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Review Article

Effectiveness of Telerehabilitation in Geriatric Populations: A mini-review

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ABSTRACT

Aging in the human is an extraordinary issue that affects the subject's quality of life. Another factor affecting the patient's health and quality of life (QoL) is obesity, which has reached a pandemic situation. Thus, geriatric patients are liable to different cardiometabolic complications with increased rate of morbidity and mortality in this vulnerable group. Thus, rehabilitation in geriatrics is a vital issue, that could improve the patient QoL. However, and due to logistic and personal factors, the application of rehabilitation is limited. This urges researchers and physical therapists to search for out of the box methods to deliver rehabilitation. Telerehabilitation has emerged as reasonable alternative to traditional methods. Telerehabilitation in physical therapy could be comparable with in-person rehabilitation or better than no rehabilitation for conditions such as osteoarthritis, low back pain, hip and knee replacement, multiple sclerosis, and in the context of cardiac and pulmonary rehabilitation. However, several researchers have raised the question of whether telerehabilitation has advantages that could be superior to in-person rehabilitation. In this context, we will briefly discuss the potential advantages of telerehabilitation over in-person rehabilitation and summarize the available literature related to the topic.

After reviewing available literature, we found progressive increase of telerehabilitation in many countries. It was associated with an outcome comparable or better than traditional – face to face – methods. Telerehabilitation interventions include different means of delivery. These include- but not limited to- chat, video conferencing, phone calls, and different healthcare applications tailored for patient's conditions. These represented telecommunication methods. Besides, tele- and remote-monitoring, Virtual and augmented reality, Wearable technology, and Interactive and assistive technologies are available. Interestingly, patient compliance is increased with telerehabilitation than traditional methods. The readily available online means and programs, with progressive reduction of cost can explain the condition. Exercise programs can be employed by telerehabilitation as other interventions even for fragile patients.

Keywords: Obesity; Aging; Telerehabilitation; Chair Exercise; Quality of Life; Functional Perfomance..

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INTRODUCTION

Human aging is an extraordinarily intricate process that lowers the quality of life due to time-dependent functional deterioration [1].

According to the World Health Organization (WHO), Egypt is ranked 18th for the highest prevalence of obesity globally [2]. Additionally, when obesity rates rose quickly, the prevalence of certain cardiometabolic disorders also rose, increasing morbidity and mortality [3], [4], [5]. Since 1975, the rate of obesity has increased threefold around the world, with approximately 13% of adults classified as obese and roughly 39% considered overweight [6]. The high percentage of elderly and obese people coincides with the rise in the number of elderly people.

Telerehabilitation (TR) was established to adapt rehabilitation services that can be provided to patients through interventions. Currently, it is employed to improve the efficacy of chronic therapy. These interventions can be received in various ways; technology facilitates two-way contact through chat, video conferencing, phone calls, and healthcare apps. Clinical results from TR interventions have been comparable to or superior to those from face-to-face (FTF) therapies, and they also exhibit high levels of program compliance at home [7], [8].

Numerous elderly patients who are geographically isolated or lack access to local services continue to encounter obstacles to receiving expeditious and appropriate care due to the escalating costs and wait times associated with orthopedic health services, as well as inadequate accessibility to these services. [9], [10]. Older individuals also adhere poorly to home exercise programs [11]. This necessitates real-time interventions, such as the utilization of video conferencing or phone calls to transmit exercise information without the necessity of physically meeting with physiotherapists at the clinic. Numerous studies have recently examined the efficacy of TR in the treatment of illnesses such as stroke [12], [13], chronic obstructive pulmonary disease (COPD) [14], [15], and heart disease [16], [17].

Elderly people and others who may be fragile or deconditioned can employ chair-based exercise, a sitting, structured, and progressive exercise program that uses a chair to offer stability [18]. Elderly people can engage in safe, easy-to-implement physical activities with this exercise. [19].

In this mini review, the effectiveness of telerehabilitation intervention in the geriatric population will be shown.

EFFECTIVENESS Of TR

Telerehabilitation in stroke and post discharge myocardial infarction (MI): Telerehabilitation can be a suitable alternative to usual rehabilitation care in post-stroke patients, especially in remote or underserved areas. Cardiovascular telerehabilitation (CV-T-REHAB) was examined by Nacarato et al. [20] and was found to improve 6MWT (11.14 m), VO_2max (1.18 ml/kg/min), and QoL (standardized mean difference [SMD] = 0.36). Compared to presential cardiovascular rehabilitation (CV-P-REHAB) (1.08 ml/kg/min), CV-T-REHAB enhanced VO_2max more. Age differences contributed to some heterogeneity, as CV-T-REHAB enhanced QoL in individuals over 65 but not in those under 64**.**

The effectiveness of telerehabilitation in enhancing functional capacity, agility, lower limb strength, endurance, forced expiratory volume in 1 second, and dyspnea is further supported by a meta-analysis and systematic review. Muscular strength and exhaustion improved due to dynamic muscular resistance training, whether or not it was combined with other exercise modalities. Furthermore, telerehabilitation has shown benefits in the contagious-phase COVID-19 patients' quality of life [21]**.**

Bashar *et al.* [22] in their recent meta-analysis, showed increased mHealth uptake among post-discharge MI and stroke patients, including significant underrepresentation of female participants, scarce studies from low-middle-income countries or rural areas and limited reporting of hard clinical endpoints. mHealth was associated with positive outcomes across most studies. However, it is affected by digital disparity and the need to prioritize inclusive, user-centered designs and integrate objective measurement tools on future studies.

The stroke telerehabilitation intervention was shown to enhance physical function considerably by **Chumbler *et al.*** [25]**,** with improvements continuing for up to three months after the intervention was finished.

Telerehabilitation for Chronic lung disorders: According to **Miozzo et al.** [24]**,** telerehabilitation programs can help patients with chronic lung disorders preserve their functional ability, enhance their quality of life, and lessen the negative impacts of the disease's progression.

As stated by **Gamble *et al.*** [25]**,** telerehabilitation may be a viable substitute for in-person rehabilitation in enhancing functional performance in older individuals.

On the other side, **Martínez-Pozas *et al.*** [26] in their study supports the use of face-to-face implementation of rehabilitation, as it improved the physical function and QoL in patients with post COVID-19 condition (PCC). However, the univeriate analysis was associated with the absence of differences between FTF and TL for studied outcomes. Thus, the choice of the form of pulmonary rehabilitation approach should be individualized (tailored).

Telerehabilitation after orthopedic surgery and bone diseases: The enhanced intensity supplied by telerehabilitation is a promising option to be presented to patients, as **Agostini et al.** [27] reported a considerable favorable effect for patients after orthopedic surgery.

After total knee arthroplasty, **Liu X *et al.*** [28] showed that, TR proved to be more effective than traditional face to face (FTF) rehabilitation in patients who underwent TKA.

In a systematic review and meta-analysis, **Jia Q *et al.*** [29] concluded that TR has positive trends in pain amelioration and functional improvement in middle-aged and geriatric adult patients with knee osteoarthritis (KOA). However, the available evidence is insufficient to demonstrate significant superiority that traditional approaches. Given its good accessibility, tele-rehabilitation can be used as a complementary method with traditional rehabilitation.

Adverse events associated with TR: Yau T *et al.* [30] reported that telerehabilitation was delivered with rare adverse events. If present, it is mostly mild/non-severe. Interestingly the rate of adverse events was comparable between asynchronous and synchronous telerehabilitation methods. Cardiac telerehabilitation had the most frequent adverse events. They recommended the use of TIDieR reporting guidelines for detailed reporting of telerehabilitation interventions and its adverse event characteristics. However, the authors confirmed the increased accessibility of TR among older adults.

Conclusion: This review evaluated various applications of telerehabilitation. In conclusion, it has been demonstrated that telerehabilitation is an emerging and compelling domain. Its effectiveness is comparable to traditional approaches especially in cardiorespiratory and orthopedic condition. We propose the necessity for additional research to enhance electronic equipment and devices, aiming to maximize their versatility in application. This approach is anticipated to significantly improve the reliability and effectiveness of telerehabilitation devices in resolving specific patient concerns.

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REFERENCES

1. Leidal AM, Levine B, Debnath J. Autophagy and the cell biology of age-related disease. Nat Cell Biol. 2018 Dec;20(12):1338-1348. doi: 10.1038/s41556-018-0235-8.

2. Malenfant JH, Batsis JA. Obesity in the geriatric population - a global health perspective. J Glob Health Rep. 2019;3: e2019045. doi: 10.29392/joghr.3.e2019045.

3. Kokkorakis M, Boutari C, Katsiki N, Mantzoros CS. From non-alcoholic fatty liver disease (NAFLD) to steatotic liver disease (SLD): an ongoing journey towards refining the terminology for this prevalent metabolic condition and unmet clinical need. Metabolism. 2023 Oct;147:155664. doi: 10.1016/j.metabol.2023.155664.

4. Kokkorakis M, Muzurović E, Volcanšek Š, Chakhtoura M, Hill MA, Mikhailidis DP. Steatotic Liver Disease: Pathophysiology and Emerging Pharmacotherapies. Pharmacol Rev. 2024 May 2;76(3):454-499. doi: 10.1124/pharmrev.123.001087.

5. Brunet A, Berger SL. Epigenetics of aging and aging-related disease. J Gerontol A Biol Sci Med Sci. 2014 Jun;69 Suppl 1(Suppl 1): S17-20. doi: 10.1093/gerona/glu042.

6. World Population Review. Obesity Rates By Country 2025. World Population Review. Last updated 2025. Available at: https://worldpopulationreview.com/country-rankings/obesity-rates-by-country. Last accessed December 2025

7. Emmerson KB, Harding KE, Taylor NF. Providing exercise instructions using multimedia may improve adherence but not patient outcomes: a systematic review and meta-analysis. Clin Rehabil. 2019 Apr; 33 (4): 607-618. doi: 10.1177/0269215518819706.

8. Bentley CL, Powell L, Potter S, Parker J, Mountain GA, Bartlett YK, et al. The Use of a Smartphone App and an Activity Tracker to Promote Physical Activity in the Management of Chronic Obstructive Pulmonary Disease: Randomized Controlled Feasibility Study. JMIR Mhealth Uhealth. 2020 Jun 3;8(6): e16203. doi: 10.2196/16203.

9. Comans T, Raymer M, O'Leary S, Smith D, Scuffham P. Cost-effectiveness of a physiotherapist-led service for orthopaedic outpatients. J Health Serv Res Policy. 2014 Oct;19(4):216-23. doi: 10.1177/1355819614533675.

10. Oldmeadow LB, Bedi HS, Burch HT, Smith JS, Leahy ES, Goldwasser M. Experienced physiotherapists as gatekeepers to hospital orthopaedic outpatient care. Med J Aust. 2007 Jun 18; 186 (12):625-8. doi: 10.5694/j.1326-5377.2007.tb01079.x.

11. Pickering RM, Fitton C, Ballinger C, Ashburn A. Self reported adherence to a home-based exercise programme among people with Parkinson's disease. Parkinsonism Relat Disord. 2013 Jan;19(1):66-71. doi: 10.1016/j.parkreldis.2012.07.006.

12. Johansson T, Wild C. Telerehabilitation in stroke care--a systematic review. J Telemed Telecare. 2011; 17 (1): 1-6. doi: 10.1258/jtt.2010.100105.

13. Laver KE, Adey-Wakeling Z, Crotty M, Lannin NA, George S, Sherrington C. Telerehabilitation services for stroke. Cochrane Database Syst Rev. 2020 Jan 31;1(1): CD010255. doi: 10.1002/14651858.CD010255.pub3.

14. Lundell S, Holmner Å, Rehn B, Nyberg A, Wadell K. Telehealthcare in COPD: a systematic review and meta-analysis on physical outcomes and dyspnea. Respir Med. 2015 Jan;109(1):11-26. doi: 10.1016/j.rmed.2014.10.008.

15. McLean S, Nurmatov U, Liu JL, Pagliari C, Car J, Sheikh A. Telehealthcare for chronic obstructive pulmonary disease. Cochrane Database Syst Rev. 2011 Jul 6;2011(7):CD007718. doi: 10.1002/14651858.CD007718.pub2.

16. Clarke M, Shah A, Sharma U. Systematic review of studies on telemonitoring of patients with congestive heart failure: a meta-analysis. J Telemed Telecare. 2011;17(1):7-14. doi: 10.1258/jtt.2010.100113.

17. Dalleck LC, Schmidt LK, Lueker R. Cardiac rehabilitation outcomes in a conventional versus telemedicine-based programme. J Telemed Telecare. 2011;17(5):217-21. doi: 10.1258/jtt.2010.100407.

18. Robinson KR, Leighton P, Logan P, Gordon AL, Anthony K, Harwood RH, Gladman JR, Masud T. Developing the principles of chair based exercise for older people: a modified Delphi study. BMC Geriatr. 2014 May 19; 14: 65. doi: 10.1186/1471-2318-14-65.

19. Sexton BP, Taylor NF. To sit or not to sit? A systematic review and meta-analysis of seated exercise for older adults. Australas J Ageing. 2019 Mar;38(1):15-27. doi: 10.1111/ajag.12603.

20. Nacarato D, Sardeli AV, Mariano LO, Chacon-Mikahil MPT. Cardiovascular telerehabilitation improves functional capacity, cardiorespiratory fitness and quality of life in older adults: A systematic review and meta-analysis. J Telemed Telecare. 2024 Sep; 30 (8): 1238-1248. doi: 10.1177/ 1357633X221137626.

21. Martins RL, Monteiro EDSS, de Lima AMJ, Santos ADC, Brasileiro-Santos MDS. Effect of Telerehabilitation on Pulmonary Function, Functional Capacity, Physical Fitness, Dyspnea, Fatigue, and Quality of Life in COVID-19 Patients: A Systematic Review and Metanalysis. Telemed J E Health. 2024 Aug;30(8):e2256-e2286. doi: 10.1089/tmj.2023.0653.

22. Bashar N, Aamdani SS, Khalid S, Aziz N, Sattar S, Samad Z, Kamal AK. Identifying mobile health interventions for post-discharge stroke and myocardial infarction patients: a scoping review. BMJ Open. 2025 Jul 30;15(7): e094425. doi: 10.1136/bmjopen-2024-094425.

23. Chumbler NR, Quigley P, Li X, Morey M, Rose D, Sanford J, Griffiths P, Hoenig H. Effects of telerehabilitation on physical function and disability for stroke patients: a randomized, controlled trial. Stroke. 2012 Aug; 43 (8): 2168-74. doi: 10.1161/STROKEAHA.111.646943.

24. Miozzo AP, Camponogara Righi N, Yumi Shizukuishi ML, Marques Ferreira H, et al. A Telerehabilitation Program for Maintaining Functional Capacity in Patients With Chronic Lung Diseases During a Period of COVID-19 Social Isolation: Quasi-Experimental Retrospective Study. JMIR Rehabil Assist Technol. 2022 Dec 22;9(4):e40094. doi: 10.2196/40094.

25. Gamble CJ, van Haastregt J, van Dam van Isselt EF, Zwakhalen S, Schols J. Effectiveness of guided telerehabilitation on functional performance in community-dwelling older adults: A systematic review. Clin Rehabil. 2024 Apr;38(4):457-477. doi: 10.1177/02692155231217411.

26. Martínez-Pozas O, Corbellini C, Cuenca-Zaldívar JN, Meléndez-Oliva É, Sinatti P, Sánchez Romero EA. Effectiveness of telerehabilitation versus face-to-face pulmonary rehabilitation on physical function and quality of life in people with post COVID-19 condition: a systematic review and network meta-analysis. Eur J Phys Rehabil Med. 2024 Oct;60(5):868-877. doi: 10.23736/S1973-9087.24.08540-X.

27. Agostini M, Moja L, Banzi R, Pistotti V, Tonin P, Venneri A, Turolla A. Telerehabilitation and recovery of motor function: a systematic review and meta-analysis. J Telemed Telecare. 2015 Jun;21(4):202-13. doi: 10.1177/1357633X15572201.

28. Liu X, Yang G, Xie W, Lu W, Liu G, Xiao W, Li Y. Efficacy of telerehabilitation for total knee arthroplasty: a meta-analysis based on randomized controlled trials combined with a bibliometric study. J Orthop Surg Res. 2024 Dec 26;19(1):874. doi: 10.1186/s13018-024-05381-9.

29. Jia Q, Guo Z, Zhang B, Wang H. Effect of tele-rehabilitation guided intervention on pain and function in middle-aged and older adult patients with knee osteoarthritis: a systematic review and meta-analysis. Front Public Health. 2025 Dec 17;13:1724092. doi: 10.3389/fpubh.2025.1724092.

30. Yau T, Chan J, McIntyre M, Bhogal D, Andreoli A, Leochico CFD, Bayley M, Kua A, Guo M, Munce S. Adverse events associated with the delivery of telerehabilitation across rehabilitation populations: A scoping review. PLoS One. 2024 Nov 19;19(11): e0313440. doi: 10.1371/journal.pone.0313440.

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