherapists believed that using this method was convenient for patients because they did not have to visit the clinic in person and there was a new enthusiasm for using this method. There was a cure in the patients (35). Carl Froilan states that the average score of attitudes towards telerehabilitation among physicians was  $4.2 \pm 1.0$  out of 5, and physicians believed that using telerehabilitation is a good idea for providing rehabilitation services (30). About 80.7% of physiotherapists in Aloyuni et al. study (6) reported that telerehabilitation in physiotherapy is reliable and valid. In addition, 92.2% agreed that the implementation of telerehabilitation improves the quality of health care (5). According to Mahmood et al (14), more than 80% of professionals accepted the benefits of a mobile phone-based home exercise program, 72% agreed that it would reduce costs, and 70% believed that it would ensure the confidentiality of information. Most of the participants (82%-94.2%) found that the mobile phone-based home exercise program helped to

reduce the time spent using post-stroke care services. Most physiotherapists had a positive attitude towards telerehabilitation in Erturan's study, and 82.7% believed that telerehabilitation can reduce the energy spent by physiotherapists in rehabilitation (4). While approximately 77.2% (115/98) of Bieble et al's study, participants welcomed the integration of mobile application-based treatment methods for hip or knee osteoarthritis, 14.8% (115/17) were against it (39). Speech therapists in Bajaj's study also had positive attitudes toward telerehabilitation services (<51%), with most stating that using online platforms to provide telerehabilitation services during the COVID-19 pandemic was convenient and assured They use this technology (1). 89.7% of physiotherapists in Saeed's study had a positive attitude towards the use of telecommunication methods in telerehabilitation. A significant majority (79.1%) recognized telerehabilitation as a legitimate service, and 80.6% agreed on its effectiveness in tracking patient conditions. In other studies, professionals had a positive attitude towards telerehabilitation in different fields (45).

### **Professionals' knowledge of telerehabilitation**

Out of 33 studies included in this research, 15 studies evaluated the knowledge of professionals in the field of telerehabilitation (1, 6, 20, 21, 23, 24, 27, 28, 30, 32, 34, 36, 40, 43, 44). Among them, eight studies evaluated the knowledge level of professionals as high (6, 20, 21, 24, 28, 32, 34). Seven of these studies were conducted in developing countries (6, 20, 21, 24, 28, 32) and one in a developed country (34). The study by Kaur et al. states that 61.2% of physiotherapists had sufficient knowledge about telerehabilitation, 18% had moderate knowledge, and 19.5% lacked knowledge in this field. Also, the majority of physiotherapists in study 15 stated that they had sufficient knowledge about telerehabilitation, and more than 50% of them reported that telerehabilitation could be used at every stage of the patient's rehabilitation (6). In addition, more than half of the speech therapists (<50%) in the study Bajaj et al. stated that they had little familiarity with telerehabilitation before the outbreak of COVID-19, and after the establishment and implementation of telerehabilitation services after the outbreak of the COVID-19 pandemic, the knowledge They have improved. But still, many of them did not feel prepared with the technical knowledge and skills needed to provide telerehabilitation services (1). In three studies, the knowledge of professionals in the field of telerehabilitation was reported to be moderate (26, 30, 32). Mansouri et al. (26) reported in his study that the average knowledge score of speech therapists was 2.66 out of 5 ( $\pm 0.73$ ), which is considered an average value. In addition, in Ken Erbin et al's study (32), the average score for telerehabilitation knowledge among physiotherapists was 5.8 out of 9 points, and the majority of participants (50.3%) had an average level of knowledge (ie, with 50 to 70% correct answers). On the other hand, seven studies evaluated the knowledge level of specialists as low (21, 23, 27, 31, 40, 43, 44), six of which were conducted in developing countries (21, 23, 27, 31, 40, 44) and one was conducted in a developed country (43). In Cacciante et al's study (40), the level of knowledge about telerehabilitation before the COVID-19 pandemic among speech therapists was very low. So only 11 people (9.40%) of the therapists were familiar with telerehabilitation. Most physicians, (61.5%), also reported inadequate telerehabilitation knowledge in Carl Froilan et al's study (31). In addition, Rebecca Farah et al. (44) states in her study that almost one-third (31.3%, n = 26) of cardiologists indicated that they had good knowledge of telecardiac rehabilitation, and 4.8% (n = 4) indicated that they had very poor knowledge. They have from CR. Regarding the content of the program, 31.3% of the participants (n=26) stated that they had an average level of knowledge of cardiac rehabilitation components and 10.8% (n=9) had very poor knowledge of cardiac rehabilitation components. More than half of the speech therapists (<50%) in Bajaj et al's study (1) stated that they had little knowledge of telerehabilitation before the outbreak of COVID-19 and that their knowledge improved after the establishment and implementation of telerehabilitation services after the outbreak of the COVID-19 pandemic. But still, many speech therapists did not feel prepared with the technical knowledge and skills needed for telerehabilitation. In the study of Arzani et al. (27), physiotherapists admitted that they have little knowledge about the use of tele-physiotherapy technology. 14.88% of users have very poor knowledge, 26.95% have poor knowledge, 38.93% have relative knowledge, 15.88% have high knowledge, and 3.34% have good knowledge. They were very high. In this study, the lowest level of knowledge (27.08%) was about how to consult patients with tele physiotherapy and the highest level of knowledge (70%) was about the standards of tele physiotherapy. Al Maliki et al, (23) also believes that physicians had little knowledge about pulmonary rehabilitation because few of them participated in

pulmonary rehabilitation training. Cho HM (43), in the study of the impact of using video games and virtual reality in physiotherapy, states that physiotherapists have the least necessary knowledge for AVG/VR, which indicates the need for educational interventions.

#### **Professionals' awareness of telerehabilitation**

Out of 33 studies included in this research, 10 studies examined the awareness of professionals about telerehabilitation (18-22, 24, 25, 27, 36, 41). 9 of these studies were conducted in developing countries (18-21, 24, 25, 27, 41) and one in a developed country (36). In nine studies, professionals had a good knowledge of telerehabilitation. All participants in the Aljabri et al. (24) study were aware of telerehabilitation as a practice modality used by health professionals in Saudi Arabia and had a clear understanding of what telerehabilitation is and how it can improve access to OT services in Saudi Arabia. Also, in Bairapareddy et al's study (18), most healthcare professionals (37/52; 71%) were aware of the benefits of smartphone-based telerehabilitation and its functionality. According to Suzer et al's (41) study, the majority of physical therapists, 76.26%, reported that they were aware of telerehabilitation, while 23.74% were not aware of telerehabilitation. Physiotherapists stated the main ways of their awareness, scientific meetings (64.90 percent), and course materials (64.24 percent). The majority of physical therapists (86.2%) in Ramanandi et al's study (20) were familiar with physical therapy services and stated that they obtained information about physical therapy from other studies (25.5%), various media (24.1%), and other physical therapists (19.7%). Gurman Kaur et al (21) in their study stated that physiotherapists had good knowledge about telerehabilitation and the majority of them (78.0%) were aware of telerehabilitation. Of the 200 physiotherapists in the study, 10 were aware of telerehabilitation and used it regularly, 32 (16.0%) used it intermittently, and 114 (57.0%) used telerehabilitation but did not use telerehabilitation. In Nazreen Nihara et al's study (19), 63.2% of audiologists were aware of tele-practice guidelines by ISHA. A quarter of the participants (36.9%) were not aware or did not know about tele-practice guidelines. However, in two studies, professionals had little knowledge of telerehabilitation, both of which were conducted in developing countries. In the study of Arzani et al. (27), 84.37% of physiotherapists had little knowledge and familiarity with this technology and its benefits. Ullah et al (25) also stated in their study that a total of 46% of the participants were aware of telerehabilitation service technology but did not use it.



**Table 2.** Summary of characteristics of the included studies

Author/country/year	Type of Study	Type of research instrument	Field	No. of participants	Rehabilitation approach	Attitude to telerehabilitation	Knowledge of telerehabilitation	Awareness of telerehabilitation	Goals	Results
Sosa, Ken Erbin <sup>32</sup> 2024 Philippines	Analytical Cross-Sectional Study	Online Questionnaire	Physiotherapy	145	Facebook Messenger Google Meet Call SMS Viber Zoom	Most of the respondents had a positive attitude towards telerehabilitation. (<70%).	The average TR knowledge score of the respondents was 5.8 out of 9 points. The majority (50.3%) had average TR knowledge (ie, with 50-70% correct answers).	-	Determine the telerehabilitation knowledge, attitude, and practice of PTs in the Philippines during the COVID-19	The positive telerehabilitation attitudes may represent a small group of PTs favoring telerehabilitation, while information from the larger population remains unknown.
Joanna Apps <sup>33</sup> 2024 United Kingdom	Cross-Sectional Study	Online survey		43	Computer, Telephone	Parents/caregivers responded to the MTUAS questions in ways suggesting broadly positive attitudes toward technology.	-	-	Exploring the views of UK parents and carers on the use of digital technology in supporting their child and the potential for greater use in the care of children with complex needs	Parents and caregivers positively viewed digital technology as a tool to support their children and enhance rehabilitation services.
Hee-Mun Cho <sup>43</sup> 2023 Korea	Cross-Sectional Study	Internet-based survey	Physiotherapy	350	Active Video Games and virtual reality	Therapists with previous experience of using AVG/VR technology showed a more favorable attitude towards AVG/VR.	Therapists in this study scored the lowest in knowledge of AVG/VR, indicating the need for educational interventions.	-	Attitudes toward virtual rehabilitation	Therapists' attitudes, perceptions, and intentions toward VR/AVG are crucial factors in establishing and implementing VR/AVG; thus, the results of this study provide valuable evidence for future policies related to VR/AVG in rehabilitation medicine.
Naif Q. Aljabri <sup>24</sup> 2023	Qualitative Study	Semi-structured	Occupational Therapy	9	-	They indicated positive	Saudi occupational	All participants	Investigate OTs' perspectives	Saudi occupational therapists have

<p><b>Saudi Arabia</b></p>		<p>phone interviews</p>				<p>attitudes towards telerehabilitation, a sense of willingness to use it, and plans to use it in their practice.</p>	<p>therapists had a good knowledge of telerehabilitation and some had used it during the pandemic.</p>	<p>were aware of telerehabilitation as a modality of practice used by health professionals in Saudi Arabia and elsewhere.</p>	<p>on telerehabilitation, including attitudes, perceived enablers, and barriers to implementation in practice,</p>	<p>good knowledge and awareness of telerehabilitation; some used it during the pandemic.</p>
<p><b>Sinem Erturan<sup>4</sup> 2023 Ireland</b></p>	<p>Cross-Sectional Study</p>	<p>Online Questionnaire</p>	<p>physiotherapy</p>	<p>219</p>		<p>Physiotherapists show a positive attitude towards TR and recognize its potential benefits. 88.1% of participants believed that TR programs could be a solution for people with physical problems during the pandemic. 90% of them believed that TR could save time and money and 82.7% believed that it could reduce the energy spent by physiotherapists in rehabilitation.</p>	<p>-</p>	<p>-</p>	<p>Understanding the desires, perceptions, and barriers that physiotherapists face when implementing TR in a developing country</p>	<p>The study reveals that physiotherapists in the developing country exhibit a positive attitude towards TR and recognize its potential benefits. However, various barriers, such as training deficiencies, need to be addressed to facilitate broader adoption of TR in their practices</p>
<p><b>Warda Saeed<sup>45</sup> 2024 Pakistan</b></p>	<p>Cross-Sectional Study</p>	<p>Online Questionnaire</p>	<p>physiotherapy</p>	<p>350</p>	<p>Telecommunications</p>	<p>89.7% of the participants had a positive attitude towards the use of</p>	<p>-</p>	<p>-</p>	<p>Evaluation of the knowledge, attitudes, and skills of physiotherapists regarding telerehabilitation</p>	<p>Physiotherapists generally hold a positive view of telerehabilitation, recognizing its importance in the</p>

						telecommunications in remote rehabilitation. A significant majority (79.1%) recognized telerehabilitation as a legitimate service, with 80.6% agreeing on its effectiveness in patient follow-up.			ion, to ascertain their proficiency and perceptions of its application in clinical settings.	continuum of care. Nonetheless, the variability in ICT skills highlights the need for comprehensive training to fully exploit the capabilities of telerehabilitation in enhancing patient care.
<b>Akın Suzer<sup>41</sup> 2023 Türkiye</b>	Cross-Sectional Study	A web-based survey	Medicine	237				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. How PTs were aware of TR were mainly scientific meetings (64.90%) and lectures (64.24%)	Investigate the awareness and opinions of PTs in Turkey about TR.	Most of the PTs in Turkey 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.
<b>Gurman Kaur<sup>21</sup> 2023 India</b>	Qualitative	Online Survey Questionnaire	Physiotherapy	200	Physiotherapy, OPD, home visit, video call, Phone	The knowledge was complete in 62.5%, partial knowledge in 18.0%, and 19.5% did not know.	The awareness about TR was good and a majority (78.0%) of particip	Evaluate the knowledge, attitude, awareness, and practice of TR among PTs in India	Physiotherapists were aware and had good knowledge and attitudes towards the implementation of TR. However, the usage and implementation were limited	

								ants were aware of telerehabilitation.		due to time and cost
<b>Leochico 2022 Philippines</b> <sup>30</sup>	Cross-Sectional Study	Online survey	Medicine	62	-	The average score of attitudes towards telerehabilitation was $4.2 \pm 1.0$ and doctors believe that using telerehabilitation is a good idea.	The respondents had a mean telerehabilitation knowledge score of $2.1 \pm 1.1$ out of 5, interpreted as fair.	-	Determining the Rehabilitation Medicine residents' current levels of telerehabilitation readiness, knowledge, and acceptance, their pattern of beliefs about telerehabilitation, and the factors affecting their readiness.	The Rehabilitation Medicine residents in the Philippines had mixed levels of telerehabilitation adoption. Although it seemed that despite their relatively low telerehabilitation knowledge and high telerehabilitation acceptance, their optimism and innovativeness seemed to be significant facilitators of telerehabilitation readiness.
<b>Bhavya H. Shah 2022 India</b> <sup>22</sup>	Cross-Sectional Study	Online Survey Questionnaire	Physiotherapy	158	-			Most of the respondents (%Y>) were aware of the telerehabilitation platform	Assess the awareness and expectations of telerehabilitation among physiotherapists	Physiotherapists of Ahmedabad are having good awareness and high expectations for future telerehabilitation applications. Knowledge of Telerehabilitation is more profound in clinicians as well as academicians but comparatively less in the students.
<b>Nazreen Nihara 2022 India</b> <sup>19</sup>	Cross-Sectional Study	Questionnaire	Audiology	108	-	Majority of the audiologists had a positive attitude that telepractice increases the geographical reach of services.		Among the telepractitioners, 63.2% were aware of the telepractice guidelines given	Investigated the knowledge, attitude, and practice (KAP) of teleaudiology among Indian audiologists.	Acceptance of telepractice in India among audiologists has improved post-COVID pandemic. Though majority of the audiologists possess good knowledge and

									by the ISHA. One-quarter of the participants (36.9%) were not aware or didn't know about the tele-practice guidelines.		a positive attitude toward tele-audiology, there still exists a gap in the actual use
<b>Vivek Ramanandi</b> 2022 India	Cross-Sectional Study	Online questionnaire	Physiotherapy	500	-	-	A total of 248 (57.5%) participants responded that they would like to be or would encourage any of their relatives to be a physiotherapist. The majority (254 [58.9%]) of participants considered the place of physiotherapy to be very important in the healthcare system [Table 5]. Two hundred and nine (48.5%) and 165 (38.3%) participants reported that they perceive the physiotherapy services are always or sometimes	427 of the participants reported awareness of the existence of physiotherapy. Most participants (86.2%) were familiar with physiotherapy services [Table 2]. Participants reported that they obtained information about physiotherapy from hospitals (25.5%), media (24.1%), physiot	Explore awareness, attitudes, and beliefs of Gujarati physical therapists regarding telerehabilitation and utilization of telerehabilitation services among them	A large proportion of Gujarati physical therapists are aware of telerehabilitation services. Positive attitudes and beliefs about telerehabilitation services were reported.	

						effective, respectively		herapists (19.7%), and schools (20.8%)		
<b>Parisa Arzani 27 2022 Iran</b>	Cross-Sectional, Descriptive Study	Online checklist questionnaires	Physiotherapy	192	Tele-physiotherapy (TPT)	In general, physiotherapists had a positive attitude towards remote physiotherapy. The highest percentages of PTs' positive attitudes were related to the usefulness of TPT with face-to-face healthcare services (92.70%), and the need for accurate documentation and training guidelines on the use of TPT network systems (90.62%).	Physiotherapists acknowledged that they had little knowledge of the use of this technology. PTs' knowledge analysis suggests that on average: 14.88 % of the users had very poor knowledge, 26.95 % had poor knowledge, 38.93 % relative knowledge, 15.88 % had high knowledge, and 3.34 % had very high knowledge of TPT. They also had the lowest level of knowledge (27.08) on "how to consult patients with TPT" and the highest level of knowledge about the TPT standards (30.21 %).	84.37% of physiotherapists had little knowledge and familiarity with this technology and its benefits.	Investigated the physiotherapists' perception of TPT and the barriers to its practical application during the COVID-19 outbreak.	The results indicate that during the COVID-19 pandemic in Iran, a significant increase in the use of TPT has developed. The overall physiotherapists' attitude towards TPT was positive, but it was necessary to minimize or eliminate the barriers to applying this effective method.
<b>Leochico 31 2022 Philippines</b>	Cross-Sectional Study	Online questionnaire	Rehabilitation Medicine	161	Websites Online courses	-	The majority of medicine		Determination of the perceptions and	Despite their limited baseline knowledge,

					Conferences / Webinars		reported inadequate telerehabilitation knowledge (61.5%),		experiences of psychiatrists in the Philippines regarding telerehabilitation	skills, and experience regarding telerehabilitation, many psychiatrists in the Philippines learned to adopt this service delivery method during the pandemic.
<b>Baran Bayati</b> <sup>28</sup> <b>2021</b> <b>Iran</b>	Qualitative Study	Depth semi-structured interviews	speech therapy	12	Tele-speech therapy		The participants had relatively good knowledge and experience in using remote speech therapy		This study aimed to investigate speech therapists' perspectives on using tele-speech therapy.	Although remote speech therapy has many benefits for professionals and patients, the challenges of using this technology should not be underestimated.
<b>Al Maliki</b> <sup>23</sup> <b>2021</b> <b>Saudi</b>	Cross-Sectional Study	Online questionnaire	Medicine	1111		37% of Physicians showed a positive attitude towards pulmonary rehabilitation, and they believed that patients benefit from pulmonary rehabilitation, it improves the quality of life.		Few doctors attended pulmonary rehabilitation training and had little knowledge about pulmonary rehabilitation.	Evaluation of knowledge, awareness, and practice about the effectiveness and benefits of pulmonary rehabilitation for patients with COVID-19 among doctors	Physicians showed a positive attitude towards pulmonary rehabilitation, believing that patients benefit from pulmonary rehabilitation and would like to have more educational opportunities to increase their knowledge about the effectiveness of pulmonary rehabilitation.
<b>Gagan Bajaj</b> <sup>1</sup> <b>2021</b> <b>India</b>	Cross-Sectional Study	Internet-based questionnaire	Speech Therapy	102	Telerehabilitation services	Therapists had a positive attitude towards telerehabilitation services (<51%), most of them stated that it was convenient to use online platforms to	More than half of the therapists (<50%) stated that they had little knowledge of telerehabilitation before the outbreak of COVID-19 and that their		Gather the knowledge, attitudes, and practices (KAP) of SLPs in India regarding telerehabilitation services during the pandemic	In a country like India, where face-to-face SLP services are still not available in different geographical locations, the scope of telerehabilitation SLP services is relevant even beyond the current pandemic.

						provide telerehabilitation services during the COVID-19 pandemic, and they confidently used the technology.	knowledge improved after the establishment and implementation of telerehabilitation services after the outbreak of the COVID-19 pandemic.			
<b>Sarah Ibraheem Albahrouh</b> <sup>42</sup> <b>2021</b> <b>Kuwait</b>	Cross-Sectional Survey	Electronic questionnaire/ Face-to-face semi-structured interviews	Physiotherapy	273	-	This study found that the PTs surveyed had positive perceptions of telerehabilitation and Most of them agreed that telerehabilitation offers a practical solution to providing physiotherapy services to patients, particularly during the COVID-19 pandemic	-	To investigate physiotherapists' perceptions of and willingness to use telerehabilitation in Kuwait during the COVID-19 pandemic and to explore the barriers that may hinder the use of telerehabilitation in this sector.	In Kuwait, physiotherapists show overall positive perceptions towards and a willingness to use telerehabilitation to facilitate patients' access to physiotherapy services.	
<b>Luisa Cacciante</b> <sup>40</sup> <b>2021</b> <b>Poland</b>	Qualitative Research Study	Survey questionnaire	Speech Therapy	136	-	-	The level of knowledge about TR before the COVID-19 pandemic was very low. So only 11 people (9.40%) of the therapists were familiar with remote rehabilitation.	Analysis of the Italian speech and language therapists (SLTs) opinions on the feasibility of the TR in the field of speech-language therapy during the COVID-19 pandemic	The results of this study showed that the majority of Italian SLTs were not familiar with TR systems before the epidemic and were not satisfied with this type of treatment delivery method, and face-to-face treatment was preferable to TR treatment. However, the opinion about TR is changing with more	



									exposure to the method.	
<b>Hooshang Dadgar</b> <sup>29</sup> <b>2021</b> <b>Iran</b>	Cross-Sectional Study	A web-based survey	Occupational therapists, Speech therapists, Audiologists, Psychologists, and Educators	118	Virtual training and telerehabilitation	All specialty professionals had a generally positive attitude toward telerehabilitation in the current study.	-	-	Investigate the feasibility, satisfaction, and attitude of rehabilitation professionals toward telerehabilitation during the COVID-19 pandemic in Iran	Because of the positive role of telerehabilitation in a situation such as the COVID-19 pandemic, healthcare systems should create mechanisms for its optimal use, protocol preparation, health professionals training, and infrastructure acquisition
<b>Bairaparedy</b> <sup>18</sup> <b>India</b> <b>2021</b>	Cross-sectional survey	Online questionnaire	physicians, rehabilitation nurses, and physiotherapists	52	Smartphones	Healthcare professionals had high knowledge of smartphone-based telerehabilitation among chronic obstructive pulmonary disease.	-	The majority of the healthcare professionals (n = 37/52; 71%) were found to be aware of smartphone-based telerehabilitation benefits and the overview of the functioning.	Assess the feasibility of administering a smartphone-based telerehabilitation program for chronic obstructive pulmonary disease patients in India.	While knowledge of smartphone-based telerehabilitation is high among healthcare professionals and chronic obstructive pulmonary disease patients, implementation of this novel intervention measure has been limited due to perceived constraints associated with smartphone-based telerehabilitation.
<b>Rebecca Farah</b> <sup>44</sup> <b>2021</b> <b>Lebanon</b>	Quantitative cross-sectional survey	Survey questionnaire	cardiology	77	-	Physicians had a positive attitude toward the use of cardiac rehabilitation. Half of the participants (51.8%, 43 people) thought that CR could be effective in	-	Almost one-third (31.3%) of the participants stated that they had good knowledge of cardiac rehabilitation and 4.8% stated that they had very poor	Assess the knowledge, attitudes, and practices among physicians in Cardiac Rehabilitation	Lebanese healthcare providers need more information and training on CR, which suggests that such education programs are important to develop.

						Lebanon. Overall, 52.4% (n=43) of physicians strongly agreed that the quality of care for patients they received would increase.	knowledge of CR. Regarding the content of the program, 31.3% of the participants stated that they had an average level of knowledge of CR components and 10.8% had very poor knowledge of CR components.		
<b>Sami Ullah</b> <sup>25</sup> <b>2021</b> <b>saudi</b>	Cross-Sectional Study	Survey questionnaire	Rehabilitation professional	82	-	-	46% of the participants were aware of telerehabilitation service technology but did not use it.	Exploring Saudi-based rehabilitation professionals' knowledge of telerehabilitation.	Even though a considerable number of the participants considered telerehabilitation as an important service delivery method, most of them are not involved in telerehabilitation
<b>Banafshe Mansuri</b> <sup>26</sup> <b>2021</b> <b>Iran</b>	Cross-Sectional Study	Online questionnaire	speech-language pathologists	465	Tele-training	SLPs who participated in the study had good attitudes toward telepractice (mean 3.99 ± 0.53 on a scale of 1-5).	The mean of the knowledge score of the SLPs was 2.66 (±0.73), a value that is considered to be moderate	investigation of the knowledge, attitude, and practice (KAP) of SLPs relative to telepractice during the COVID-19 pandemic	Policymakers should take appropriate action in the field of effective telepractice for training SLPs especially during or before situations such as the COVID-19 pandemic
<b>Johanna Theresia Biebl</b> <sup>39</sup> <b>2020</b> <b>Germany</b>	Cross-Sectional Study	Questionnaire Study	Surgical medicine	127	Mobile health programs	Participants' attitudes toward possible exercise modules are shown in Figure 3. Approximately 77.2% (98/115) of the participants	-	Determine the expectations and attitudes of medical professionals toward app-based therapy for osteoarthritis of the hip or knee	The study showed a high acceptance of app-based therapy for osteoarthritis, indicating a huge potential of this form of treatment to be applied, prescribed, and recommended

						said they would welcome the integration of coaching procedures into the app, but 14.8% (17/115) said they were against it. It was believed by 76.0% (77/115) of participants that patients should receive feedback (eg, via SMS text messaging), while 33.0% (38/115) did not recommend this function.			by medical professionals. It was widely accepted that the content should reflect a multimodal therapy approach.
<b>Helen Morse</b> <sup>34</sup> <b>2020</b> <b>UK</b>	Mixed-method	Focus groups and semi-structured interviews	stroke clinicians	6	Virtual Reality	All clinicians (except one) agreed that VR rehabilitation could improve their work performance and effort. The majority of physicians (80%) reported that they had sufficient resources and knowledge to use VR rehabilitation in clinical practice	-	Examining the opinions of clinicians about the use of virtual reality in post-stroke care	Overall, end-users were positive and interested in using VR telerehabilitation for spatial neglect.
<b>Saleh Aloyuni</b> <sup>6</sup> <b>2020</b> <b>Saudi Arabia</b>	Cross-Sectional Study	Questionnaire	Physiotherapy	347	Video conferencing	80.7% (n = 280) and (78.4%, n = 272) of PTs reported that TR was reliable and valid in PT. Furthermore, 92.2% (n = 320) agreed that the majority of PTs reported having sufficient knowledge of TR. The PTs in the study scored highest in the general	-	Explore physiotherapists' (PTs) knowledge, attitudes, and barriers towards implementation of TR in physical therapy settings	It appears that there is a relatively high number of PTs in the KSA with knowledge of TR; however, facilities and usage are limited.

						<p>implementation of TR in the physiotherapy setting improves the quality of health care.</p> <p>knowledge domain and more than 50% of respondents reported that the TR can be used at every stage of patient rehabilitation</p>		
<p><b>Lawford, Belinda 2019 Australia</b></p>	<p>Descriptive Qualitative Study</p>	<p>Semi-structured interviews</p>	<p>Physiotherapy</p>	<p>8</p>	<p>Telephone-delivered exercise therapy</p>	<p>Physiotherapists believed that the provision of medical services over the phone exceeded their expectations and a new desire to use this model arose in them. They also found that it was convenient for the patient to provide telephone services because they did not have to visit the clinic in person.</p>	<p>Investigating the perception of physiotherapists before and after the implementation of the treatment method over the phone for knee arthrosis</p>	<p>Although physical therapists were initially skeptical about the effectiveness of the telephone service method for osteoarthritis of the knee, their perception of this non-traditional method changed upon experience.</p>
<p><b>Amreen Mahmood 2019 India</b></p>	<p>Cross-Sectional Study</p>	<p>Questionnaire-based study</p>		<p>52</p>	<p>Mobile-Based Home Exercise Program</p>	<p>Most of the participants showed a positive attitude towards this treatment method. More than 80% of participants accepted the benefits of a mobile phone-based home exercise program,</p>	<p>Assess the acceptability and attitude toward a mobile-based home exercise program among stroke survivors and their primary caregivers</p>	<p>Stroke survivors and caregivers have embraced the concept of a mobile phone-based home exercise program even in low-resource settings, but further studies to understand the treatment and cost-effectiveness of this technology among stroke</p>

						72% agreed that it would lead to reduced costs, and 70% believed that it would ensure the confidentiality of information.			survivors will lead to better implementation.
<b>Marika Demers 38 2018 Canada</b>	Mixed-methods including Qualitative and Quantitative Approaches	Focus groups and semi-structured interviews	Medicine 9		Game-based virtual reality	All clinicians were very satisfied with the VR intervention. Clinicians stated that this intervention has the potential to increase treatment effectiveness and potentially transfer skills learned in treatment to real-world situations.		Determine user satisfaction and safety of incorporating a low-cost virtual rehabilitation intervention as an adjunctive therapeutic option for cognitive-motor upper limb rehabilitation in individuals with sub-acute stroke.	Incorporation of this type of functional activity game-based virtual reality intervention in the sub-acute phase of rehabilitation represents a way to transfer skills learned early in the clinical setting to real-world situations, and may lead to better integration of the upper limb into everyday activities
<b>Lawford 13 2018 Australia</b>	Cross-Sectional Study	Internet-based survey	Physiotherapy 217		Telephone- and Internet-mediated service models	81% of the therapists believed that receiving a physical therapy exercise program over the phone saves the patient's time and is a cost-effective way for patients to receive services. Also, physicians believe that using services in the form of		Investigating the perception of physiotherapists and willingness to use telephone and internet-based exercise therapy methods for people with knee and hip arthritis.	Physiotherapists agree that telerehabilitation offers time-saving and privacy benefits for people with osteoarthritis and that video-delivered care is better than telephone service.

						video care for patients is useful, effective, and easy, and improves osteoarthritis in patients.			
<b>Rob Argent</b> <sup>36</sup> <b>2018</b> <b>Ireland</b>	Qualitative Study	One-to-one semi-structured interviews	Orthopedic	10	A single wearable sensor and an Android application	Experts had a positive attitude towards wearable technology and believed that this technology motivates the user to achieve their goals, and gives people the opportunity to track health-related data, and analyzing their results is also useful.	Participants were aware of wearable technology, with many stating they have used some sort of wearable device in their personal lives,	opinions of orthopedic healthcare professionals regarding the opportunities and challenges of using wearable technology in rehabilitation	Clinicians were excited by the opportunity to continuously track data in real-time and felt the exercise technique and adherence feedback would further support the patient in the home environment.
<b>Suzanne H. Kimball</b> <sup>37</sup> <b>2017</b> <b>United States</b>	Cross-Sectional Study	Online questionnaire	Audiology	258	Smartphones	On average, physicians had a positive attitude toward the use of smartphones by patients in audiological rehabilitation. Less experienced physicians had relatively more negative attitudes toward the integration of smartphones in hearing health care than more		Role of smartphones in audiology rehabilitation and hearing research and reports on the findings of a survey assessing attitudes of audiologists towards smartphone integration in hearing healthcare	The findings suggest that the attitudes of audiologists likely do not represent a barrier regarding smartphone integration in audiological rehabilitation.

					experienced physicians.				
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## Discussion

Telerehabilitation is an emerging method of providing rehabilitation services through information and communication technology. The attitude, knowledge, and awareness of telerehabilitation professionals are prerequisites for merging this new technology and tool successfully. Hence, this systematic review aimed to integrate the best research evidence on the attitudes, knowledge, and awareness of professionals in telerehabilitation. The results show that all health professionals had a positive and promising attitude toward the use of telerehabilitation in providing services to patients, but half of the professionals had little knowledge and limited experience about the use of telerehabilitation. This review found 33 studies that met all inclusion criteria. These studies evaluated the attitude, knowledge, or awareness of professionals in the field of telerehabilitation.

Based on the findings of our study, the attitude of professionals towards telerehabilitation was investigated in 24 studies. Most of these studies (24 cases) showed positive and promising views about telerehabilitation (1, 4, 6, 13, 14, 19, 20, 23, 24, 26, 27, 29, 30, 32-36, 38, 39, 42-45), while participants' attitudes toward telerehabilitation in one study were moderate (37).

Preservation of privacy and confidentiality is also a significant concern that is considered an obstacle in the use of telerehabilitation (46-48). Physiotherapists in Lawford et al's study (13) believed that the use of telephone and video-based exercise therapy methods for people with knee and hip arthrosis would preserve patient privacy and save patients' time, but few of them agreed that patients do not have any physical contact. Overall, physical therapists had a positive attitude toward video-delivered care compared to telephone-delivered care and perceived video-delivered care as better than telephone-delivered care, with more than half they could not reach a majority agreement on the attitudes related to providing care by phone. According to Mahmood et al study (14), most of the participants had a positive attitude towards mobile app-based therapy. More than 80% of the participants accepted the benefits of a mobile phone-based home exercise program, 72% agreed that it would lead to reduced costs, and 70% believed that it ensured the confidentiality of information. The majority of participants (82%-94.2%) perceived that the mobile phone-based home exercise program helped to reduce time spent using stroke care services. On the other hand, concerning patient confidentiality and privacy, it has been reported in other studies that patient safety and privacy are issues that can be compromised during the provision of telerehabilitation services to patients (46-48). Therefore, it seems that due to the importance of confidentiality and privacy of patients, by providing strong security solutions when using telerehabilitation services, this concern can be solved to some extent.

A challenge for the use of telerehabilitation is considered physical contact between patient and provider (42). There is a strong view that telerehabilitation cannot completely replace the need or desire for face-to-face therapy (49). Although the convenience of providing telerehabilitation services is consistently expressed in various studies, there are cases where face-to-face treatment is preferred (42, 49). While some of the participants in Shulver et al's (49) study preferred the face-to-face nature of counseling to video consultation, one patient believed that videoconferencing therapy alone would be more appropriate for an individual who was confined primarily to the home due to disability. It is too boring and human contact and face to face is also important. Other patients also acknowledged that some people are uncomfortable talking to a screen instead of meeting in person. In addition, the physiotherapists in Albahrouh et al's (42) study believe that telerehabilitation has many disadvantages, including difficulty in diagnosing some physical problems, lack of patient and therapist privacy, lack of practical interventions, and lack of clinical effectiveness. Some PTs stated that they do not use telerehabilitation in the treatment of patients because they do not trust the effectiveness of this method in identifying some of the patient's problems, so they prefer face-to-face sessions. In contrast, a study in Australia also reported that physical therapists expressed concern about the lack of physical and visual contact with patients during telephone consultations before providing telephone exercise therapy to people with knee osteoarthritis and believed that their relationship and communication would be harmed by the patients, while after providing the intervention, the physiotherapists found that they had fewer problems than they had anticipated, they were able to establish a strong relationship with the patients, and the adherence to the treatment performed in this method was high. As a result, most physical therapists became more enthusiastic about care provided over the phone (35). This discrepancy between



expectations and experiences may be partly because physical therapists are not adequately trained to provide care at a distance or without physical and visual contact with their patients. However, due to the lack of studies examining patient perspectives in telerehabilitation, it is unclear whether using technologies and reducing face-to-face contact with therapists is an appropriate approach for patients, especially elderly patients (49). It seems that according to the views and opinions of rehabilitation professionals in this field, in some cases, a combined approach can be used in the field of rehabilitation, and if necessary, some meetings or initial examinations can be done in person and face to face, and the continuation of the meetings exercises or evaluations of rehabilitation measures carried out using telerehabilitation technologies. This approach can probably solve some of the concerns of people until the concerns of professionals and patients in this field are resolved proper infrastructures are created and their attitudes, knowledge, and awareness are changed, especially in developing countries.

About half of the studies (50%) examined professionals' knowledge of telerehabilitation. Half of these studies reported professionals' knowledge to be high (6, 20, 21, 24, 28, 32, 34) and the other half reported telerehabilitation knowledge to be low (21, 23, 27, 31, 40, 43, 44).

Specific and hands-on training acts as a key facilitator in the adoption of telerehabilitation. According to Bairapareddy et al. (18) study, professionals have a high knowledge of smartphone-based telerehabilitation in chronic obstructive pulmonary disease. Most participants learned about smartphone-based telerehabilitation in lectures and symposia (18.9%) along with peer group discussions (27%). On the other hand, in Sosa et al's study (32), physiotherapists had average knowledge of telerehabilitation (5/8 out of 9). And they considered their knowledge to be unskilled or average. This implies a strong need to increase the knowledge and skills of physiotherapists regarding TR through seminars, training, and integration with the educational curriculum. These things will inevitably increase the confidence of physical therapists in digital practice and ultimately help to reorganize their practice program by combining digital practice with face-to-face practice to improve patient treatment outcomes. Most physicians (61.5%) in Carl Froilan et al's study (31) reported insufficient knowledge of telerehabilitation. The most common sources of information about telerehabilitation during the pandemic included interaction with colleagues (52.8%), various websites related to telerehabilitation (41.6%), online courses (38.5%), and conferences/webinars. (37.3%) Also, in the Philippines, TR was not part of the curriculum and internship training, and this could have affected the respondents' understanding and confidence in using TR (30). Telerehabilitation has existed even before the Covid-19 pandemic. Therefore, we can be inspired by the experiences of reputable institutions that have extensive experience in telerehabilitation training for professionals. However, curriculum design should be adapted and contextualized according to the needs and resources available in the local environment. Considering that most professionals are familiar with information technology skills, the content of distance rehabilitation training can go beyond basic and technical aspects and include ethical, legal, and socio-economic principles applicable to their target work area (44, 50).

On the other hand, the level of awareness of telerehabilitation was measured in only about a third of the studies (32%). The majority (86.2%) of the participants in Ramanandi et al's study (20) were aware of physical therapy services and reported receiving information about physical therapy from hospitals (25.5%), various media (24.1%), other physical therapists (19.7%), and other methods obtained (20.8%). Nazreen Nihara et al. (19) states that 63.2% of audiologists were aware of tele audiometry guidelines. A quarter of the participants (36.9%) did not know or did not know about these instructions. Therefore, the inclusion of tele-practice guidelines in the field of audiometry in the curriculum can help many professionals to become familiar with the ethical rules and guidelines related to tele audiology.

#### **Advantages and limitations**

This systematic review has many advantages. First, we adhered to guidelines for requesting systematic review techniques, second, the JBI assessment checklist was used to assess the strength of evidence of each of the included studies, leading to improved transparency of the quality of included studies. Third, this review provides valuable insights to health policymakers on telerehabilitation in medicine and healthcare. Of course, this study was limited to examining studies related to the attitude, knowledge, and awareness of specialists towards telerehabilitation, and it is recommended to examine the successful and unsuccessful experiences of implementing this issue and the factors affecting the success and failure of implementing these programs in future studies be paid

**Conclusion**

The evidence from this survey shows that all healthcare professionals had a positive and hopeful attitude toward the use of telerehabilitation in providing services to patients, but half of the professionals had little knowledge and limited experience with telerehabilitation. The reason for that was insufficient training regarding the use of telerehabilitation technologies and a lack of familiarity with related instructions. Therefore, according to the obtained results, the need for comprehensive training for the full use of telerehabilitation capabilities in increasing patient care for healthcare professionals seems necessary.

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