



Annotated Bibliography – Systematic Reviews of Telehealth Services

1. Russell TG, Hill AJ, O'Leary SP, Galea OA, Cottrell MA. *Clin Rehabil. Real-time telerehabilitation for the treatment of musculoskeletal conditions is effective and comparable to standard practice: a systematic review and meta-analysis. Clin Rehabil. 2017 May; 31(5): 625-638. PubMed abstract URL: <https://www.ncbi.nlm.nih.gov/pubmed/27141087>.*

The objective of the study was to evaluate the effectiveness of treatment delivered via real-time telerehabilitation for the management of musculoskeletal conditions, and to determine if real-time telerehabilitation is comparable to conventional methods of delivery within this population. Six databases, (Medline, Embase, Cochrane CENTRAL, PEDro, psycINFO, CINAHL) were searched from inception to 2015. **Real-time telerehabilitation appears to be effective and comparable to conventional methods of healthcare delivery for the improvement of physical function and pain in a variety of musculoskeletal conditions.** Aggregate results suggest that telerehabilitation is effective in the improvement of physical function (SMD 1.63, 95%CI 0.92-2.33, I²=93%), whilst being slightly more favorable (SMD 0.44, 95%CI 0.19-0.69, I²=58%) than the control cohort following intervention. Sub-group analyses reveals that telerehabilitation in addition to usual care is more favorable (SMD 0.64, 95%CI 0.43-0.85, I²=10%) than usual care alone, whilst treatment delivered solely via telerehabilitation is equivalent to face-to-face intervention (SMD MD 0.14, 95% CI -0.10-0.37, I² = 0%) for the improvement of physical function. The improvement of pain was also seen to be comparable between cohorts (SMD 0.66, 95%CI -0.27-1.60, I²=96%) following intervention.

2. Van Egmond MA, van der Schaaf M, Vredevelde T, Vollenbroek-Hutten MMR, van Berge Henegouwen MI, Klinkenbijn JHG, Engelbert RHH. *Effectiveness of physiotherapy with telerehabilitation in surgical patients: a systematic review and meta-analysis. Physiotherapy. 2018 Sep; 104(3): 277-298.*

The objective of this study was to study the effectiveness of physiotherapy with telerehabilitation on postoperative functional outcomes and quality of life in surgical patients. Academic databases and systems such as MEDLINE, EMBASE, CINAHL, the Cochrane Library, PEDro, Google Scholar and the World Health Organization International Clinical Trials Registry Platform. The following key words and Medical Subject Headings (MeSH) combined with Boolean operators were used: 'Physical Therapy Modalities' [Mesh] OR 'ExerciseTherapy' [Mesh] OR physiotherap* [tiab] OR

exercise* [tiab] AND 'Telemedicine' [MAJR] OR 'Telecommunications' [MAJR] OR telehealth [tw] AND 'Surgical Procedures Operative' [MeSH] AND randomized controlled trial [pt] OR controlled clinical trial [pt]. **Physiotherapy with telerehabilitation has the potential to increase quality of life, is feasible, and is at least equally effective as usual care in surgical populations. This may be a sufficient reason to choose physiotherapy with telerehabilitation for surgical populations, although the overall effectiveness on physical outcomes could not be determined.** The search strategy yielded 1031 results. After removing duplicates, 799 records remained and were initially screened. Fifty-five records were found to be eligible for full screening, of which 23 records were included for qualitative synthesis. Adults aged > 18 years with an indication for thoracic, upper abdominal or orthopedic surgery were included in this review.

3. Block VAJ, Pitsch E, Tahir P, Cree BAC, Allen DD, Gelfand JM. Remote Physical Activity Monitoring in Neurological Disease: A Systematic Review. *PLOS ONE* | DOI:10.1371/journal.pone.0154335 April 28, 2016.

Objective of the study was to perform a systematic review of studies using remote physical activity monitoring in neurological diseases, highlighting advances and determining gaps. Studies were systematically identified in PubMed/MEDLINE, CINAHL and SCOPUS from January 2004 to December 2014 that monitored physical activity for 24 hours in adults with neurological diseases. **These studies show that remote physical activity monitoring is feasible in neurological diseases, including in people with moderate to severe neurological disability. Remote monitoring can be a psychometrically sound and responsive way to assess physical activity in neurological disease.** 137 studies met inclusion criteria in multiple sclerosis (MS) (61 studies); stroke (41); Parkinson's Disease (PD) (20); dementia (11); traumatic brain injury (2) and ataxia (1). Across diagnoses, physical activity is consistently lower in neurological populations than in those without neurological disease. Physical activity monitoring is feasible in these populations, including in those with impaired cognition. The studies support the use of remote monitoring of physical activity primarily for observational purposes as a way to assess activity status over time.

4. Sarfo FS, Ulasavets U, Opare-Sem OK, Ovbiagele B. TELE-REHABILITATION AFTER STROKE: AN UPDATED SYSTEMATIC REVIEW OF THE LITERATURE. *J Stroke Cerebrovasc Dis.* 2018 September; 27(9): 2306–2318. doi: 10.1016/j.jstrokecerebrovasdis.2018.05.013.

Objective of the study was to provide an updated systematic review on the efficacy of tele-rehabilitation interventions for recovery from motor, higher cortical dysfunction and post-stroke depression among stroke survivors. **In this systematic review of literature, we show that tele-rehabilitation for motor and higher cortical deficits as well as post-stroke depression appear to be as effective as in-person therapies if not better.** Researchers searched PubMed and Cochrane library from January 1, 1980 to July 15, 2017 using the following keywords: "Telerehabilitation stroke", "Mobile health rehabilitation", "Telemedicine stroke rehabilitation", "Telerehabilitation". The inclusion criteria for this study were randomized controlled trials, pilot or feasibility trials that included an intervention group that received any tele-rehabilitation therapy for stroke survivors compared with a control group on usual or standard of care. This search yielded 49 abstracts. Two investigators by consensus, settled on 22 publications that met the criteria for inclusion and further review. Tele-rehabilitation interventions focused on motor recovery (n=18), depression or caregiver strain (n=2) and higher cortical dysfunction (n=2). Use of telemedicine for post-stroke rehabilitation could be especially important for regions around the world with a lack of socioeconomic resources, including under-resourced areas of high-income countries, where neuro-rehab experts and facilities are virtually non-existent.

5. *de la Torre-Díez I, López-Coronado M, Vaca C, Aguado JS, de Castro C. Cost-Utility and Cost-Effectiveness Studies of Telemedicine, Electronic, and Mobile Health Systems in the Literature: A Systematic Review. VOL. 21 NO. 2 FEBRUARY 2015 TELEMEDICINE and e-HEALTH. DOI: 10.1089/tmj.2014.0053*

Objective of the study was to perform a systematic review of cost-utility and cost-effectiveness research works of telemedicine, electronic health (e-health), and mobile health (m-health) systems in the literature. Academic databases and systems such as PubMed, Scopus, ISI Web of Science, and IEEE Xplore were searched, using different combinations of terms such as "cost-utility" OR "cost utility" AND "telemedicine," "cost-effectiveness" OR "cost effectiveness" AND "mobile health," etc. In the articles searched, there were no limitations in the publication date. **Some cost-effectiveness studies demonstrate that telemedicine can reduce the costs, but not all. Most research studies in the literature have concluded that telemedicine systems are cost-effective; yet there are too few articles about cost-effectiveness to draw strong conclusions.** All the searches returned a total of 98 results, of which 63 were duplicated or had an irrelevant title, did not meet inclusion criteria and were excluded in this research. The majority of these articles were duplicates. Of the remaining 35 articles, all resulted in relevant contributions.