

ISSN: 2651-4451 • e-ISSN: 2651-446X

Turkish Journal of Physiotherapy and Rehabilitation

2025 36(1)50-60

PRIYA MEHTA, PT¹ VARSHA RAHTORE, PT² RAMHARI MEENA, PT³ SHIVAM DIXIT, M.Stat, MPhil⁴

- 1 Demonstrator, MAHSI, MGM Medical College, (Department of Physiotherapy), Indore,(Madhya Pradesh), India.
- 2 MPT Neurology, MAHSI, MGM Medical College, (Department of Physiotherapy), Indore, (Madhya Pradesh), India.
- 3 Principal, MAHSI, MGM Medical College, (Department of Physiotherapy), Indore, (Madhya Pradesh), India.
- 4 MGM Medical College, (Department of Community Medicine), Indore, (Madhya Pradesh), India.

Correspondence (İletişim):

PRIYA MEHTA

106-A, Shri Mangal Nagar, Bicholi Hapsi Road, Indore (Madhya Pradesh), 452010, India , Email: dr.priyamehta88@gmail.com, ORCID ID- 0009-0003-4722-8299

VARSHA RATHORE E-mail: varsharathoremsv@gmail.comORCID ID: 0009-0008-4700-4638

> RAMHARI MEENA E-mail: dr.ramhariphysio@gmail.com ORCID ID: 0000-0003-2758-5312

SHIVAM DIXIT E-mail: dixit.shivam2007@gmail.com ORCID ID: 0000-0002-6651-3381

Received: 22.10.2024 (Geliş Tarihi) Accepted: 08.03.2025 (Kabul Tarihi)

CC BY - NC

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

USE OF PHYSIOTHERAPY-RELATED SMARTPHONE APPLICATIONS IN CLINICAL PRACTICE AMONG PHYSIOTHERAPISTS IN INDIA – A CROSS SECTIONAL SURVEY STUDY

ORIGINAL ARTICLE

ABSTRACT

Purpose: The rapid evolution of smartphone applications has transformed healthcare delivery worldwide. However, despite this growing trend, there is limited information on how Indian physiotherapists specifically utilize these mobile applications and their perspectives on integrating them into clinical practice.

Methods: This is a cross sectional descriptive survey study; the self-administered questionnaire was distributed to over 2,500 working physiotherapists across India through social media platforms. Questionnaire consists of 4 parts including demographics, knowledge, perceptions and barriers to adoption with current application functionalities. Data were obtained from 456 Physiotherapists. Descriptive data analysis was conducted which included calculating the frequencies and percentages of participants.

Results: Findings indicated that while 65.6% of respondents were aware of physiotherapyrelated smartphone applications, only 35.1% reported using them in clinical practice. The majority of participants (79.5%) perceived these applications as beneficial. Key barriers included a lack of knowledge about appropriate applications (49.78%) and lack of technical support (40.35%). A statistically significant association was found between designation and use of physiotherapy-related smartphone applications at (p < 0.05).

Conclusion: This study reveals significant gap between awareness and practical integration of physiotherapy-related smartphone applications among Indian physiotherapists. Addressing identified barriers, including awareness, educational initiatives and technological support enhancements, could facilitate wider adoption of these applications in clinical settings.

Keywords: mHealth, Physiotherapy, Smartphone Applications.

HİNDİSTAN'DA FİZYOTERAPİSTLER ARASINDA KLİNİK UYGULAMADA "FİZYOTERAPİ İLE İLGİLİ" AKILLI TELEFON UYGULAMALARININ KULLANIMI – KESİTSEL BİR ANKET ÇALIŞMASI

ARAŞTIRMA MAKALESİ

ÖΖ

Amaç: Akıllı telefon uygulamalarının hızlı evrimi, dünya çapında sağlık hizmetlerinin sunumunu dönüştürmüştür. Ancak, bu büyüyen trende rağmen, Hintli fizyoterapistlerin bu mobil uygulamaları nasıl kullandığı ve bunları klinik pratiğe entegre etme konusundaki bakış açıları hakkında sınırlı bilgi bulunmaktadır.

Yöntemler: Bu, kesitsel tanımlayıcı bir anket çalışmasıdır; kendiliğinden doldurulan anket, Hindistan genelindeki 2.500'den fazla çalışan fizyoterapiste sosyal medya platformları aracılığıyla dağıtılmıştır. Anket, demografik bilgiler, bilgi düzeyi, algılar ve mevcut uygulama işlevsellikleri ile ilgili benimseme engellerini içeren 4 bölümden oluşmaktadır. Veriler, 456 fizyoterapisten elde edilmiştir. Katılımcıların frekansları ve yüzdelerinin hesaplanmasını içeren tanımlayıcı veri analizi yapılmıştır.

Bulgular: Bulgular, katılımcıların %65.6'sının fizyoterapi ile ilgili akıllı telefon uygulamalarından haberdar olduğunu, ancak sadece %35.1'inin bunları klinik pratiğe uyguladığını göstermiştir. Katılımcıların büyük bir kısmı (%79.5), bu uygulamaları faydalı olarak algılamaktadır. Önemli engeller arasında uygun uygulamalar hakkında bilgi eksikliği (%49.78) ve teknik destek eksikliği (%40.35) yer almaktadır. Pozisyon ile fizyoterapiyle ilgili akıllı telefon uygulamalarının kullanımı arasında istatistiksel olarak anlamlı bir ilişki bulunmuştur (p < 0.05).

Sonuç: Bu çalışma, Hindistan'daki fizyoterapistler arasında fizyoterapi ile ilgili akıllı telefon uygulamalarına dair farkındalık ile bunların pratikte entegrasyonu arasında önemli bir boşluk olduğunu ortaya koymaktadır. Farkındalık, eğitim girişimleri ve teknolojik destek gibi belirlenen engellerin ele alınması, bu uygulamaların klinik ortamlarda daha geniş bir şekilde benimsenmesini kolaylaştırabilir.

Anahtar Kelimeler: mSağlık, Fizyoterapi, Akıllı Telefon Uygulamaları.

INTRODUCTION

The integration of smartphone applications has revolutionized healthcare delivery across various disciplines, including physiotherapy (1). Physiotherapists in India, like their counterparts worldwide, are increasingly incorporating these applications into their clinical workflows to enhance patient care and facilitate ongoing professional development (2,3). The way healthcare professionals use smartphones for accessing medical information shows transition to technology-driven solutions from relying on text-based resources (4).

Mobile health (mHealth) is a recent concept that involves using mobile and wireless technologies, like wearable, to deliver healthcare services. It encompasses a broad range of applications, from patient monitoring and disease management to health education and communication. Many physiotherapy applications fall under the broader category of mHealth, offering a high-reach and low-cost solution in both medicine and public health (5,6).

Telerehabilitation, which involves providing rehabilitation services from a distance, serves as an alternative to conventional treatment (7). Programs supervised remotely by healthcare professionals can help patients integrate exercise routines into their daily lives, extending beyond in-clinic rehabilitation. This approach may also address issues of non-compliance among physiotherapy patients (8).

In the realm of smartphones, 'applications ' refer to mobile applications developed to offer users various functionalities, such as web browsing, audio playback, video streaming, and content creation (9). Different app stores, like the Apple Store and Google Play Store, along with specialized websites, allow healthcare professionals to download applications tailored to their field, often for free or at a low cost (10,11).

Telerehabilitation and mHealth are revolutionizing physiotherapy care in India, leveraging the increasing penetration of smartphone technology. Telerehabilitation offers a much-needed solution to the shortage of qualified physiotherapists, particularly in rural and underserved areas, by enabling remote consultations via video conferencing. This allows therapists to guide patients through exercises, monitor their progress, and provide real-time feedback, overcoming geographical barriers and expanding access to quality care. This approach has proven effective for various conditions, offering a viable alternative to traditional in-person therapy, which can be challenging to access for many Indians (12,13). mHealth complements this by empowering patients with mobile apps for self-management. Apps like APECS, TeleHab, myPhysio App etc. track daily activity, offer personalized exercise plans, and provide educational resources in local languages, promoting patient engagement and adherence to treatment (14). This is particularly relevant in India, where patient education and self-management are crucial for long-term health outcomes.

These applications (apps) can be categorized into groups such as physiotherapy applications for patients, home rehabilitation exercise applications, assessment tools for physiotherapy, and educational resources related to Physiotherapy (15). In the current study, by Physiotherapy related Smartphone applications we mean applications used for Assessment, treatment planning and providing Physiotherapy treatment protocol to client. It does not include applications used for communication, for education and other fitness applications.

The mobile revolution offers a unique opportunity to provide medical help at any time and place it is needed (14,16). Despite the rapid adoption of smartphone applications in healthcare, there remains a significant gap in understanding their use and impact among physiotherapists in specific regions, such as India. While previous researches have explored the use of smartphone applications among Physiotherapy professionals in other countries like Nigeria (17), Kuwait (18), and South Africa (19), there is a lack of insight into their utilization and effect in India. Research conducted in India has mainly focused on physiotherapy students in Delhi, investigating their ownership of smartphones and use of apps for education and clinical development purpose (20). However, there is limited literature regarding the utility of physiotherapy-related smartphone applications for practicing professionals. This study aims to address the need to understand usage patterns, perceptions, and barriers to adopting physiotherapy-related smartphone applications in clinical practice, highlighting the gap between technological awareness and its practical implementation.

METHODS

This cross sectional, descriptive design aimed to identify the use of Physiotherapy related smartphone application, their knowledge, perception and perceived barrier among Physiotherapists in India. A self-administered questionnaire was developed via Google Docs using available literature about use of mobile devices among health care providers (17,18,19, 20). The Google Doc consists of information about the survey study, consent, and the questionnaire. The questionnaire was then reviewed by five senior Physiotherapists for expert opinion on degree of relevance and degree of clarity of each question on a 4 point likert scale. Three minor changes were done as per experts feedback in the section of demographic and perception regarding Physiotherapy Applications. A pilot study was conducted on 30 working Physiotherapists to check suitability of the items on target population. Minor revisions were done to enhance clarity of questionnaire before distribution of final version. To assess the internal consistency of the questionnaire, Cronbach's alpha was calculated, yielding a value of 0.941, which indicated the excellent reliability of the instrument. The study applied Cochran's formula for sample size calculation, utilizing the proportion of individuals using physiotherapy-related smartphone applications, which was derived from a pilot study.

Cochran's formula

$$n = \frac{Z^2 * p * q}{d^2} = \frac{(1.96)^2 * 40 * 60}{(5)^2} = \frac{9216}{25} = 368.64$$

Take 10% non-response rate

 $368.64 + 36.86 = 405.50 \cong 410$

Z²= Critical value at 95% confidence level

p= Proportion of Use of Physiotherapy-Related Smartphone = 40% (based on pilot study)

q= 100-p= 100-40= 60%

d= margin of error (5%)

The questionnaire consists of 4 parts : Part A includes demographic data and work experience; Part B- explores the knowledge regarding physiotherapy related smartphone application; Parts C- deals with the perception about use of physiotherapy related smartphone application & Part D- explores with perceived barriers (app related as well as physiotherapist related) regarding use of smartphone application. The questionnaire consisted of a series of yes and no responses and multiple choice questions.

The study was approved by Ethics And Scientific Review Committee, MGM Medical College and MY Hospital ,Indore (M.P), India on 3rd November 2023 (REG No EC / MGM / NOV-23 /188) .After an ethical committee approval, the Self administered questionnaire was sent via social media platforms like LinkedIn, E-mail and WhatsApp groups to over 2500 working Physiotherapists all over India. The study involved participants with a minimum of one year of work experience, aged 21 or older, and of both genders. Physiotherapy students and individuals unable to read or understand English were excluded, as the survey was conducted in English only. Participants provided consent before accessing the digital survey. A reminder was sent after two weeks, with a final reminder issued four weeks later to complete the questionnaire.

Statistical analysis was performed using SPSS statistical software (New York 2017) version 25.0 (trial version). The results were presented using descriptive statistics, including percentages and frequency tables. Descriptive data analysis was performed, calculating the frequencies and percentages of participant's demographic information. Normality of the variables was checked by Shapiro- Wilk test. A cross-tabulation technique was employed to examine the associations between age, clinical experience, type of work, and the use of physiotherapy-related smartphone applications. Chi-square tests were conducted to determine the significance of these associations, at p<0.05. Additionally, Excel coding was utilized to calculate the frequencies of responses to multiple-choice questions related to perceptions and barriers.

Table 1. Demographic data of participants

Socio-demographic	Frequency	Percentage (%)
Gender		
Male	192	42.1
Female	264	57.9
Age		
<25	163	35.7
26-30	148	32.5
31-35	81	17.8
36-40	32	7.0
Above 40	32	7.0
Qualification		
Bachelor of Physiotherapy (BPT)	207	45.4
Master of Physiotherapy (MPT)	234	51.3
PhD	15	3.3
Clinical experience		
1-5	307	67.32
6-10	72	15.79
11-15	45	9.87
16-20	26	5.48
21-25	4	0.88
>25	3	0.66
Type of work		
Academic	95	20.83
Clinical	361	79.17
Location of your work		
Academic institute or university	95	20.8
Home care.	40	8.8
Hospitals	121	26.5
Private clinic	181	39.7
Trust / NGO organization	19	4.2

RESULTS

Demographics

A total of 456 participants completed the survey, yielding a response rate of 18.24%. Among the respondents, 58% were females and 42 % were males. Of the total respondents, 68.2% were in the age range of 21 and 35 years, while only 7% fell within the 36 to 40 age group. 51.3 % of the respondents were MPT and 45.4% had done their Bachelor's in Physiotherapy. 3.3 % respondents had done their Ph.D. Regarding clinical experience, 67.32% reported having 1-5 years of clinical experience, and only a small percentage had more than 15 years of

experience (7.02%).Physiotherapists, who were not in academics, formed 79.17% of the total respondents. Table 1 represents the demographic characteristics of the participants.

Knowledge and use of Physiotherapy related Smartphone Applications.

All the participants own a smartphone. Of the respondents, 65.6% are aware of Physiotherapy related smartphone applications ; however only 45.2% had physiotherapy application in their smartphone and only 35.1% are using it in their clinical practice. A majority of participants (64.9%) did not use any smartphone applications in their clinical practice.

Knowledge & use of Physiotherapy related smartphone applications	Frequency	Percentage (%)				
Do you own smartphone						
iPhone	85	18.6				
Android	371	81.4				
Are you aware of Physiotherapy related smartphone applications						
Yes	299	65.6				
No	157	34.4				
Do you have Physiotherapy related applications in your smart phone						
Yes	206	45.2				
No	250	54.8				
Are you using any Physiotherapy related smartphone applications in your clinical practice						
Yes	160	35.1				
No	296	64.9				
How often do you use Physiotherapy related applications						
Never	296	64.9				
Less than Twice weekly	18	3.94				
More than twice weekly	15	3.33				
Daily	19	4.16				
When need arises	108	23.7				

Table 2.	Knowledge	and use of	physiotherap	oy related	smartphone	applications
----------	-----------	------------	--------------	------------	------------	--------------

Among the 206 Physiotherapists who have applications on their smartphone, only 160 were using them in clinical practice. Table 2 represents participant's response for perception and use of Physiotherapy related smartphone applications .

Perception of Physiotherapy related Smartphone Applications.

Figure 1 presents a bar graph illustrating key perceptions about the use of physiotherapy-related smartphone applications in clinical practice. Among the respondents, 79.5% perceived physiotherapy-related smartphone applications as helpful in clinical practice. Most participants agreed that these applications: Provide solutions for accessibility issues (51.75%), save effort (43.66%), save time and money (47.37%) and internet has a potential role in healthcare (48.46%).

Barriers to using Smartphone Applications

A total of 296 participants (64.9%) reported not using any smartphone applications in their clinical practice. Barriers were categorized into two main groups: physiotherapist-related barriers and application-related barriers.

Physiotherapist-Related Barriers

A significant barrier was a lack of knowledge about appropriate applications, with 227 participants (49.78%) acknowledging this issue. Other barriers were: not aware of its availability (44.08%), because hands on is more beneficial and effective (40.13%), never explored (39.04%), lack of suitable training to practice tele rehabilitation (30.04%), lack of perceived clinical usefulness (29.6%), do not have time due to heavy patient care (22.37%) and reduces trust and confidence of patients (18.86%).

Figure 2 depicts the physiotherapist-related barriers to using smartphone applications.

Application-Related Barriers

The most frequently cited application-related barriers were lack of technical support (40.35%) and concerns about patient privacy and confidentiality (39.69%). High cost of applications (25.22%), limited or no mobile access (24.14%) and lack of personalized app to provide patient specific information and rehabilitation (2.85) are other barriers cited by participants. Figure 3 illustrates application related barriers in using smartphone applications.



Figure1. Perception about use of smartphone applications.

Associations

Association between Age Group and Use of Physiotherapy-Related Smartphone Applications

Among the 160 participants who used smartphone applications, the majority were aged 21 to 35 years, with fewer users in the 35 to 40 years age group. However, there was no statistically significant association between age group and the use of physiotherapy-related smartphone applications (p= 1.000). Table 3 shows association between age and use of Physiotherapy related smartphone applications .

Association between Clinical Experience and Use of Physiotherapy-Related Smartphone Applications

The majority of participants using applications had 1 to 5 years of clinical experience, whereas those with 20-25 years of experience have the lowest percentage of users of these applications. Never-



Figure 2. Physiotherapist related barriers in using smartphone applications



Figure 3. Applications related barriers in using smartphones applications

theless, there was no statistically significant association between clinical experience and the use of physiotherapy-related smartphone applications (p =0.530). Table 3 shows association between clinical experience and use of Physiotherapy related smartphone applications.

Association between Type of work and Use of Physiotherapy-Related Smartphone Applications

A significant association was observed between type of work and the use of physiotherapy-related smartphone applications. Specifically, 71% of clinical practitioners used these applications, whereas only 28% of professionals who were doing academic work used these applications. This indicates a statistically significant relationship between type of work and the use of physiotherapy-related smartphone applications. (p=0.002).Table 4 shows association between type of work and use of Physiotherapy related smartphone applications.

DISCUSSION

This study explored the use of physiotherapy-relat-

Physiotherapy related		Age						
applications in your smart phone	<25	26-3	30 31-	35 3	6-40	Above 40	Total	
Yes	57 (35.6%)	52 (32.5	29 5%) (18	1%) 1	1 (6.9%)	11 (6.9%)	160 (100.0%)	
No	106 (35.8%)	96 (32.4	52 1%) (17.	6%) 2	1 (7.1%)	21 (7.1%)	296 (100.0%)	
Chi-square value					0.034			
p-value	1.000 (Not significant)							
Physiotherapy related	Clinical Experience (in Years)							_
applications in your smart phone	1-5	11-15	16-20	21-25	6-10) М	ore than 25	Total
Yes	103 (64.4%)	17 (10.6%)	11 (6.9%)	3 (1.9%)) 25 (15.6	5%) 1	(0.6%)	160 (100.0%)
No	204 (68.9%)	28 (9.5%)	14 (4.7%)	1 (0.3%)) 47 (15.9	9%) 2	(0.7%)	296 (100.0%)
Chi-square value					4	1.139		
p-value	0.530 (Not significant)							

Physiotherapy related applications in your smart phone	Т	Total	
	Academician	Clinical physiotherapist	
Yes	46 (28.7%)	114 (71.3%)	160 (100.0%)
No	49 (16.6%)	247 (83.4%)	296 (100.0%)
Chi-square value		9.366	
p-value		0.002 (Significant)	

Table 4. Association between type of work and use of physiotherapy related smartphone applications.

ed smartphone applications among physiotherapists in India, providing insights into application usage, knowledge, perceptions, and barriers. Majority of Participants were in the age group of 21-35 years (68.2%) and had 1-5 years of clinical experience (67.32%). These findings support the study done in Nigeria where age group with the highest frequency was 21-30 years (47.9%) and had 1-5 years of clinical experience (58.3%). This shows a higher need of awareness, education and training among the age group of >35 years and experienced Physiotherapists in India. The findings reveal that 65.6% of respondents were aware of such applications. 45.2% had them installed on their smartphone and only, 35.1% reported using them in clinical practice. This result supports the findings of the study done in Nigeria on 48 Physiotherapists, which reported that 50% Physiotherapists were aware of applications while only 25% have Physiotherapy related smartphone applications related to health information in their smartphones (17). In contrast study done in India on Physiotherapy students in Delhi found that 62% of students have installed Physiotherapy related applications to support their education and practice activities, and 13.2% students who have installed apps but never used it (20). However they did not studied the barriers, practicing Physiotherapists face in adopting these apps in clinical practice, which is a crucial aspect investigated in our study. The difference in this result may be attributed to the fact that students may be more motivated to explore apps for learning and professional development, while practitioners face additional challenges like time constraints, patient privacy concerns, and pressure to prioritize traditional methods.

The study identifies a significant gap between the awareness (65.6%) and their actual use in clinical practice (35.1%). This suggests that although

many physiotherapists are aware of these applications, they are not consistently integrating them into their day-to-day clinical work. Addressing this knowledge-to-action gap by providing regular training sessions or workshops and online courses on how to effectively integrate mobile applications into clinical practice, could lead to improved patient outcomes and more efficient clinical practice.

Despite the low usage rate, 79.5% of participants viewed these applications as helpful for clinical practice, with significant agreement that they provide solutions for accessibility issues (65%) and save time and money (60%). These findings are consistent with previous study, which reported that majority of Physiotherapists were willing to use telerehabilitation and considered it as a viable option to deliver healthcare to patients during COVID -19 pandemic in Kuwait (18). This positive perception reflects openness to integrating technology into health care settings among Indian Physiotherapists. Majority of the Indian population resides in rural areas with limited healthcare facilities. Rural tele-density has seen remarkable growth, increasing from just 1.9% in 2005 to over 48% by March 2015 as per a survey from Telecom Regulatory Authority of India (21). Awareness and training about Physiotherapy related smartphone applications to local healthcare workers and community health centers can provide solutions to lack of specialist and accessibility issues of the rural populations.

To improve integration of Physiotherapy related smartphone applications in to clinical practice, identification of barriers and steps to eliminate them is necessary. In this study, lack of knowledge of appropriate applications (49.78%), unaware of its availability (44.08%), because hands on is more beneficial and effective (40.13%), never explored (39.04%), lack of suitable training to practice tele rehabilitation (30.04%) were top Physiotherapist related barriers to use of applications in Clinical Practice. These findings support the previous study done in India which found lack of awareness, lack of training & never explored as the major barriers, reported by Physiotherapy students (20). Our Study findings clearly suggest that many Physiotherapists may not be familiar with the apps available for assessment & rehabilitation, and this lack of knowledge directly impacts their ability to recommend these tools to patients. Increasing awareness through targeted training sessions, webinars, and workshops would help physiotherapists understand the benefits and practical applications of these tools. This can be done through collaborations with physiotherapy colleges and professional associations and by incorporating mobile technology utility into the undergraduate curriculum (9).

Finding of this current study also revealed that lack of technical support (40.35%), concern regarding patient privacy and safety (39.69%) and high cost of applications (25.22%) was major app related barrier for not using smartphone apps in clinical practice. These findings are in line with previous studies which have reported app quality, lack of personalised app, responsibility for client safety, lack of connection between technology experts and clinicians and lack of suitable training to practice telerehabilitation were the reasons for not prescribing apps (9,18,19). By addressing barriers like lack of technical support and privacy issue through technical assistance in hospitals and clinics and ensuring that apps comply with data protection regulations to prevent unauthorized access of patient information, can promote broader adoption of Physiotherapy related smartphone applications across India. Collaboration between Technology experts and Physiotherapists would help in designing of apps as per need will improve both the delivery and efficacy of therapy provided through telerehabilitation (20).

This study examined associations between demographic factors—specifically age and clinical experience—and the use of Physiotherapy related smartphone applications. Regarding age, while a higher proportion of users were observed in the younger age group (21-35 years), no statistical significant association was found between age and application usage. This suggests that older profes-

sionals can adopt smartphone applications once they become acquainted with their benefits and functionalities. Similarly, no statistical significant association was found between clinical experience and the use of smartphone applications, with majority of participants had 1-5 years of clinical experience. This suggests that experienced physiotherapists also see value in integrating mobile applications into practice. Additionally, statistically significant association was found between use of smartphone applications and type of work, highlights that clinical practitioners are more likely to incorporate smartphone applications compared to academic counterparts. This could be due to the more hands-on nature of clinical practice, where real-time access to information, treatment plans, or patient monitoring through mobile apps can improve workflow and patient outcomes. In contrast, academic professionals may have fewer opportunities to utilize mobile apps in their day-to-day responsibilities, which might explain their lower adoption rate. To best of our knowledge, there is no previous literature available to compare the results related to association of this study.

Our research has some limitations. First- the result could be strengthened by involving more Physiotherapists and increasing the sample size. Second -distribution of data was not uniform across India and use of social media platform for survey, may have introduced sampling bias.

The study found that Indian Physiotherapists have a positive perception for using apps, but there is a significant gap between awareness of these apps and actually using them in clinical practice. The research also identified key challenges, such as lack of knowledge about appropriate app and lack of technical support, as most important barrier to integration of smartphone apps in Physiotherapy. To overcome these obstacles, a structured training program is needed to enhance digital skills among Physiotherapists, with focus on practical use of these apps. Strengthening technical assistance through app tutorial, a help desk, and ensuring strong privacy protections are essential steps towards increasing the integration of smartphone applications into clinical practice in India. The implementation of these strategies involves collaboration among practitioners, educational institutes, policy makers and technical experts to create a supportive system for digital innovation in Physiotherapy. Future research should explore ways to enhance digital literacy of physiotherapists, assessing reliability of available physiotherapy applications, evaluate the impact of smartphone applications on patient outcomes, and assess the effectiveness of different strategies for overcoming adoption barriers. By addressing these issues, the full potential of mobile health technologies can be realized, improving the efficiency and accessibility of Physiotherapy services in India.

Sources of Support: In this study, no specific grant was received from any public, commercial, or not-for-profit funding agencies.

Conflict of Interest: The Authors reports no conflicts of interest

Author Contributions: Concept- PM, VR; Design-PM,VR,RM,SD; Supervision-PM,RM; Materials-VR; Data Collection-PM,VR, Analysis- SD; Literature Review- PM,VR; Article Writing-PM,VR;Critical Review-RM

Explanations: None

Acknowledgement- We wish to acknowledge the substantial contributions of Dr. Priti Taneja, Paediatrician and Ex-HOD, Department of Physiology, for her valuable insights and assistance as well as Dr. Niketa Shobhit, MPT (Paediatrics), for her thorough verification of the questionnaire. We are grateful to Dr. Neeraj Singh, PhD (Sports), for his invaluable ideas and suggestions which greatly influenced the Publication process.

Abbreviations: (mHealth) – Mobile health, (Apps) – Applications

REFERENCES

- Burnette, P. Mobile Technology and Medical Libraries: Worlds Collide. The Reference Librarian. 2010;52(1–2): 98–105. https:// doi.org/10.1080/02763877.2011.523816
- Lindquist AM, Johansson PE, Petersson GI, Saveman BI, Nilsson GC. The use of the Personal Digital Assistant (PDA) among personnel and students in health care: a review. J Med Internet Res. 2008 Oct 28;10(4):e31. doi: 10.2196/jmir.1038. PMID: 18957381; PMCID: PMC2629360.
- Prgomet M, Georgiou A, Westbrook JI. The impact of mobile handheld technology on hospital physicians' work practices and patient care: a systematic review. J Am Med Inform Assoc. 2009 Nov-Dec;16(6):792-801. doi: 10.1197/jamia.M3215. Epub 2009 Aug 28. PMID: 19717793; PMCID: PMC3002124.

- Sheth M, Verma S. Use of mobile devices for health care information by post graduate physiotherapy students. Int J Physiother Res. 2018;(6)6:2905-2908.
- Dicianno BE, Parmanto B, Fairman AD, Crytzer TM, Yu DX, Pramana G, Coughenour D, Petrazzi AA. Perspectives on the evolution of mobile (mHealth) technologies and application to rehabilitation. Phys Ther. 2015 Mar;95(3):397-405. doi:10.2522/ ptj.20130534. Epub 2014 Jun 12. PMID: 24925075; PMCID: PMC4757639.
- Iwaya L, Gomes M, Simplicio M, Carvalho T, Dominicini C, Sakuragui R. Mobile health in emerging countries: A survey of research initiatives in Brazil. Int J Med Inform. 2013;82 05:283–298. doi: 10.1016/j.ijmedinf.2013.01.003. [DOI] [PubMed] [Google Scholar])
- Lai JC, Woo J, Hui E, Chan W. Telerehabilitation a new model for community-based stroke rehabilitation. Journal of Telemedicine and Telecare. 2004;10(4):199-205. doi:10.1258/1357633041424340
- Rawstorn JC, Gant N, Meads A, Warren I, Maddison R. Remotely Delivered Exercise-Based Cardiac Rehabilitation: Design and Content Development of a Novel mHealth Platform. JMIR Mhealth Uhealth. 2016 Jun 24;4(2):e57. doi: 10.2196/ mhealth.5501. PMID: 27342791; PMCID: PMC4938883.
- Ravenek, M, Alvarez, L. Use of mobile 'apps' in occupational therapy: Therapist, client and app considerations to guide decision-making. World Federation of Occupational Therapists Bulletin.2016; 75(1), 43–49. https://doi.org/10.1080/14473828.20 16.1162430.
- Franko OI. Smartphone apps for orthopaedic surgeons. Clin Orthop Relat Res. 2011 Jul;469(7):2042-8. doi: 10.1007/s11999-011-1904-0. Epub 2011 May 6. PMID: 21547414; PMCID: PMC3111786.
- Chatterley T, Chojecki D. Personal digital assistant usage among undergraduate medical students: exploring trends, barriers, and the advent of smartphones. J Med Libr Assoc. 2010 Apr;98(2):157-60. doi: 10.3163/1536-5050.98.2.008. PMID: 20428281; PMCID: PMC2859274.
- Tousignant M, Moffet H, Boissy P, Corriveau H, Cabana F, Marquis F. A randomized controlled trial of home telerehabilitation for post-knee arthroplasty. J Telemed Telecare. 2011;17(4):195-8. doi: 10.1258/jtt.2010.100602. Epub 2011 Mar 11. PMID: 21398389.
- Peretti A, Amenta F, Tayebati SK, Nittari G, Mahdi SS. Telerehabilitation: Review of the State-of-the-Art and Areas of Application. JMIR Rehabil Assist Technol. 2017 Jul 21;4(2):e7. doi: 10.2196/rehab.7511. PMID: 28733271; PMCID: PMC554489.
- Physiopedia. Telerehabilitation and the use of smartphone physiotherapy applications for home exercise programs. Last accessed on 2019 Aug 27. Available from: http://www.physio-pedia.com.
- Jin J, Sklar GE, Min Sen Oh V, Chuen Li S. Factors affecting therapeutic compliance: A review from the patient's perspective. Ther Clin Risk Manag. 2008 Feb;4(1):269-86. doi: 10.2147/tcrm. s1458. PMID: 18728716; PMCID: PMC2503662.
- Kassianos AP, Georgiou G, Papaconstantinou EP, Detzortzi A, Horne R. Smartphone Applications for Educating and Helping Non-motivating Patients Adhere to Medication That Treats Mental Health Conditions: Aims and Functioning. Front Psychol. 2017 Oct 11;8:1769. doi: 10.3389/fpsyg.2017.01769. PMID: 29075216; PMCID: PMC5641822.
- Bolarinde SO, Olasoji OB, Ibidunmoye OD. The use of smartphones and Physiotherapy-related applications for health information among clinical Physiotherapists. Indian J PhysTher Res. 2021;3:51-5
- Albahrouh IS and Buabbas AJ. Physiotherapists' perceptions of and willingness to use tele rehabilitation in Kuwait during the COVID -19 pandemic. BMC Med Inform DesicMak. 2021; 21:22.

http://doi.org/10.1186/s12911-021-01478-x.

- RoweM.,Sauls B.The use of smartphone applications in clinical practice:A survey of south African Physiotherapists' .South African Journal of Physiotherapy.2020 Apr20; 76(1):1327.https:// doi.org/10.4102/sajp.v76i1.1327.
- Singh P, Kalra N. Smartphone and medical related App usage among physiotherapy students of Delhi. Int Res J EngTechnol. 2017;4:1411-4.
- TRAI (Telecom Regulatory Authority of India) (2015), "Telecom Subscription Data 31st March, 2015. http://www.trai.gov.in (accessed on 15 July, 2015).