Supplementary Files

Figure 1: **Draft MEDLINE search strategy**. This strategy was adapted to the syntax of the other databases.

Draft Medline Search

1. MeSH descriptor: [Heart Failure] explode all trees
2. ("heart failure" OR "cardiac failure" OR "myocardial failure" OR "myocardial insufficiency" OR "heart decompensation")
3. (#1 OR #2)
4. MeSH descriptor: [Telerehabilitation] explode all trees
5. MeSH descriptor: [Cardiac Rehabilitation] explode all trees
6. ("tele-rehabilitation" OR "telerehabilitation" OR "telecardiology" OR "tele-cardiology" OR "telecare" OR "Remote Rehabilitation" OR "Virtual Rehabilitation")
7. (#4 OR #5 OR #6)
8. (#3 AND #7)
9. randomized controlled trial [pt]
10. controlled clinical trial [pt]
11. randomized [tiab]
12. placebo [tiab]
13. drug therapy [sh]
14. randomly [tiab]
15. trial [tiab]
16. groups [tiab]
17. #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16
18. animals [mh] NOT humans [mh]
19. #17 NOT #18
20. #8 AND #19

Figure 2.1. Description of trial and patients' characteristics of all included studies

Author Year Country	Study Population	Specific characteristics of experimental group	Specific characteristics of control group	Exclusion criteria	Comorbidities / Medication (exp/cont)	Sample size	Enrolled patients (n)	Intervention	Duration of the rehabilitation program	Follow-up visits and total period	Adherence rate/ Satisfaction	Outcomes
Babu 2011 India	Congestive HF NYHA II-IV Tertiary care, university teaching hospital	Mean age: 56.87+-10.45 Sex(M/F): 13:2 EF: 30+-8.8 Length of stay: 5.46 +-0.91 Length of stay UCI:1 +-0.92 SF36: 33.8	Mean age: 58.73+-10.81 Sex(M/F): 10:5 EF: 31+-12.5 Length of stay: 6.8 +-3.7 Length of stay UCI: 1.13 +-1.6 SF36: 32.3	AMI, Uncontrolled arrhythmias, valvular disease, severe orthopedic and neurological problems	Not described Diuretics: all Digoxin: 9/8 ACE-I: 12/12	Calculated: 15 for each group (considered 20% drop-out rate)	30 CONt: 15 EXP: 15 Final: 27 CONt: 13 EXP: 14	Home based CR vs standard care without exercise program	8w	8w Assessment: **-6MWT**: Baseline and at 8w **-QoL**: Baseline, Discharge and at 8w	72,6% (defined as exercise >80% days)	6MWT QoL (SF36)
Bernocchi 2018 Italy	HF patients undergoing in-hosp rehab (3 rehabilitation centers) NYHA II-IV	Mean age: 71+-9 Sex: 88% male Mean BMI: 28,5	Mean age: 70+-9.5 Sex: 75% male Mean BMI: 27,7	Physical activity limitations due to non-cardiac/ pulmonary conditions; life expectancy<6M; severe cognitive	Not reported SABA/LAMA/ICS: 56/56 Digitalis: 4/11	Calculated: at least 44 (20-25% drop-out rate)	112 CONt: 56 EXP: 56 Final: 80	Home based CR vs Standard Medical Care without	4M	6M Assessment of satisfaction, 6MWT, QoL, BARTHEL:	65% performed 3-5d/w 16% >5d/w 19%<3d/w	6MWT QoL (MLHFQ) BARTHEL CAT Dyspnoea PASE

	Diagnosis of COPD (B,C,D) for >12M	EF%: 44.5 +- 12.4 FEV1/FVC: 60+- 10.2	EF%: 43.3 +- 13.2 FEV1/FVC: 62+- 8.9	impaiments; did not return home after hospitalization	BB: 37/30 ACE-I: 25/28 Diuretics: 42/47 Aldosterone antag: 27/32		CONt: 45 EXP: 35	exercise program		-Baseline -4M -6M	High satisfaction	
Chen 2018 Taiwan	HF patients from outpatient, general ward, intensive care unit HFrEF NYHA <IV	Mean age: 61+-11 Sex (M/F): 17/2 BMI: 24.9 +- 2.6 Mean EF: 36+- 9 Mean Pvo2: 18.2 +- 4.1 CABG:2	Mean age: 60+-16 Sex (M/F): 14/4 BMI: 25.2 +- 5.7 Mean EF: 32+- 11 Mean Pvo2: 18.9 +- 4.1 CABG: 0	LVEF>50% NYHA IV High bedridden status Musculoskeletal system problems or other contraindications for exercise	Not described	Not mentioned	75 CONt: 40 EXP: 35 Final: 37 CONt: 18 EXP: 19	Home based CR vs standard medical care without exercise program	3M	3M Assessment of physical parameters (CPET, 6MWT): Baseline End of the trial	11 losses in control, 16 in intervention No specific measure about adherence.	Pvo2 6MWT Anaerobic threshold QoL
Cowie 2014 Scotland	HF patients selected at NHSS Stable for 1M With OMT With EF reduced NYHA II-III	Mean age: 65.5 Sex (M/F): 18/2 BMI: 26.6 NYHA II/III: 12/8	**HOSPITAL**Mean age: 71.2 Sex (M/F): 16/4 BMI: 27.3 NYHA II/III: 12/8 Severe LV Impairment: 10	Not reported at the article	DM, COPD, HT, CVA, PVD, Anemia, Renal failure, Osteoporosis No information about medications	Not reported at the article	60 HOME: 20 HOSP: 20 CONt: 20 Final: 46	Home based CR vs Hospital CR vs usual care	8w	8w Assessment -Baseline -End of the trial	HOME: 77% HOSP: 86% (defined as completion of total of exercise sessions)	ISWT QoL

		Severe LV Impairment: 15	**CONTROL** Mean age: 61.4 Sex (M/F): 17/3 BMI: 27.1 NYHA II/III: 13/7 Severe LV Impairment: 10				HOME: 15 HOSP: 15 CONt: 16					
Hwang 2017 Australia	HF patients from cardiology and general medical ward, with recent hospital admission and referred to HF service >18yo NYHA<IV	Mean Age: 68 Sex (M/F): 19/5 Mean LVEF: 36% HFpEF: 3 NYHA: I – 3 II – 9 III – 12 Atrial Arrythmia: 9	Mean Age: 67 Sex (M/F): 21/6 Mean LVEF: 35% HFpEF: 2 NYHA: I – 2 II – 21 III – 6 Atrial Arrythmia: 12	Symptomatic severe aortic stenosis, significant ischemia at low exercise intensity; lived in an institution; lived more than 1h driving distance from the treating hospital; no support person at home	DM, Chronic respiratory conditions, Depression, Stroke, Arthritis Medications: ACE-I: 23/25 BB:22/23 Diuretics: 21/26 Home O2: 3/0	Calculated: 48 (drop-out rate of 10%; power 80%)	53 CONt 29 EXP: 24 Final: 49 CONt 26 EXP: 23	Home based CR vs Outpatient CR	12w	24w Assessment of walking, balance, strength, incontinence, QoL: Baseline End 3M after the end of trial	EXP: 71% CONt:30 % (adherent: >80% sessions)	6MWT TUGT 10min walk test Strength grip QoL RUIS BOOMER EQ-5D Adherence Satisfaction
Lang 2018 Scotland	HFpEF EF>45% NYHA< IV Single center (Tayside, Scotland)	Mean Age: 71.8 Sex (M/F): 9/16 BMI: 32.1	Mean Age: 76 Sex (M/F): 14/11 BMI: 32.2	Patients who have undertaken (CR) within the last 6 months; with severe chronic pulmonary	HTA, DM, Renal impairment, AF (6/13), previous AMI (4/5)	Planned to recruit 50 patients based on	50 EXP: 25 CONt :25 Final: 45	Home based CR vs Usual Care	12w	6M Assessment of: HRQoL, clinical events, ISWT, EQ-5D, SCHFI	Minimum adherence: 92% (attend to 1st and 2 other	ISWT QoL Clinical events SCHFI Safety Acceptability

		HF ischemic: 8 NYHA: I- 1; II- 15; III- 9	HF ischemic: 16 NYHA: I- 1; II- 16; III-8	disease, requiring home oxygen or hospitalization for exacerbation within 12 months; any of the following contraindications to exercise testing or exercise training documented: Early phase after ACS; Untreated life-threatening arrhythmias; Acute heart failure; Uncontrolled hypertension; Advanced AV block; Acute myocarditis and pericarditis; Symptomatic aortic stenosis; Severe hypertrophic obstructive cardiomyopathy; Acute systemic	Medication: BB: 18/13 ACE-I: 11/14 Angiotensin antag: 7/7	"estimations"	EXP: 22 CONt :23			at baseline, 4M and 6M	contacts) High level of satisfaction (qualitative analysis)	

				illness; Intracardiac thrombus; Progressive worsening of exercise tolerance or dyspnoea at rest over previous 3–5 days, Significant ischaemia during low-intensity exercise, Recent embolism, Thrombophlebitis,Recent-onset atrial fibrillation /atrial flutter (in the last 4 weeks); unable to understand the study information or to complete study procedures; in a long-term care establishment or who are unwilling or unable to travel								

				to research assessments;								
Servantes 2012 Brazil	HF patient followed at HF medical center (São Paulo Federal University) EF<40% Pvo2<20 w/ OMT stable for 3M age 30-70y NYHA II-III	**EXP1**: Mean Age: 51.76 +- 9.83 Sex (M/F): 47/53 % BMI: 26.87+- 4.69 Mean EF: 29.59+- 6.61 NYHA: II-82.4%; III-17.6% **EXP2**: Mean Age: 50.82 +- 9.45 Sex (M/F): 47/53 % BMI: 27.98 +- 4.42 Mean EF: 31 +- 5.02	Mean Age: 53 +- 8.19 Sex (M/F): 45.5/54.5% BMI: 27.73 +- 3.66 Mean EF: 31.55+- 5.77 NYHA: II-72.7%; III-27.3%	NYHA IV; MI or revascularization in past 4M; unstable angina, complex or symptomatic ventricular arrythmias, obstructive aortic or mitral valvular disease, hypertrophic cardiomyopathy, abnormal exercise testing, hypotension, pulmonary arterial pressure >50mmHg, chronic obstructive pulmonary disease, leg claudication, musculoskeletal disorders or psychiatric disease	All with sleep apnea and sedentary behaviour. HTA, Overweight DM, Dyslipidemia Medication: BB: all ACE-I: all Aldosterone antag: >90% Diuretics: 17/14/10 Anticoagulant: 7/7/4 Glycemic control: 5/7/4 Digitalis: 2/1/3 CCB: 1/0/0	Not mentioned	50 EXP1:18 EXP2:18 Cont: 14 Final: 45 EXP1:17 EXP2:17 Cont: 11	Home based CR – aerobic exercise w/ or without strength training – vs No training	3M	3M Assessment of CPET, Isokinet strength, QoL, Polysomnography at baseline, 1M, 2M and end of the trial (3M)	Adherence was assessed by nº sessions completed EXP1: 98.5+- 13.7% EXP2: 100+- 11.2% CONT: not reported	CET Muscle Strength Endurance QoL Polysomnography

		NYHA: II-82.4%; III-17.6%										
Karapolat 2009 Turkey	HF as result of ischemic or cardiomyopathy Clinical stability for at least 3M HFrEF NYHA II-III Under OMT Stable during exercise tests Patients from Ege University Hospital's Cardiac Rehabilitation	Mean Age 45.16+-13.58 Sex(M/F) 21/11 BMI 25.19+-4.20 Dilated HF 59.4% NYHA II- 17; III- 15 FEV1: 78.78+-13.06	Mean Age 44.05+-11.49 Sex (M/F) 22/14 BMI 27.09+-3.83 Dilated HF 44.4% NYHA II-26; III-10 FEV1: 76.86+-16.86	neurological, orthopedic, peripheral vascular, or severe pulmonary disease; NYHA class IV; unstable angina pectoris; poorly controlled or exercise-induced cardiac arrhythmias; recent ACS or revascularization (<3M); significant valvular heart disease; AF; uncontrolled HT; performing exercise training at regular intervals during the previous 6w	DM, HT, Hyperlipidemia Medication: Digoxin 46.9/63.9 % BB (alfa+beta) 84.4/76.7 % ACE-I 87.5/77.8 % AT1-I 12.5/5.6% Diuretics Spiro 81.3/83.3 % Furo 37.5/32.3 % AAS 68.8/66.7 %	Not mentioned	74 EXP: 37 Cont: 37 Final: 68 EXP: 32 Cont: 36	Home based CR vs Hospital based CR	8w	8w Assessment of: CPET, 6MWT, HR-QoL, Psychological symptoms, Hemodynamic parameters At baseline and End of the trial	Interv: 87,5% Control: 90% (defined as "mean attendance")	CPET 6MWT QoL (SF36) Psychological symp: BDI, STAI Echocardiographic measures
Keast 2013	HF patients referral to CR program	Mean Age 62.1	Mean Age 62.8	Psychiatric disorder; inability to	Previous IM, ICD, Pacemaker	With total of 54	54 EXP: 27	Home based Nordic	12w	12w Assessment: clinical	EXP: 69,3%	6MWT CEPT Strength

Canada	(Tertiary cardiac care center, Otawa) EF 20-35% NYHA II-III Clinical stable >40y	Sex(M/F) 22/5 Ischemic HF: 19 Mean EF%: 27.6 NYHA II- 6 III- 21 ICD: 10 Previous IM: 17	Sex(M/F) 22/5 Ischemic HF: 22 Mean EF%:26.3 NYHA II- 0; III- 27 ICD:7 Previous IM:23	understand English	, Revascularization and others comorbilities not specified Medication ACE-I 25/21 BB 25/24 ARA 4/4 Diuretic 16/15 Digoxin 2/4	participants, the study has 80% power	CON: 27 Final: 43 EXP: 22 CON: 21	walk vs Outpatient CR		history, BP, BW, Waist, HR, Anxiety, depression and leisure-time activity questionnaire, CPET at Baseline and End of the trial	Control: 66,9% (defined as “attendance to supervised exercise sessions”)	Anthropometric measures HADS
Piotrowicz 2010 Poland	HF diagnosis for >3M with HFrEF NYHA II-III Clinical stable and on OMT for 4w Able to exercise Patients with ICD were included; from Institute of Cardiology, Warsaw	Mean Age 56.4+-10.9 Sex (M/F) 64/11 BMI 27,7+-4.3 Ischemic HF 73.7% NYHA II- 37; III- 38 Previous IM 64%	Mean Age 60.5+-8.8 Sex (M/F) 53/3 BMI 26.5+-3.8 Ischemic HF 85.7% NYHA II- 31; III- 25 Previous IM 78.6%	NYHA class I or IV; unstable angina; (iii) a history ACS <1M, CAB<2M, initiation of CRT<1y, symptomatic and/or exercise-induced cardiac arrhythmia or conduction disturbances; valvular or congenital heart disease requiring surgical	DM, Stroke, Hyperlipidemia, Angioplasty, CABG Medication BB- all ACE-I: 51/69 AR-b: 5/11 Digoxin 8/17 Diuretics 40/58 Spiro 51/72	For power= 0,8 and difference of this parameter over 8w= 20%, sample size= 47 is satisfied. For drop out rate of 25%, sample	152 EXP: 77 Cont: 75 Final: 131 EXP: 75 Cont: 56	Home walking vs Outpatient CR	8w	8w Assessment of clinical status, 3D-echo, 6MWT, HRQoL, CPET at baseline and end of the trial	All patients in intervention group completed the program.	VO2 peak HRQoL 6MWT Safety Adherence

				treatment; HCM; severe pulmonary hypertension or other severe pulmonary disease; uncontrolled HT; anemia, acute and/or decompensated non-cardiac disease; physical disability related to severe musculoskeletal or neurological problems; acute or chronic inflammatory disease; cancer; severe psychiatric disorder	AAS 48/55 Anticoagulation 16/28 Statins 52/67 ICD 13/24	size= 63 patients is enough for each group						
Piotrowicz 2015 Poland	HF diagnosis for >3M with HFrEF NYHA II-III Clinical stable and on OMT for 4w	Mean Age 54.4+-10.9 Sex (M/F) 64/11 BMI 28+-3	Mean Age 62.1+-12.5 Sex (M/F) 31/1 BMI 28+-3	unstable angina; a history of an acute coronary syndrome within the last month, coronary artery bypass grafting	DM, Stroke, Hyperlipidemia, Angioplasty, CABG Medication	Estimation was made, for 80% power and drop out rate of 15% -	111 EXP: 77 Cont: 34 Final: 107	Home walking vs Usual Care without any formal exercise plan	8w	8w Assessment of clinical status, 3D-echo, 6MWT, HRQoL,	94,7% were adherent (attended to at least 80% of	6MWT CPET QoL – SF36 Acceptance and Adherence

	Able to exercise at home. Patients with ICD were included; from Institute of Cardiology, Warsaw	Mean LVEF 30+-8 Ischemic HF 66.7% NYHA II- 51; III- 24 Previous IM 62.7%	Mean LVEF 34+-6 Ischemic HF 84.4% NYHA II- 23;III-9 Previous IM 81.3%	within the last two months, or initiation of CRT-P or CRT-D <6M, or implantation of a pacemaker and/or ICD <6w; symptomatic and/or exercise induced cardiac arrhythmia or conduction disturbance; valvular or congenital heart disease requiring surgical treatment; HCM; severe pulmonary hypertension or other severe pulmonary disease; uncontrolled HT; anaemia; acute and/or decompensated noncardiac disease; physical disability related to severe	BB- all ACE-I: 61/27 AR-b: 12/4 Diuretics 37/13 Spiro/epler 24/9 AAS 54/24 Anticoagul 25/10 Statins 60/28 ICD 56/16	"sample size=32 is satisfied"	EXP: 75 Cont: 32			CPET at baseline and end of the trial	sessions)	

				musculoskeletal or neurological problems; acute or chronic inflammatory disease; severe psychiatric disorder								
Safiyari-Hafizi 2016 Canada	HF with HFrEF NYHA<IV VO2p<69% predicted for age 45-75y OMT	Mean Age 57.8+-8.1 Sex (M/F) 15/5 BMI 30.3 +-4.4 NYHA: I- 3 II- 14 III-3 Initial Pvo2 46.7 +-10.2 EF 27.8 +-8.8	Mean Age 58.9+-6.9 Sex (M/F) 14/6 BMI 28.9 +-4.9 NYHA: I- 3 II- 14 III- 3 Initial Pvo2 47.6 +-10.8 EF 26+-8.3	Musculoskeletal limitations; Pulmonary disorders that limit exercise; Contraindications to training; Patients already involved in an exercise program Medications: Diuretics 14/10 ACE-I 13/13 AR-B 9/9 Nitrates 19/20 BB 18/18 Digitalis 3/6 Antiarryth 1/5 CCB 16/15 Anticoag 10/12	Not reported	Not reported	40 EXP: 20 CONt: 20 Final: 29 EXP: 14 CONt: 15	Home based-interval training vs UC without any formal exercise prescription	12w	12w Assessment of 6MWT, QoL, VO2p at baseline and end of the trial	EXP: 77+/-20% "adherence to the exercise prescription was high in intervention group"	6MWT pVo2 QoL Adverse events
Frederix 2017	Patients were on current	Mean Age 61	Mean Age 61	Non-CV condition that limits ability to	AF, DM, HT, PAD, Hyperlipid	For 95% power and	140 EXP: 70	Center based CR	12w	2y Assessment:	"TR was associated with	pVo2 CV risk control,

Belgium	active rehabilitation a center; HFrEF or HFpEF, or CAD treated conservatively, with PCI or CABG; NYHA<IV OMT and stable for >4w 18-80y. Patients were recruited from different centers.	Sex (M/F) 59/11 BMI 28 HFrEF 2 HFpEF 2 CAD 65 EF>50%: 52 NYHA I- 54 II- 12 III- 3	Sex (M/F) 55/15 BMI 28 HFrEF 4 HFpEF 1 CAD 65 EF>50%: 50 NYHA I- 61 II- 4 III- 5	exercise; terminal disease, dementia, cognitive impairment; simultaneous participation on another trial; history of VF exertional sustained VT/SVT within previous 6M	emia, Overweight, PCI, CABG Medication BB 53/57 ACE-I 44/48 Statin 66/64 Antiplatet Dual 37/40 Mono 29/27 Diuretics 12/14 Oral Antidiabetic 10/10 Insulin 7/5 Anticoagulation 4/5 Antiarrhythmics 4/3	account a dropout rate of 30%, a sample of 140 patients should be obtained	Cont: 70 Final: 119 EXP: 60 CON: 59	followed by Home based CR Vs Center CR only		Assessment of clinical status, echoTTE, CPET, MET, HRQoL, IPAQ, EQ-5D at Baseline, end of study and 2y later	sign lower lack of adherence (OR 0,56, CI 0.45-0.69)"	HR-QoL, IPAQ physical activity, EQ-5D CV readmission rate Costs analysis
Peng 2018 China	HF patients from a Teaching hospital in Chengdu, discharge to home. >18yo HFrEF NYHA I-III	Age: ≤60: 14 >60: 35 Sex (M/F) 28/21 Duration of HF: ≤1y: 16 >1y: 33 NYHA:	Age: ≤60: 16 >60: 33 Sex (M/F) 30/19 Duration of HF: ≤1y: 14 >1y: 35 NYHA:	MI<1M; unstable angina, uncontrolled HT, severe respiratory diseases, decompensated non-cardiac disease, malignancy,	Comorbidities median: EXP – 1.0 CONT – 1.0	For 80% power, 52 patients were needed. To allow withdrawals, 98 patients	98 EXP: 49 CONt: 49 Final: 83 EXP: 42	TR program home-based vs usual care (without any exercise	2M	6M Assessment of MLHFQ, 6MWT, NYHA, resting HR, HADS anxiety and depression	Attrition: EXP: 14,3% CONt: 16,3%	QoL (MLHFQ), 6MWT, HADS, Heart Rate, LVEF, Changes in NYHA Classification

	Stable condition and medication for >4w	I-11 II-18 III-20 Ischemic HF: 61,2% (30)	I-3 II-18 III-18 Ischemic HF: 59,2% (29)	physical disability, mental disease; previous participation in exercise cardiac rehabilitation programs.		were included.	CONt: 41	prescription)		at baseline, end of trial and 4M later		
Zielinska 2006 Poland	HF patients referred to different clinics and hospitals in Poland. HFrEF NYHA II-III Clinical stable and stable doses of drugs for >4w	Mean Age: 62+-7 BMI: 28,6 +-5,3 HF etiology: CAD: 36 DCM: 7 Mean LVEF: 33,3+-8,1	Mean Age: 56,2+-13,5 BMI: 25,7 +-3,3 HF etiology: CAD: 14 DCM:4 Mean LVEF: 31,2 +-7,1	MI, coronaroplasty or heart surgery <3M; disorders of musculoskeletal system, positive initial stress test; mental disorders; resting HR>110 bpm	Medication: ACE in BB Spiro Furosemid Statin	Not mentioned	61 EXP: 43 CON: 18 FINAL: 61 EXP: 43 CON: 18	3w of Outpatient CR followed by 9w home based exercise training vs usual care (without exercise prescription)	12w	Assessment of MLHFQ Stress Test HR, BP at baseline, 3w and 12w (end of the trial)	All patients completed the program	QoL (MLHFQ) Duration of Stress Test HR, BP
Piotrowicz 2019 Poland	Clinical stable patients diagnosis with Heart Failure from 5 centers LEFV≤40% NYHA I-III	Mean age: 62.6+-10.8 Sex (M/F): 377/48 BMI: 28.7 NYHA I-54 II-293 III-68	Mean age: 0.262.2+-1' Sex (M/F): 376/49 BMI: 29.1 NYHA I-50 II-284 III-91	CV hospitalization within 6months Unstable patients NYHA IV	AF%: 18.6/18.8 Depression % 23.1 / 28.6 B-blocker: 96.2/97.9 ACE-I: 92.9/93.6 Resynchronization and cardiovert	Calculated: 800 (considered 20% drop-out rate)	850 CONt: 425 EXP: 425 781 FINAL CONt: 386	Home based CR with first week at the hospital vs usual care without exercise program	9w	26M Assessment -Baseline -9w: end of exercise program -14M -26M	EXP: 88.4% (defined as completed >80% of training sessions)	1ry:Ratio of Percentage of days alive and out of the hospital 2ry: mortality, hospitalizations.

		Mean EF: 31+-7 Cause of HF: 281 ischemic CABG: 16.5%	Mean EF: 30+-7 Cause of HF: 274 ischemic CABG: 16.5%		er-defibrillator: 36.4 / 32.8		EXP: 395					At end of exercise program: 6MWT, pVO2, SF-36, change in NYHA class
Dalal 2019 UK	HFrEF within last 5y from 4 centers in the UK. NYHA I-IV	Mean age: 69.7+-10.9 Sex (M/F): 81/26 BMI: 28.1 NYHA I-24 II-63 III-20 Mean EF: 34.5 Ischemic aetiology of HF: 48 (45%)	Mean age: 69.9+-11 Sex (M/F): 88/21 BMI: 28.0 NYHA I-19 II-63 III-26 Mean EF: 33 Ischemic aetiology of HF: 50 (46%)	Participants who undertaken cardiac rehabilitation within 12M prior to enrolment.	AF: 45% NT-pro-BNP <2000: 79% Devices: 16.5% Depression: 25% B-blocker: 84% ACE-I: 64% Diuretic: 65%	Calculated: 108 for each group (considered attrition rate of 20%)	216 CONt: 109 EXP: 107 185 FINAL CONt: 93 EXP: 92	12w of home-based exercise vs usual care without cardiac rehabilitation	12w	12M Assessment at: -clinical visits at baseline, 4M and 12M -at 6M by post	EXP: 96% (attendance to the first contact with facilitator and two more contacts	1ry: QoL (MLHFQ) 2ry: death, hospitalizations, EuroQoL, HADS, physical activity (accelerometer and ISWT)

Figure 2.2 Description of TR intervention in all included studies

Study	Exercise modality	Session duration/ intensity/ frequency	Supplemental exercise	Monitoring during the session	Feedback (type, frequency)	Educational sessions / Previous inpatient CR	Control group	Management of HF condition
Babu 2011 India	Walking + exercises	1st week: Walking: 5-10min, RPE 4-6 Exercises: 5reps x 2sets 2-4w: walking 10-15min; exercises 5reps x 4sets 4-6w: walking 20-30min; exercises 5reps x 6sets 6-8w: walking 30-40min; exercises 5reps x 8sets	Not reported	No telemonitoring during exercise session.	Weekly calls by therapist to assess patient's status and to adjust exercise level.	1w of supervised exercises and walking for 1h, 3x/day. Prescription was based RPE between 3-4/10, individualized for each patient. The progression was made when the patient was comfortable at that level.	physician directed advice on staying active	According to American Heart Association Guidelines
Bernocchi 2018 Italy	Exercise program with mini-ergometer and pedometer	Depended on patient's status: Basic level: 15-25min mini-ergometer + 30min callisthenic exercises for 3x/w High level: 30-45min mini-ergometer (0-60W) + 30-40min muscle reinforcement (0.5kg) for 3-7d/w	Basic level: free walking 2x/w High level: pedometer-based walking	Yes - pulse oximeter and ECG monitors.	Weekly structured calls from: -NT to assess patients' status and give healthy style advices. -**PT** to assess dyspnea, muscle fatigue (Borg scale) and adjust training plan.	Educational intervention from NT and PT for 4M	Standard care program with medication and oxygen, visits from the general practitioner and in-hospital check-ups. At enrollment received educational session and were invited to practice daily physical activity	Not mentioned

Chen 2018 Taiwan	Aerobic exercise based on patient's preference – walking (47%) jogging (5.4%), stationary cycling (47%)	At least 30min for at least 3x/w Exercise at 60-80% of peak HR	Not reported	No telemonitoring during exercise session.	Telephone interviews every 2w only to monitor patient's status. No changes to exercise plan were done.	Educational support during admission. 1w of outpatient CR at the hospital	Standard health care, with previous activity levels. No formal exercise prescription.	Medications were not changed in any patient during the study
Cowie 2014 Scotland	Aerobic exercise, interval training	2x/w, at 40-60% HR reserve, 12-13 Borg RPE 1h session: 15min warm-up, 30min aerobic overload, 15min cool-down HIIT: 90second functional aerobic exercise stations per circuit, 2 rounds.	Not reported	No telemonitoring during exercise session.	Telephone interviews by PT every 2w to assess patient's status. Registry of exercise session parameters in a dairy	No previous CR. Support for home exercise by a DVD and booklet.	- Standard health care, no training -Hospital CR: similar to home program	Not reported
Hwang 2017 Australia	Aerobic and strength training	Synchronous videoconferencing for PT guidance 60min, 2x/w 10min warm-up, 40min aerobic and strength exercises, 10min cool down. Intensity gradually progressed;	Additional home exercises to undertake 3x/w at similar intensity.	Real Time monitoring before and during each session – pulse oximeter and HR monitor.	RT feedback during each session. Telephone contacts in case patient needed additional support.	Session for experimental group to familiarization with videoconference software. Educational sessions for both groups (face-to-face or	Outpatient CR 2x/w, similar program as experimental group. They also had home exercises to undertake 3x/w at similar intensity.	Not mentioned

		prescription was tailored.				by electronic slides).		
Lang 2018 Scotland	Walking or chair-based exercises	Progressive exercise training, tailored, based on walking or chair-based exercise DVD, or combination of two. 2-3x/w Also includes a CD for relaxation and breathing control exercises	Not reported	Not specific reported but no indications of telemonitoring during exercise session.	Support by cardiac nurses as need by telephone contacts	No prior CR. REACH Manual also provided information about HF, medication, symptom monitoring and how to manage stress/anxiety.	Usual Care without any formal exercise program	According to Guidelines
Servantes 2012 Brazil	Walking only (EXP1) or with strength exercises (EXP2)	1-2M: 3x/w Session: 10min warm-up, 30min walking, 10min cool-down. 3rdM: 4x/w Session: 10min warm-up, 45min walking, 10min cool-down. Intensity established by VO2 AT.	EXP2 did additional strength exercises for upper and lower limbs with graduated free weights (1M: 12rep; 2M:14rep; 3M:16rep)	No telemonitoring during exercise session	Weekly calls to assess patient's status, adherence and give support. Reviewed monthly by physiotherapist and cardiologist to adjust exercise intensity.	3 sessions of supervised exercise to plan training program. Educational session about CVRF. Home group had manual with information about exercise.	No training at all Evaluated weekly	Not mentioned
Karapolat 2009 Turkey	Aerobic exercise (walking), strength and flexibility exercises	45-60min session, 3x/w; 5min warm-up, 30min of aerobic exercise, 5min cool-down	Not mentioned	No telemonitoring during exercise session	Weekly calls to assess patient's status and exercise motivation	Educational session by physiotherapist and a manual with instructions.	Outpatient CR (exercise program similar to intervention, done at rehabilitation unit)	During the trial, patient's drug therapy remained unchanged

		at 60-70% pVO2, 13-15 Borg scale, 60-70% HRR specific program for each patient						
Keast 2013 Canada	Nordic Walk (NW) – walking with poles	2x/w, 1h session: 15min warm up, 10-15min NW (progression to 30min), 15min stretching Intensity: at 60-75% HRR, Borg scale 3-5	Additional walking to accumulate 200-400 min/week	Supervised online sessions. Patients self-monitored their HR at rest and immediately after workout.	RT-feedback during online sessions	Initial session for learning the Nordic Walking technique	2x/w supervised exercise sessions for 1h: 15min warm up, 10-15min walking (progression to 30min), 15min stretching. Additional walk and strength training at home, to accumulate 200-400min/wk. Intensity: at 60-75% HRR, Borg scale 3-5	During the trial, patient's drug therapy was modified as needed.
Piotrowicz 2010 Poland	Walking on level ground	2x/day, 3x/w 5-10min warm up Gradually increase time of continuous walking (10min 2x/d – 15min 2x/d – 20min/d) 5min cool-down Intensity: 40-70% of HR reserve (11 at Borg scale)	Not mentioned	Telemonitoring of clinical status, vital signs and ECG before each session. If no contraindications, patients received permission from monitoring center to start training. Patients transmitted ECG	Daily telephone contacts to assess patient's status and give psychological support. Based on monitoring before and after each session,	3-6 monitored educational sessions	Supervised Interval training on cycle ergometer (gradually increase: 10/15min/d with 1-3min of exercise followed by 1-2min of active recovery –-> 30min/d 4min of exercise	Not reported

				immediately after the end of every session.	consultants were able to adjust training protocol.		followed by 2min of active recovery), 3x/w During the session, ECG, HR and BP were monitored.	
Piotrowicz 2015 Poland	Nordic walk (NW)	5x/w; tailored sessions for each patient 5-10min warm-up; 15-45min of NW 5min cool-down At 40-70% of HRR, Incremental over time: Pvo2<14: 10min NW; Pvo2 14-20: 15min NW; Pvo2>20: 20min NW. Final goal was to perform 45-60min session	Not reported	Telemonitoring of clinical status, vital signs and ECG before each session. If no contraindications, patients received permission from monitoring center to start training. Patients transmitted ECG immediately after the end of every session. Patients were advised to be accompanied during training.	Daily telephone contacts to assess patient's status and to give psychological support. Based on monitoring before and after each session, consultants were able to adjust training protocol.	3-6 monitored educational sessions	Usual Care according to guidelines, without any formal exercise training and did not perform supervised rehabilitation	Not reported
Safiyari-Hafizi 2016 Canada	HIIT (walking) + resistance training supervised	Period of high intensity work (80-85% pVO2) followed by periods of active recovery (40-50% pVO2). Duration of each interval was individualized	Not reported	Telemonitoring by HR monitor and pedometer, to track work out. Program was adjust based on changes in HR responses to exercise	Contacts to ensure compliance: 1st M: 3x/w; 2nd M: 2x/w; 3rd M: 1x/w	No previous CR. No mention to educational sessions	No formal exercise training – standard health care with encouragement to exercise moderately on a regular basis	Not reported

		FC<3METs started short daily walks of 5-10min; (2-3min fast, 1min rest). Week12 walks of 45-60min w/ 7-8min fats and 1-2min slow FC 3-5METs started walks of 15min, 1-2x/d; Progression was the same as for group with FC>5METs. FC>5METs started sessions of 20-30min 3-5x/w (1min fast, 3min slow); Week 12 walks of 55-60min w/ 7-8min fast and 1min slow, for 6-7x/week. Resistance: 10 exercises with bands 15reps; same number of reps but resistance increased (over 12w, resistance increase 30%)						

Frederix 2017 Belgium	Aerobic exercise: walking	If Pvo2>80%: 30min sessions, 3x/w If Pvo2<80%: patient chose the intensity of exercise session. Instructed to wear the accelerometer during entire study period. Volume of steps was based on BMI (10000-12000 if BMI>30, 8000-10000 if BMI<30)	Not reported	Telemonitoring by accelerometer, data was transmitted automatically. Patients uploaded data at least every 2w.	Weekly tele feedback through SMS or email with intention to encourage patients to achieve the goals.	6w of center-based CR and 7day training led by nurse after randomization. Weekly advice on healthy life-style (dietary, smoking cessation, etc)	24w center-based CR: 2-3x/w, 45-60min sessions of walking/ running/ cycling. Patients were instructed to wear the accelerometer 3times (start, after 6w, end) They did not receive advices on healthy life-style or telecoaching	Not reported
Peng 2018 China	Aerobic exercise with strength exercises	Stage 1(w1-w4): 3x/w – 3-5min warm-up; 10-14min of walking/jogging at 40-70%HRR, 3-5min cool-down. Stage 2(w5-w8): 3x/w – 3-5min warm-up; 20-24min of walking/jogging and muscular strength exercises, at 40-70%HRR, 3-5min cool-down	Not reported	Supervised sessions by physiotherapists (via online webcam) with real-time adjustments to the training session and protocol.	Weekly telephone contacts to assess patient's status. Consultation at any time (call or message).	One Education lecture at discharge and brochure.	Usual care with simple discharge education and regular follow-up visits at the clinic. They were not instructed to perform any type of exercise	According to guidelines.

Zielinska 2006 Poland	Aerobic exercise – cycling (in outpatient) ; walking, swimming or cycling at home	3w CR outpatient: 30min of cycling with 5cycles of 4min work with load and 2min unloaded; 30min general exercises (breathing, coordination, relaxation) 9w CR Home: At least 4x/w 15min morning gymnastics, physical recreation (walking, swimming, cycling) and general exercises	Not mentioned	Outpatient CR sessions were supervised and monitored by constant ECG and 6min measures of BP. Home program included measures of BP and HR performed by the patient	Assessments at baseline, 3w and 12w. No other follow-up or regular feedback during the trial was mentioned.	Educational program: lectures, 1x/w Sessions of psychotherapy about philosophy of life, emotional support, relaxation techniques	Usual care with education about physical exercise principles at discharge, regular follow-up visits according to guidelines. They didn't perform any specific exercise program.	Not specified
Piotrowicz 2019 Poland	Endurance aerobic Nordic walking training; respiratory muscle training; light resistance and strength exercises	1w of hospital training followed by 8w of home-based HCTR; 5x/week; Exercise training was programmed individually for each patient	Not described	Home sessions were monitored with tele-ECG, blood pressure device and body-weight scale	Daily telephone contact to give permission for the training and to assess adherence.	1w of hospital training and educational sessions.	Baseline clinical evaluation during 3-day hospitalization. Observation of their clinical status and recommendation for suitable lifestyle for 9w. Some could participate in rehabilitation.	According to guidelines.
Dalal 2019 UK	2 types: chair-based exercise	12w Exercise >3x/week, starting from	Not described	No telemonitoring.	Face-to-face and telephone	Patient "Progress tracker", 3-day	Medical management according to	According to guidelines.

	and walking training	their own personal level and gradually building up over 2-3M.			contacts over 12w.	training course by nurses and physiotherapist; manual for family and friends	national and local guidelines. No cardiac rehabilitation.	

Usual Care – cardiac rehabilitation program done at the hospital in outpatient setting; CONt – control group; EXP – experimental group; HFrEF – heart failure with reduced ejection fraction; HFpEF – heart failure with preserved ejection fraction; BMI – body mass index
NHSS – National Health Service of Scotland; HCM - hypertrophic cardiomyopathy; RPE: modified Borg's rating of perceived exertion
CAT – COPD Assessment Test; PASE – physical activity profile; BDI – Beck Depression Inventory; RPE – modified Borg's rating of perceived exertion
NT – nurse tutor; PT – Physiotherapist Tutor; FC – functional capacity; MET – metabolic equivalent task; IPAQ – international physical activity questionnaire
ISWT – incremental shuttle walking test; SCHFI – Self-care of HF Index Questionnaire; echoTTE – echocardiographic trans-esophageal
ACE-I - angiotensin-converting-enzyme inhibitor; AR-b – angiotensin receptor blocker; BB- Beta blocker; ICS – inhaled corticosteroid; SABA – short acting bronchodilator; LAMA - long acting bronchodilator; CCB – calcium channel blocker; AAS – acetylsalicylic acid; Spiro – spironolactone; OMT – optimal medical therapy; CRT - cardiac resynchronization therapy; ICD – implantable cardioverter defibrillator; CABG - Coronary artery bypass surgery; AF – atrial fibrillation

Figure 3.1. Outcomes measures of all Included studies

Study	Outcome	Definition	Time	Intervention group			Control group			
				Sample size	Mean change	Mean Standard deviation	Sample size	Mean/ mean change	Mean Standard deviation	P value
Babu 2011 India	Functional capacity	6MWT: Patients were asked to walk as far as possible in 6 min along a flat corridor. The distance in meters was recorded. Standardised instructions and encouragement were commonly	T0: Baseline T1: 8w (end of trial)	14	T0: 429.33 m T1: 514.53 m T1-T0: 90.39 m	T0: 125.15 m T1: 135.12 m T1-T0: 124.04	13	T0: 310.23 m T1: 357.15 m T1-T0: 52.65 m	T0: 121.11 m T1: 147.95 m T1-T0: 112.65 m	<0.05

		given during the test								
	Quality of Life	SF-36: 36 short form survey for patient self-reporting of quality of life	T0: Baseline T1: 8w (end of trial)	14	PCS – T1-T0: 14.19 MCS – T1-T0: 14.59	PCS – T1-T0: 7.76 MCS – T1-T0: 7.18	13	PCS – T1-T0: 5.42 MCS – T1-T0: 5,03	PCS – T1-T0: 5.31 MCS – T1-T0: 7.97	PCS – 0,002 MCS – 0.003
Bernocchi 2018 Italy	Functional Capacity	6MWT: Patients were asked to walk as far as possible in 6 min along a flat corridor. The distance in meters was recorded. Standardised instructions and encouragement were commonly given during the test	T0: Baseline T1: 4M (end of trial) T2: 6M	T0 and T1: 48 T2: 45	T1-T0: 60m (22.2;97.8) T2-T1: 7m (-11.6;25.7)	Not reported. Calculated T1-T0: 88.25	T1:44 T2:35	T1-T0: -15m (-40.3;9.8) T2-T1:-43m (-63.5;-22.2)	Not reported. Calculated T1-T0: 78.38	P btw groups T1-T0: 0.0040 T2-T1: 0.0040
	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental dimensions of QoL	T0: Baseline T1: 4M (end of trial) T2: 6M	T1: 48 T2: 45	T1-T0: -10,5 (-14.2;-6.8) T2-T1: -1,6 (-3.6;0.4)	Not reported. Calculated T1-T0: 16.06	T1:44 T2:35	T1-T0: -0,44 (-4.9;4.0) T2-T1: -0,15 (-2.9;2.6)	Not reported. Calculated T1-T0: 16.28	p btw groups T1-T0: 0,0007 T2-T1: 0,4091

	Time-to-event	Event: hospitalization for any reason or death	Entire period of the study – 4M	T1: 48 T2: 45	113,4 days	Not reported	T1:44 T2:35	104,7days	Not reported	P=0,0484
Chen 2018 Taiwan	Functional Capacity	6MWT – not specified	T0: Baseline T1: 3M (end of the trial)	19	T0: 421 m T1: 462 m T1-T0: 42m	T0: 90 T1: 74 T1-T0: 79.23	18	T0: 350 m T1: 344 m T1-T0:-6 m	T0: 107 T1: 121 T1-T0: 94.05	p(exp)= 0.03 p(cont)= 0.43
	VO2 peak	Measure by CPET		19	T0: 18.2 T1: 20.9 T1-T0:+2,7	T0: 4.1 T1: 6.6 T1-T0: 4.16	18	T0: 18.7 T1: 16.5 T1-T0:-2,2	T0: 4.2 T1: 3.7 T1-T0: 2.25	p (exp)= 0,02 p (cont)< 0,01
	QoL	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental dimensions of QoL		19	T0: 32.1 T1: 20.2 m T1-T0:-11,9	T0: 18.2 m T1: 20.9 m T1-T0: 9.16	18	T0: 44.4 T1: 42.1 T1-T0:-2,3	T0: 15.3 T1: 14.0 T1-T0: 9.35	p (exp)< 0,01 p (cont)< 0,33
Cowie 2014 Scotland	ISWT	Symptom limited maximal test of functional capacity that relates strongly to VO2max during cardio-pulmonary exercise testing on a treadmill	T0: Baseline T1: 8w (end of the trial)	T0:20 T1:15	T0:270 m T1: 318 m T1-T0: 118m	T0:142 m T1: 153 m	T0:20 T1:16 T0:20 T1:15	Control: T0: 233 m T1: 241 m T1-T0: 8 m Hospital: T0: 227 m T1: 312 m T1-T0: 85	Control: T0: 132 m T1: 143 m Hospital: T0: 207 m T1: 155m	p within group p(exp)= 0.02 p(cont)= 0.42 p(hosp)= 0.01

	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental dimensions of QoL	T0: Baseline T1: 8w (end of the trial)	T0:20 T1:15	T0: 43 T1: 37 T1-T0: -6	Not reported. Calculated T1-T0: 16.06	T0:20 T1:16 T0:20 T1:15	Control: T0: 59 T1: 50 T1-T0:-9 Hospital: T0: 41 T1: 32 T1-T0:-9	Not reported. Calculated T1-T0: 16.28	p within group p(exp)= 0.65 p(cont)= 0.37 p(hosp)= 0.5
		SF36: 36 short form survey for patient self-reporting of quality of life	T0: Baseline T1: 8w (end of the trial)	T0:20 T1:15	PCS: T0: 35.29 T1: 34.01 T1-T0: -1,28 MCS: T1-T0: -0,74	PCS: T0: 10.31 T1: 11.04 T1-T0: 6.48 MCS: T0: 45.18 T1: 44.44 T1-T0: 5.55	T0:20 T1:16 T0:20 T1:15	PCS: <u>Control</u> T0: 32.69 T1: 32.08 T1-T0: -0.61 **Hospital**: T0: 31.33 T1: 33.83 T1-T0: 9.62 MCS: <u>Control</u> T0: 39.6 T1: 37.44 T1-T0:-2,16 **Hospital**: T0: 46.17 T1: 48.25 T1-T0: 2,08	PCS: <u>Control</u> T0: 7.54 T1: 7.05 T1-T0: not calculated **Hospital** T0: T1: T1-T0: 2,50 MCS: <u>Control</u> T0: 13.55 T1: 10.89 T1-T0: not calculated **Hospital**: T0: 12.05 T1: 11.21 T1-T0: 8.31	p within group PCS p(exp)= 0.34 p(cont)= 0.51 p(hosp)= 0.38 MCS p(exp)= 0.71 p(cont)= 0.73 p(hosp)= 0.81
Hwang 2017 Australia	Functional Capacity	6MWT: Patients were asked to walk as far as possible in 6 min along a flat	T0: Baseline T1: 12 (end of the trial) T2: 24 w	T0: 24 T1: 24 T2:23	T0: 346m T1: 364m T0-T1: 18m	T0: 104 m T1: 96 m T1-T0: 95.34 m	T0:29 T1:26 T2:26	T0: 382 m T1: 394 m T1-T0: 12m	T0: 106 m T1: 119 m T1-T0:92.71m	Not reported

		corridor. The distance in meters was recorded. Standardised instructions and encouragement were commonly given during the test. The test was performed twice as recommended			T2: 374 m	T2: 89 m		T2: 410 m	T2: 103 m	
	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental dimensions of QoL	T0: Baseline T1: 12 (end of the trial) T2: 24 w	T0: 24 T1: 24 T2:23	T0: 47 T1: 32 T1-T0: -15 T2: 34	T0: 19 T1: 19 T1-T0: 17.54 T2: 23	T0:29 T1:26 T2:26	T0: 41 T1: 35 T1-T0: -6 T2: 33	T0: T1: T1-T0: 14.67 T2: 21	Not reported
		EQ-5D – self measures health status from 0-100	T0: Baseline T1: 12 (end of the trial) T2: 24 w	T0: 24 T1: 24 T2:23	T0: 62 T1: 70 T2: 69	T0: 19 T1: 17 T2: 17	T0:29 T1:26 T2:26	T0: 69 T1: 70 T2: 75	T0: 18 T1: 18 T2: 14	Not reported
	Adverse events	Major:Death, cardiac arrest, syncope Minor: angina, diaphoresis,	T0: Baseline T1: 12 (end of the trial) T2: 24 w	T0: 24 T1: 24 T2:23	Total: 6 Major: 0 Minor: 6	---	T0:29 T1:26 T2:26	Total: 2 Major: 0 Minor: 2	---	Not reported

		palpitations, falls								
Lang 2018 Scotland	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental dimensions of QoL	T0: Baseline T1: 4M (end of trial) T2:6M	T0: 25 T1: 22 T2: 22	T0: 38.2 T1: 35.5 T1-T0: -2.7 T2: 29.2	T0: 27.6 T1: 28.3 T1-T0: 25.81 T2: 25.8	T0: 25 T1: 23 T2: 23	T0: 36.0 T1: 37.8 T1-T0: -1.8 T2: 38.7	T0: 26.5 T1: 27.9 T1-T0: 17.25 T2: 30.1	Not reported
		Heart-QoL - health-related quality of life questionnaire	T0: Baseline T1: 4M (end of trial) T2:6M	T0: 25 T1: 22 T2: 22	T0: 1.4 T1: 1.5 T2: 1.8	T0: 0.8 T1: 1.0 T2: 0.8	T0: 25 T1: 23 T2: 23	T0: 1.6 T1: 1.4 T2: 1.4	T0: 0.9 T1: 1.0 T2: 0.8	Not reported
		EQ-5D - self measures health status from 0-100	T0: Baseline T1: 4M (end of trial) T2:6M	T0: 25 T1: 22 T2: 22	T0: 0.57 T1: 0.60 T2: 0.65 T1-T0: +0.3	T0: 0.29 T1: 0.28 T2: 0.31	T0: 25 T1: 23 T2: 23	T0: 0.58 T1: 0.52 T2: 0.55 T1-T0: +0.6	T0: 0.31 T1: 0.34 T2: 0.29	Not reported
	Clinical events	All cause mortality, hospital admission	During 6M	25	4 hospital admissions	---	23	7 hospital admissions - 4 HF related	---	Not reported
	Functional Capacity	ISWT - Symptom limited maximal test of functional capacity that relates strongly		T0: 25 T1: 18 T2: 17	T0: 183,6 T1: 218,9 T2: 224,7	T0: 174,2 T1: 185,5 T2: 161,4	T0: 23 T1: 17 T2: 16	T0: 157,6 T1: 178,2 T2: 183,8	T0: 117,8 T1: 115,0 T2: 98,1	Not reported

		to VO2max during cardio-pulmonary exercise testing on a treadmill								
	Cost analyses	Unit costs per item		Estimated total delivery cost 362,61 £ per patient						
Servantes 2012 Brazil	Functional Capacity	Peak VO2 - measured by CPET	T0: Baseline T1: 3M	Group1 : 17 **Group2 :** 17	G1 – T0: 15.4 T1: 20.6 T1-T0: 5.2 **G2** – T0: 15.6 T1: 20.9 T1-T0: 5.3	G1 – T0: 2.7 T1: 4.4 T1-T0: not calculated **G2** – T0: 2.7 T1: 4.4 T1-T0: 2.62	11	T0: 15.7 T1: 12.8 T1-T0: -2.9	T0: 3.0 T1: 3.2 T1-T0: 1.74	p btw groups: p(T0)= 0.951 p(T1)<0.001
	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental dimensions of QoL	T0: Baseline T1: 3M	Group1 : 17 **Group2** : 17	G1 – T0: 40.4 T1: 20.7 **G2** – T0: 45.1 T1: 25.1 T1-T0: -20	G1 – T0: 17.9 T1: 16.3 **G2**- T0: 20.8 T1: 16.5 T1-T0: 17.63	11	T0: 46.5 T1: 51.0 T1-T0: 4.5	T0: 18.5 T1: 16.8 T1-T0: 11.28	p btw groups: p(T0)= 0.671 p(T1)<0.001
Karapolat 2009 Turkey	Functional Capacity	Peak VO2 - measured by CPET	T0:Baseline T1: 8w (end of trial)	T0: 37 T1: 32	T0: 17.48 T1: 18.12 T1-T0: 0.64	T0:6.09 T1: 6.00 T1-T0: 3.86	T0: 37 T1: 36	T0: 17.85 T1: 19.43 T1-T0: 1.58	T0: 4.44 T1: 4.59 T1-T0: 2.52	P btw T1 and T0 for both groups <0.05

		6MWT – walking up and down 20m hallway for 6min at their own pace. They were allowed to stop and rest when they needed and they were instructed to continue walking as soon as they felt able to do so.	T0:Baseline T1: 8w (end of trial)	T0: 37 T1: 32	T0: 383.97 T1: 423.78 T1-T0: 39,81	T0: 82.39 T1:76.89 T1-T0: 75.88	T0: 37 T1: 36	T0: 374.34 T1: 418.72 T1-T0: 44,38	T0: 79.06 T1: 50.43 T1-T0: 72.87	P btw T1 and T0 for both groups <0.05
	Quality of Life	SF36: 36 short form survey for patient self-reporting of quality of life	T0:Baseline T1: 8w (end of trial)	T0: 37 T1: 32	PCS T0: 54.64 T1:59.39 T1-T0:4.75 MCS T0: 67.67 T1:64.67 T1-T0: -3	PCS: T0: 27.43 T1: 25.35 T1-T0: 16.04 MCS: T0: 20.36 T1: 19.04 T1-T0: 9.03	T0: 37 T1: 36	PCS T0: 57.50 T1: 69.57 T1-T0:12.07 MCS T0: 67.70 T1:70.52 T1-T0: 2.82	PCS: T0: 23.98 T1: 20.94 T1-T0: 23.80 MCS: T0: 19.63 T1: 20.37 T1-T0: 14.24	PCS: p btw T1 and T0 for both groups <0.05 MCS: p not inferior to 0.05
Keast 2013 Canada	Functional capacity	6MWT: Patients were asked to walk as far as possible in 6 min along a flat corridor. The distance in meters was recorded. Standardised	T0:Baseline T1: 12w (end of the trial)	27	T0: 429.9 T1: 555.5 T1-T0: 125.6	T0: 137.3 T1: 168.8 T1-T0: 148.13	27	T0: 502.6 T1: 559.5 T1-T0: 56.9	T0: 106.2 T1: 131.9 T1-T0: 100.09	P<0.001

		instructions and encouragement were commonly given during the test. The test was performed twice as recommended								
		Peak VO2 - measured by CPET	T0:Baseline T1: 12w (end of the trial)	27	T0: 19.3 T1: 21.5 T1-T0: 2.2	T0: 7.1 T1: 9.0 T1-T0: 5.45	27	T0: 20.1 T1: 21.8 T1-T0: 1.7	T0: 6.2 T1: 7.7 T1-T0: 4.13	p=0.623
	Psychological symptoms	HADS score - depression	T0:Baseline T1: 12w (end of the trial)	27	T0: 4.6 T1: 2.4 T1-T0: -2.2	T0: 2.8 T1: 3.0 T1-T0: 2.57	27	T0: 4.6 T1: 4.4 T1-T0: -0.2	T0: 3.7 T1: 2.9 T1-T0: 0.95	p=0.014
		HADS score - anxiety		27	T0: 4.9 T1: 4.1 T1-T0: -0.8	T0: 3.6 T1: 2.7 T1-T0: 4.15	27	T0: 6.8 T1: 5.3 T1-T0: -1.5	T0: 3.9 T1: 3.3 T1-T0: 3.67	p=0.862
Piotrowicz 2010 Poland	Functional Capacity	Peak VO2 - measured by CPET	T0:Baseline T1: 8w (end of the trial)	T0:77 T1:75	T0: 17.8 T1:19.7 T1-T0: 1.1	T0: 4.1 T1: 5.2 T1-T0: 3.15	T0:75 T1:56	T0:17.9 T1:19.0 T1-T0: 1.1	T0: 4.4 T1: 4.6 T1-T0: 2.53	p=0.0001
	Functional capacity	6MWT: Patients were asked to walk as far as possible in 6 min along a flat corridor. The distance in meters was recorded.	T0:Baseline T1: 8w (end of the trial)	T0:77 T1:75	T0: 418 T1: 462 T1-T0: 44	T0: 92 T1: 91 T1-T0: 87.00	T0:75 T1:56	T0: 399 T1: 462 T1-T0: 63	T0: 91 T1: 92 T1-T0: 74.80	p=0.0469

		Standardised instructions and encouragement were commonly given during the test. The test was performed twice as recommended								
		Change in NYHA Class	T0:Baseline T1: 8w (end of the trial)	T0:77 T1:75	T0: 2.5 T1: 2.1	T0: 0.5 T1: 0.5	T0:75 T1:56	T0: 2.5 T1: 2.3	T0: 0.5 T1: 0.5	p=0.0070
	Quality of Life	SF36: 36 short form survey for patient self-reporting of quality of life	T0:Baseline T1: 8w (end of the trial)	T0:77 T1:75	PCS T0: 23.3 T1:21.60 T1-T0: -1.7 MCS T0: 25.11 T1:21.68 T1-T0:-3.43	PCS: T0: 11.32 T1: 9.65 T1-T0: 6.52 MCS: T0: 12.01 T1: 12.46 T1-T0: 5.57	T0:75 T1:56	PCS T0: 25.39 T1:23.20 T1-T0:-2.19 MCS T0: 22.78 T1:18.56 T1-T0:-4.22	PCS: T0: 10.89 T1: 10.71 T1-T0: 11.38 MCS: T0: 13.22 T1: 9.18 T1-T0: 8.82	PCS P=0.0490 MCS: P=0.0052
	Safety	Clinical events during training ou routine daily activities	Entire period of the study	T0:77 T1:75	3 episodes of paroxysmal Atrial Fibrillation		T0:75 T1:56	1 episode of paroxysmal Atrial Fibrillation		
Piotrowicz 2015 Poland	Functional capacity	Peak VO2 - measured by CPET (ml/kg/min)	T0:Baseline: T1:8w (end of the trial)	T0: 77 T1: 75	T0: 16.1 T1: 18.4 T1-T0: 0.1	T0: 4.0 T1: 4.1 T1-T0: 2.59	T0: 34 T1: 32	T0: 17.4 T1: 17.2 T1-T0: -0.2	T0: 3.3 T1: 3.4 T1-T0: 1.87	p(exp)= 0.0001 p(cont)= 0.0004
		6MWT: Patients were asked to	T0:Baseline: T1:8w	T0: 77 T1: 75	T0: 428 m T1: 480 m	T0: 93m T1: 87m	T0: 34 T1: 32	T0: 439m T1: 465m	T0: 76 T1: 91	p(exp)= 0.0001

		walk as far as possible in 6 min along a flat corridor. The distance in meters was recorded. Standardised instructions and encouragement were commonly given during the test. The test was performed twice as recommended	(end of the trial)		T1-T0: 52m	T1-T0: 85.73		T1-T0:26m	T1-T0: 69.61	p(cont)= 0.0483
	Quality of Life	SF36: 36 short form survey for patient self-reporting of quality of life	T0:Baseline: T1:8w (end of the trial)	T0: 77 T1: 75	T0: 79.0 T1: 70.8 T1-T0: -8.2	T0: 31.3 T1: 30.3 T1-T0: not calculated	T0: 34 T1: 32	T0: 73.6 T1: 67.4 T1-T0: -6.2	T0: 25.6 T1: 25.9 T1-T0: not calculated	p not stastically significant
Safiyari-Hafizi 2016 Canada	Functional capacity	Peak VO2 measured by CPET (mL/kg/min)	T0: Baseline T1: 12w (end of the trial)	T0: 20 T1: 14	No values available	No values available	T0: 20 T1: 15	No values available	No values available	No Significant improvement
		6MWT – without verbal encourgement	T0: Baseline T1: 12w (end of the trial)	T0: 20 T1: 14	No values available	No values available		No values available	No values available	Significant improvement
	Quality of Life	MLHFQ – disease specific questionnaire	T0: Baseline	T0: 20 T1: 14	No values available	No values available		No values available	No values available	Significant improvement

		with 21 questions determining key physical, emotional, social and mental dimensions of QoL	T1: 12w (end of the trial)							
Frederix 2017 Belgium	Functional capacity	Peak VO2 measured by CPET (mL/kg/min)	T0:Baseline T1: 6w T2: 24w	T0:69 T1:69 T2:60	T0: 22,46 T1: 23,91 T2: 24,46 T1-T0: 1,45	T1-T0: 4.12	T0:70 T1:70 T2:59	T0: 22,72 T1: 22,86 T2: 22,15 T1-T0: 0,14	T1-T0: 3.24	P<0,001 (overall)
	Quality of Life	14 item HeartQoL questionnaire - Global score	T0:Baseline T1: 6w T2: 24w	T0:69 T1:69 T2:60	T0: 2,27 T1: 2,46 T2: 2,53	T0: 0,63 T1: 0,51 T2: 0,44	T0:70 T1:70 T2:59	T0: 2,31 T1: 2,40 T2: 2,32	T0:0,59 T1:0,51 T2:0,58	P=0,01 (overall)
	Safety	CV readmission rate Days to 1st readmission Days lost	Entire period of study	Initial: 69 End:60	-32 readmissions -1014days to 1st readm -1,20 days lost	---	Initial: 70 End:59	-60 readmissions -894days to 1st readm -1,89 days lost	---	P=0.110 P=0.155 P=0.142
	Cost effectiveness	Total Average cost per patient			3262€	339€		4140€	513€	TR was cost-saving
Peng 2018 China	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional, social and mental	T0: Baseline T1:2M (end of the trial) T2: 6M	T0: 49 T1: 49 T2: 42	T0: 49.43 T1: 43.11 T1-T0: -6.32 T2: 42.32	T0: 12.25 T1: 8.76 T1-T0: 10.18 T2: 8.83	T0: 49 T1: 49 T2: 41	T0: 48.77 T1: 49.20 T1-T0: 0.43 T2: 49.63	T0:12.21 T1: 12.44 T1-T0: 7.80 T2: 12.39	Btw groups: p=0,072

		dimensions of QoL								
	Functional Capacity	6MWT: Patients were asked to walk as far as possible in 6 min along a flat corridor. The distance in meters was recorded. Standardised instructions and encouragement were commonly given during the test. The test was performed twice as recommended	T0: Baseline T1:2M (end of the trial) T2: 6M	T0: 49 T1: 49 T2: 42	T0: 407.09 T1: 419.23 T1-T0: 12.14 T2: 418.25	T0: 12.27 T1: 9.67 T1-T0: 10.68 T2: 9.68	T0: 49 T1: 49 T2: 41	T0: 406.05 T1: 406.55 T1-T0: 0.50 T2: 406.38	T0: 12.35 T1: 12.54 T1-T0: 10.26 T2: 12.57	Btw groups: p=0,171
	Psychological Symptoms	HADS score - depression	T0: Baseline T1:2M (end of the trial) T2: 6M	T0: 49 T1: 49 T2: 42	T0: 6.69 T1: 6.64 T2: 6.58	T0: 0.959 T1: 0.973 T2: 0.979	T0: 49 T1: 49 T2: 41	T0: 6.65 T1: 6.70 T2: 6.58	T0: 0.954 T1: 0.924 T2: 0.856	Btw groups: p=0.030
		HADS score - anxiety			T0: 6.77 T1: 6.56 T2: 6.53	T0: 0.911 T1: 0.965 T2: 0.927		T0: 6.73 T1: 6.77 T2: 6.82	T0: 0.876 T1: 0.743 T2: 0,727	Btw groups: p=0.032
Zielinska 2006 Poland	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining key physical, emotional,	T0: Baseline T1:3w T2:12w	T0: 43 T1: 43 T2: 43	T0: 46.3 T2: 36 T2-T0: -10	T0 and T1 not reported Calculated T0-T1: 16.06	T0: 18 T1: 18 T2: 18	T0: 62.7 T2: 55 T2-T0: -8	T0 and T1 not reported Calculated T0-T1: 16.28	No comparision btw groups

		social and mental dimensions of QoL								
	Functional Capacity	Changes in duration of stress test: at cycloergometer with ECG; test with increasing load at constant speed of 70/min, starting with 25W load increasing it every 3min. performed until symptoms indicating for interruption (17 on Borg scale)	T0: Baseline T1:3w T2:12w	T0: 43 T1: 43 T2: 43	T0: 521 T1: 657 T2: 688	T0: 189 T1: 209 T2: 231	T0: 18 T1: 18 T2: 18	T0: 385 T1: 420 T2: 428	T0: 205 T1: 216 T2: 235	P(exp)<0.05 P(cont) not statistically significant
Piotrowicz 2019 Poland	Ratio of Percentage of days alive and out of the hospital	The number of days alive and out of the hospital divided by the total possible days of follow-up of each patient.	T1: from 14 to 26M of follow-up	386	91.9	19.3	395	92.8	18.3	0.74
	Mortality	Percentage of patients that died during the study	T1: from 14 to 26M of follow-up	425	All cause: 54 CV: 36	All cause: 12.7% CV: 8.5%	425	All cause: 52 CV:38	All cause: 12.2% CV:8.8%	All cause: 0.86 CV: 0.95
	Hospitalization	Number of patients that were	T1: from 14 to 26M	425	All cause: 232 CV: 141 HF: 104	All cause: 54.6% CV: 36.8%	425	All cause: 245 CV: 161 HF: 103	All cause: 60.5%	All cause: 0.32 CV: 0.12

		hospitalized during the follow-up	of follow-up			HF:26.8%			CV: 40.7% HF: 26.1%	HF: 0.99
	Functional capacity	6MWT	T0: baseline T1: 9w	422	T0: 419 T1: 450 T1-T0: 30	T0: 100.3 T1: 109.5 T1-T0: 5.3	423	T0: 409 T1: 432 T1-T0: 20.7	T0: 100 T1: 106.7 T1-T0: 5.3	0.01
		Pvo2	T0: baseline T1: 9w	422	T0: 16.9 T1: 17.9 T1-T0: 0.95	T0: 6 T1: 6.2 T1-T0: 0.30	422	T0: 16.6 T1: 16.7 T1-T0: -0.0	T0: 6 T1: 5.9 T1-T0: 0.30	<0.01
		Cardiopulmonary exercise test	T0: baseline T1: 9w	422	T0: 383 T1: 428 T1-T0: 45.5	T0: 183 T1: 190 T1-T0: 8.5	422	T0: 374 T1: 390 T1-T0: 16.7	T0: 184 T1: 183 T1-T0: 8	<0.01
	Quality of Life	MLHFQ	T0: baseline T1: 9w	417	T0: 89.7 T1: 91.2 T1-T0: 1.58	T0: 12.6 T1: 12.8 T1-T0: 0.84	416	T0: 88.8 T1: 88.9 T1-T0: -0.0	T0: 14.1 T1: 14.4 T1-T0: 0.84	0.08
Dalal 2019 UK	Hospitalizations	Number of patients that were hospitalized during the follow-up	T0: baseline T3: 12M	T0: 107 T3: 92	19 patients with ≥ 1 hospitalization; in total there were 33 admissions		T0:109 T3: 93	24 patients with ≥ 1 hospitalization; in total there were 35 admissions		OR= 0.72 95%CI [0.35;1.51] p=0.386
		Hospitalizations related to HF	T0: baseline T3: 12M	T0: 107 T3: 92	3 patients with ≥ 1 hospitalization; in total there were 4 admissions		T0:109 T3: 93	6 patients with ≥ 1 hospitalization; in total there were 10 admissions		OR= 0.56 95%CI [0.13;2.33] p=0.422
	Quality of Life	MLHFQ – disease specific questionnaire with 21 questions determining	T0: baseline T1: 4M T2: 6M T3: 12M	T0:107 T1: 96 T2: 90 T3: 92	T0: 32.8 T1: 22.7 T2: 28.8 T3: 24.1 T3-T0:-8.7	T0: 23.8 T1: 18.4 T2: 20.5 T3: 20.9 T3-T0:-2.9	T0:109 T1: 100 T2: 94 T3: 93	T0: 28.3 T1: 27.8 T2: 29.5 T3: 27.5 T3-T0:-0.8	T0: 22 T1: 23.2 T2: 21.8 T3: 23.2 T3-T0:1.2	Btw groups: -5.7 +- 5 p: 0.025

		key physical, emotional, social and mental dimensions of QoL								
	Psychological Symptoms	HADS score - depression	T0: Baseline T1: 4M T2: 6M T3: 12M	T0: 107 T1: 95 T2: 89 T3: 88	T0: 4.4 T1: 3.6 T2: 4.6 T3: 3.6	T0: 3.5 T1: 2.7 T2: 3.2 T3: 3.1	T0: 109 T1: 101 T2: 94 T3: 92	T0: 4.6 T1: 4.5 T2: 4.7 T3: 3.9	T0: 3.3 T1: 3.5 T2: 3.6 T3: 3.4	Btw groups: -0.2+-0.8 p=0.563
		HADS score - anxiety	T0: Baseline T1: 4M T2: 6M T3: 12M	T0: 107 T1: 95 T2: 89 T3: 88	T0: 5.1 T1: 4.4 T2: 4.7 T3: 4.2	T0: 4.4 T1: 3.9 T2: 3.7 T3: 3.8	T0: 109 T1: 101 T2: 94 T3: 92	T0: 5.7 T1: 5.2 T2: 5.4 T3: 4.7	T0: 4.3 T1: 4.2 T2: 4.3 T3: 4.5	Btw groups: 0.1+-0.9 p=0.829
	Functional capacity	ISWT	T0: Baseline T1: 4M T2: 12M	T0: 99 T1: 66 T2: 66	T0: 262.3 T1: 328.5 T2: 328.5	T0: 153.4 T1: 181.3 T2: 181.3	T0: 103 T1: 75 T2: 75	T0: 239.7 T1: 294.3 T2: 294.3	T0: 152.4 T1: 215.5 T2: 215.5	Btw groups: 0.1+-33.4 p=0.995

Figure 3.2. Other outcomes reported and limitations of included studies

Study	Other Outcomes	Limitations
Babu 2011 India	Not reported	Barriers to the program - fear, lack of motivation; Better assessment of adherence is required Small sample size and short follow-up period
Bernocchi 2018 Italy	CAT – COPD Assessment Test; Dyspnoea by MRC PASE – physical activity profile; BARTHEL – disability	Trial wasn't blind. It is more a program of physical maintenance than a specific program for exercise training.
Chen 2018 Taiwan	Parameters of heart function measured by noninvasive cardiac output monitor	Small sample size and short period of study.
Cowie	Not reported	Subjective measures of training intensity at home.

2014 Scotland		Small sample size.
Hwang 2017 Australia	TUGT – time Up and Go Test; 10min walk test; Strengh grip RUIS – Revised Urinary Incontinence Scale BOOMER – balance outcome measure for elder rehabilitation EQ-5D; Adherence; Satisfaction – CSQ8 Cost per patient: 2325€ in telerehabilitation group and 3915€ in control group.	Low training volume and not objectively measured. Recruitment bias – results might not be generalizable.
Lang 2018 Scotland	Healthcare utilization SCHFI – self-care of HF Index Questionnaire Acceptability of program	Trial wasn't blind; imbalance between control and intervention group. Recruitment bias – results might not be generalizable. Open label can cause improvements in patient-reported outcomes.
Servantes 2012 Brazil	Muscle Strength – isokinetic test Polysomnography	Not possible to totally ensure that patients completed their exercise program. Results might not be generalizable.
Karapolat 2009 Turkey	Psychological symptoms: BDI – beck depression inventory, STAI – spielberg's state-trait anxiety inventory Echocardiographic measures of heart function	Short rehabilitation time, no long-term follow-up. Lack of control group.
Keast 2013 Canada	Strength and Anthropometric measures	Lack of blinding. Sample was composed by mostly men.
Piotrowicz 2010 Poland	Not reported	Small sample size. Short duration of program. No long term follow-up. Difficult to determine if the improvement in QoL was exercise related or caused by overall psychosocial support.
Piotrowicz 2015 Poland	Acceptance of TR program Safety (number of adverse events)	Single center trial, not blinded, short duration, small sample size. Few women were recruited – can't be generalized to female population. No comparison with other training modalities.
Safiyari-Hafizi 2016 Canada	Safety (number of adverse events)	Small sample size; High percentage of male patients; Patients were younger than 75yo.
Frederix 2017 Belgium	CPET – cardiopulmonary exercise test CV risk control, IPAQ physical activity, CV readmission rate	low generalizability because: sample had a minority of HF patients, lack of women and black patients, reflects a Belgium situation
Peng 2018 China	LVEF and HR; Changes in NYHA Classification HADS Anxiety and Depression	Limited representativeness and generalizability of the sample (all from the same hospital). Simple randomization was used. Short period of intervention and follow-up.

Zielinska 2006 Poland	Changes in NYHA, BP and HR at rest	Short intervention and follow-up period. Not properly randomized.
Piotrowicz 2019 Poland	All-cause mortality or all-cause hospitalization; All-cause mortality or cardiovascular hospitalization; All-cause mortality or heart failure associated hospitalization; Cardiovascular mortality or heart failure associated hospitalization; Percentage of expected peak VO2	Center's experience might influence the results. Only 11.5% of patients were women. 12% of participants in UC arm participated in rehabilitation programs. Can't be ascertain if the observed improvements at 9w were sustained.
Dalal 2019 UK	Number of days with at least 10min/day activity HADS Anxiety and Depression Self-Care of Heart Failure Index (SCHFI) EQ-5D, HeartQoL Costs for each participant: £418.39 (464,42€)	Lack of blinding to the treatment 15% of data were missing for the primary outcome measure at follow-up. Some uncertainty related to adherence of each patient.

Figure 3.3. Adverse events reported in all included studies

Study	Total of adverse events	AV during exercise	AE outside of exercise period	Type of Adverse events
Babu, 2011, India	0	0	0	Not specified
Bernocchi, 2018, Italy	Hospitalizations: 58	No major side effects INT: 21 (11 CV, 6Resp, 5 others)	No major side effects CONT: 37 (25 CV, 11 Resp, 5 others)	Not specified
Chen, 2018, Taiwan	0	0	0	Not specified
Cowie, 2014, Scotland	9 withdrawals	4 withdrawals: -worsening of HF:2 worsening co-morbiditites: 2	HOSP: 3 withdrawals: -worsening of HF:2 -worsening of co-morbiditites: CONT: 2 withdrawals: -worsening of HF:1 -worsening comorbiditites: 1	Worsening of HF or co-morbidities
Hwang, 2017, Australia	0 major adverse events 8 minor adverse events: 3 angina, 3 diaphoresis, 2 palpitations	6 minor adverse events: 3 angina, 1 diaphoresis, 2 palpitations	2 minor adverse events: 2 diaphoresis	major adverse events: death, cardiac arrest, syncope, fall minor adverse events: angina, diaphoresis, palpitations

Lang, 2018, Scotland	11 hospitalizations	4 hospitalizations related to HF but considered unrelated to the study	7 hospitalizations 1 died related to HF shortly after 6M period follow-up	hospitalizations
Servantes, 2012, Brazil	0 major adverse events	0	0	Traumatic or cardiovascular events
Karapolat, 2009, Turkey	0 major adverse events	0	0	Not specified
Keast, 2013, Canada	6 adverse events reported by the patient	EXP: ankle pain:1; foot ulcer:1; increase in CHF symptoms:1 CONT: foot ulcer:1; pericarditis:1; increase in CHF symptoms:1		Adverse events reported by the patient
Piotrowicz, 2010, Poland	0 deaths or hospitalizations	No worrying symptoms	EXP: 3 paroxysmal AF CONT: 1 paroxysmal AF	Death, hospitalizations, changes in ECG
Piotrowicz, 2015, Poland	0 major events	Minor skin reactions due to electrodes	during unsupervised activity: EXP- 2, CONT- 1	Death, hospitalizations, changes in ECG, musculoskeletal injuries, need to discontinue rehabilitation cycle, intervention from CIEDs
Safiyari-Hafizi, 2016, Canada	0 adverse events	0 adverse events	Not mentioned	Not specified
Frederix, 2017, Belgium	23 rehospitalizations 1y after study termination	7 rehospitalizations – reasons: In-stent restenosis:1 Atypical thoracic pain: 1 Arrythmia: 2 Pericarditis: 1 PAD: 1	16 rehospitalizations – reasons: In-stent restenosis:1 ACS: 2 Stable angina: 6 Atypical thoracic pain: 2 Arrythmia: 1 AF ablation: 1 Resynchronization ther :1 PAD: 1	Rehospitalizations
Peng, 2018, China	“No adverse events were reported”	---	---	Not specified
Zielinska, 2006, Poland	“There were no serious side effects”	---	---	Not specified
Piotrowicz, 2019, Poland	0	0	2 deaths	1 non CV, 1 stroke
Dalal, 2019, Poland	37 (not related to the intervation)	0	8 deaths (4 Exp – 4 CONt) 68 hospitalizations (33 Exp – 35 CONt)	14 hospitalizations related to HF (4 Exp – 10 CONt)

Figure 4.1. Analysis of SF-36 (PCS) Outcome

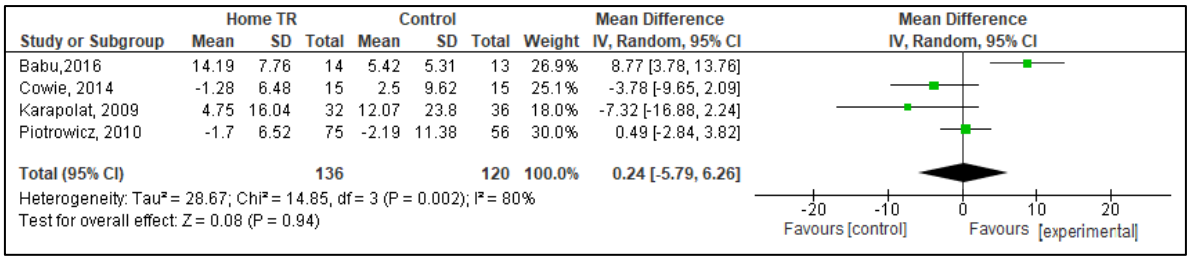

Figure 4.2. Analysis of SF-36 (MCS) Outcome

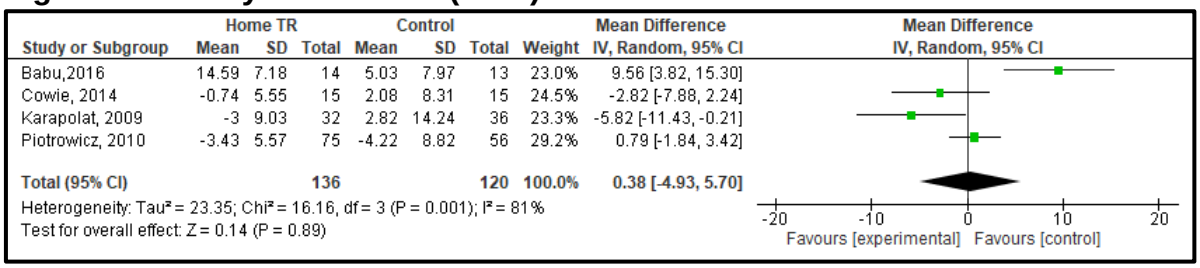

Figure 5.1. Subgroup analysis of heterogeneity for HF Classification considering 6MWT

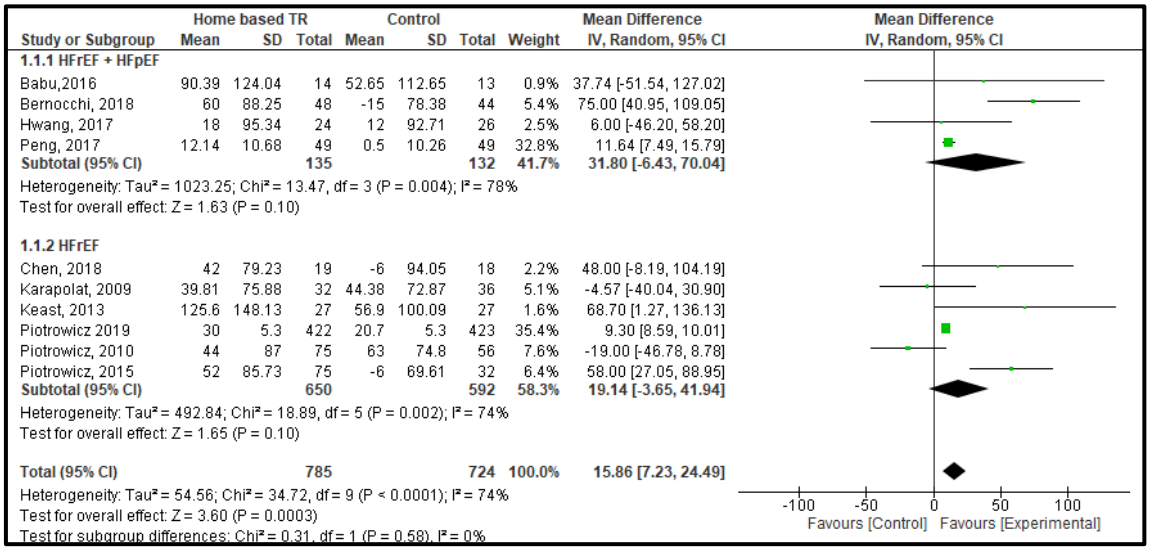

Figure 5.2. Subgroup analysis of heterogeneity for HF Classification considering QoL (MLHFQ)

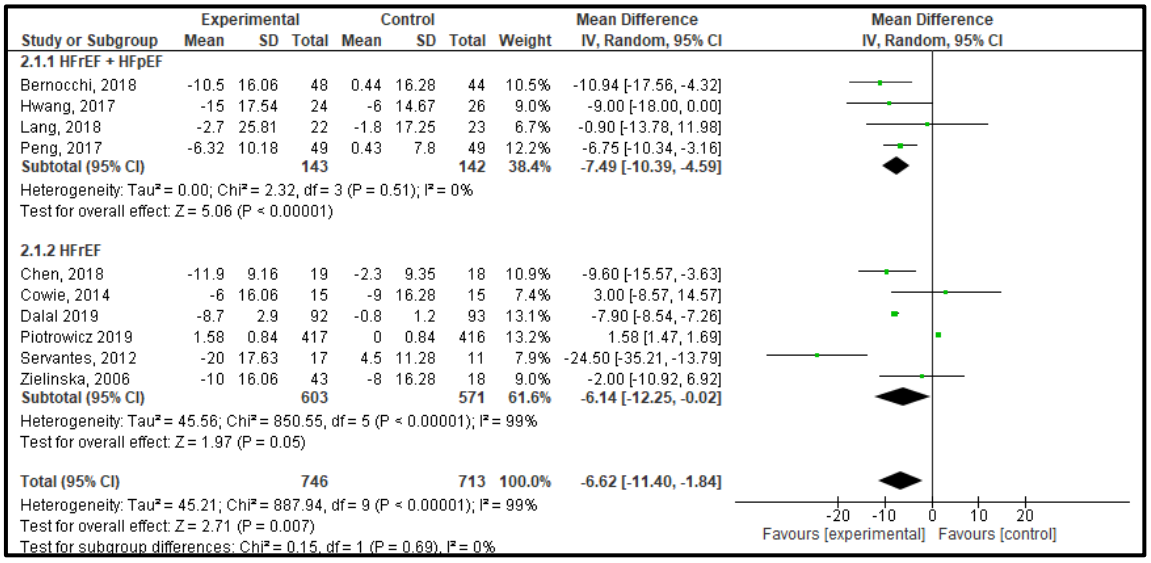

Figure 5.3. Subgroup analysis of heterogeneity for Bias Assessment considering 6MWT

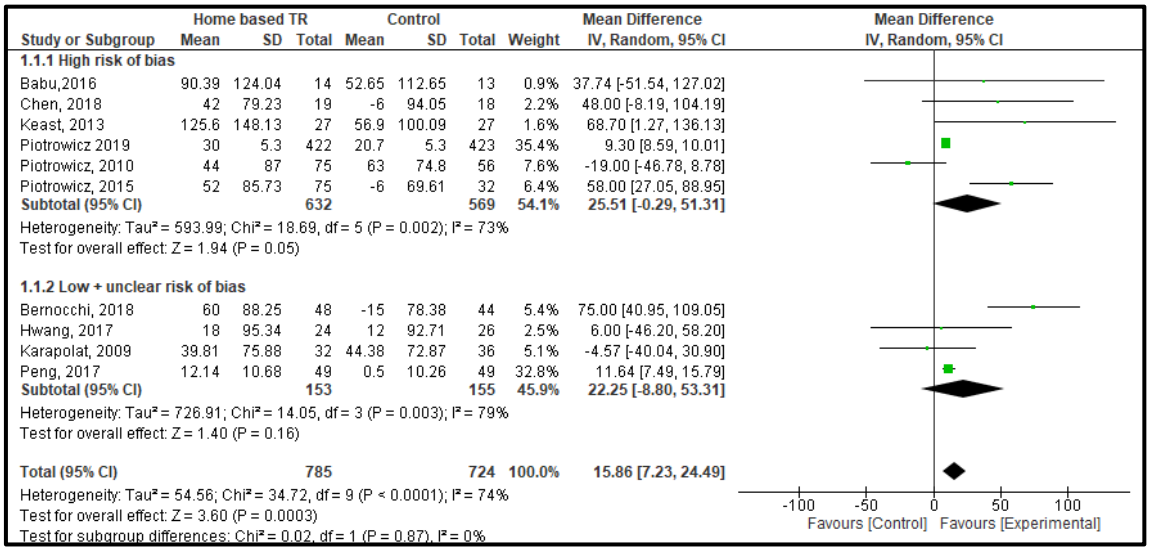

Figure 5.4. Subgroup analysis of heterogeneity for Bias Assessment considering Peak VO2

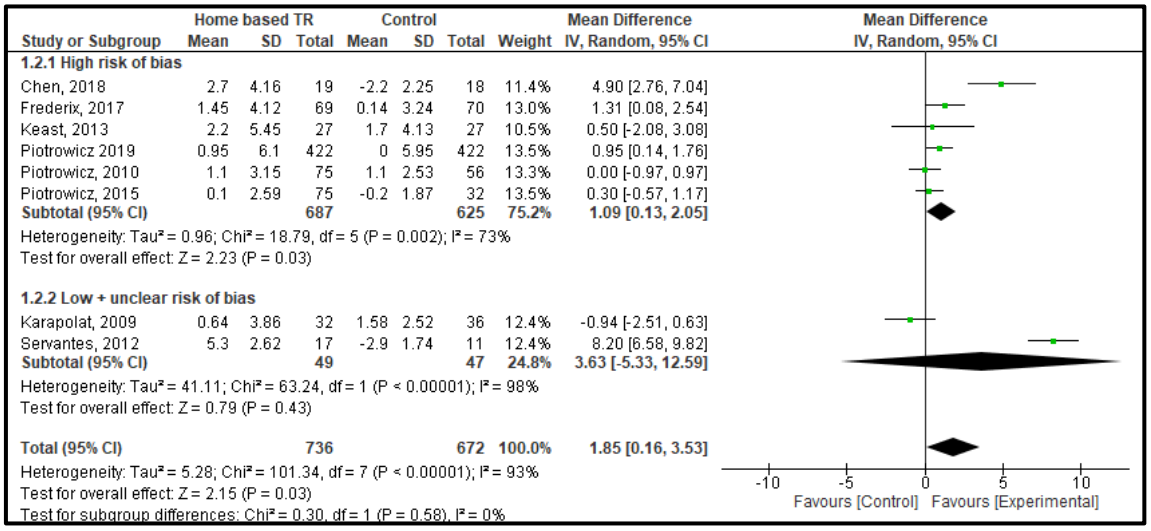

Figure 5.5. Subgroup analysis of heterogeneity for Bias Assessment considering QoL (MLHFQ)

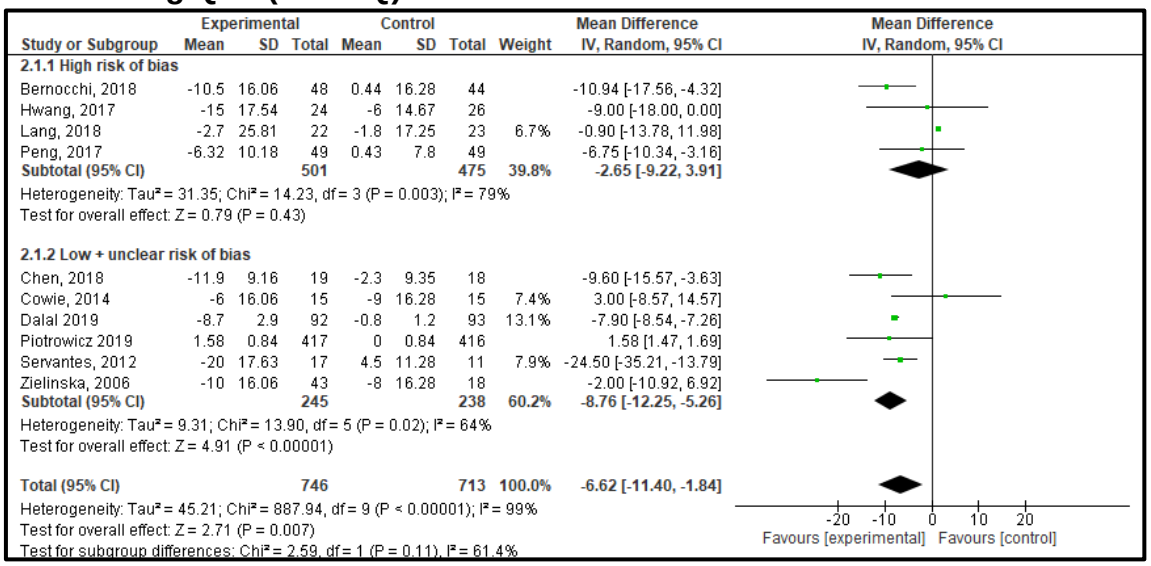

Figure 5.6. Subgroup analysis of heterogeneity for Presence of Telemonitoring considering 6MWT

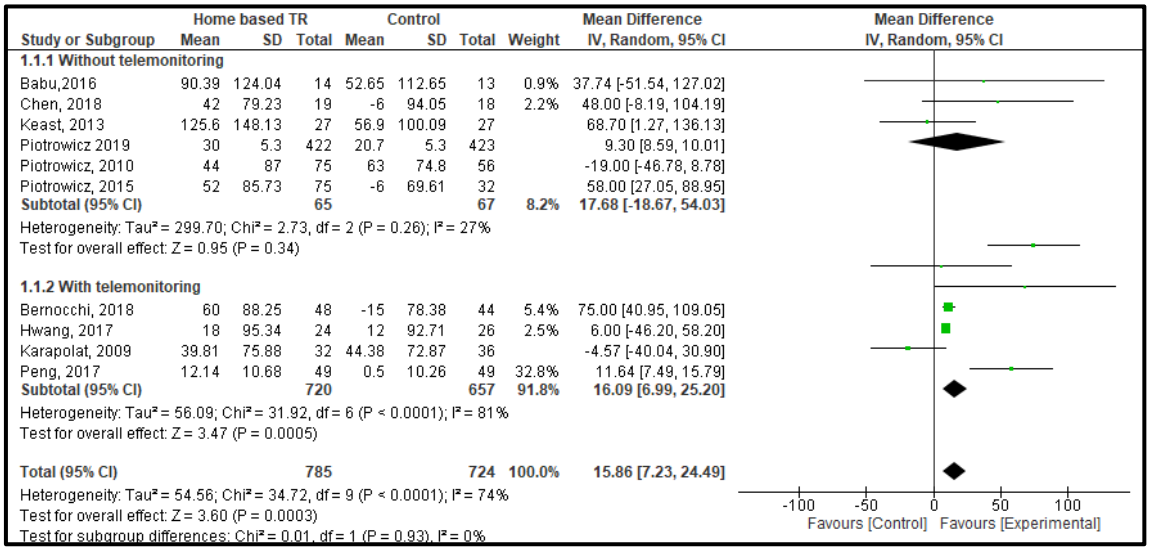

Figure 5.7. Subgroup analysis of heterogeneity for Presence of Telemonitoring considering Peak VO2

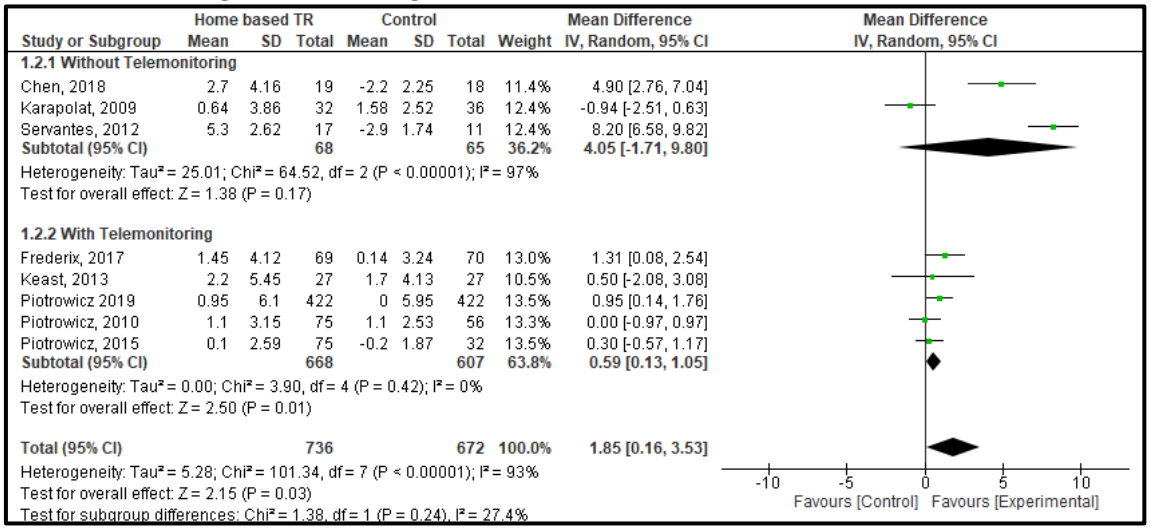

Figure 5.8. Subgroup analysis of heterogeneity for Presence of Telemonitoring considering QoL (MLHFQ)

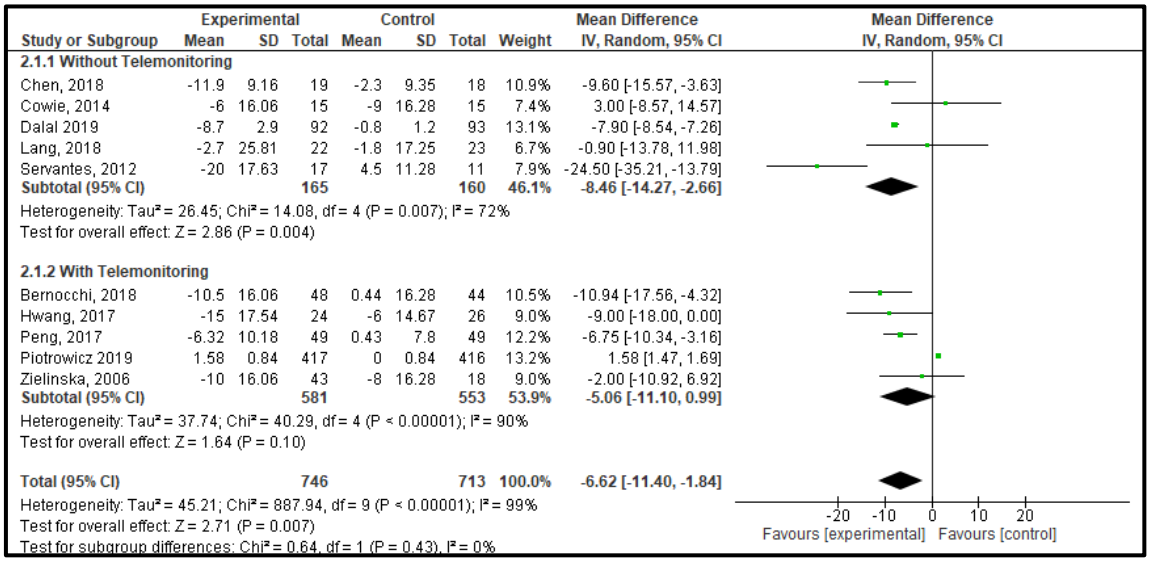

Figure 5.9. Subgroup analysis of heterogeneity for Follow-up Intensity considering 6MWT

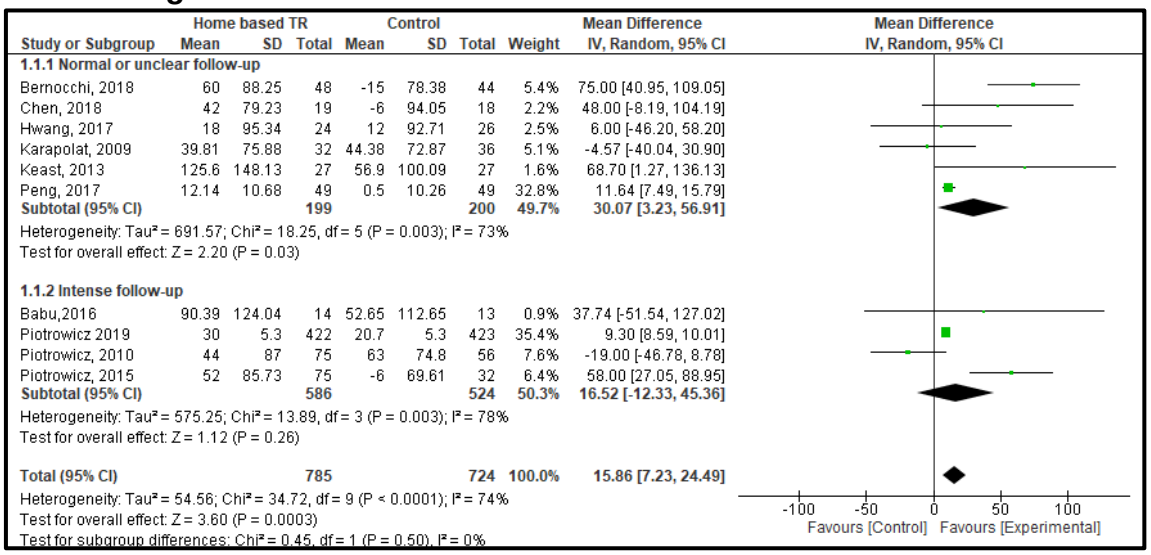

Figure 5.10. Subgroup analysis of heterogeneity for the Follow-up Intensity considering Peak VO2

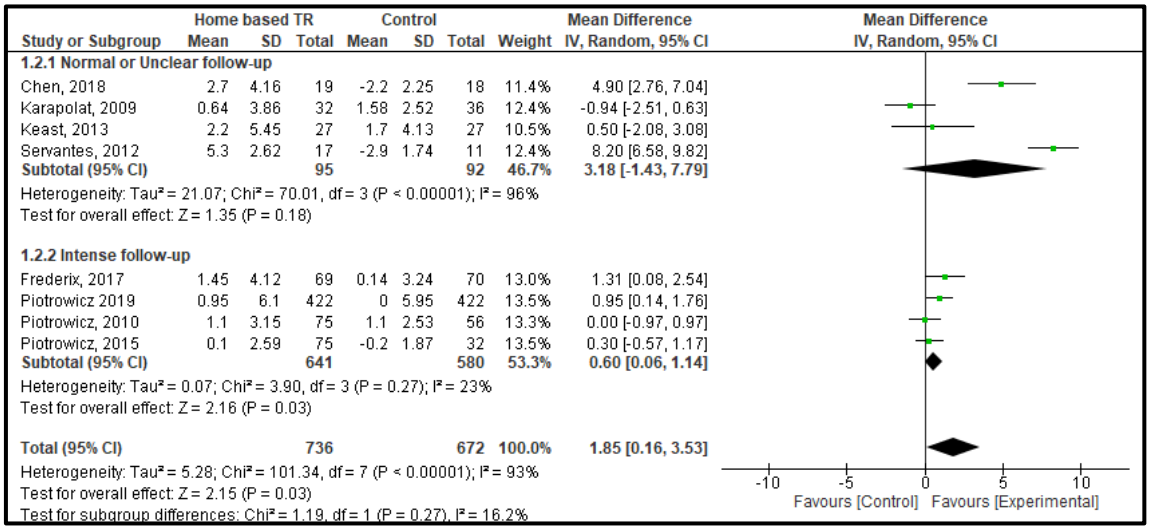

Figure 6.1. Home TR compared to Control for Adherence

Outcome: Adherence

Setting: Heart Failure; **Intervention**: Home TR; **Comparison**: Usual Care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Impact
Adherence to the intervention assessed with: attendance to sessions follow up: range 2 months to 26 months	2206 (17 RCTs)	⨁⨁◯◯ LOW [a,b,c]	Different definitions were used across the studies making impossible to perform a statistical analysis. According to that, in studies where adherence was defined as "attending to all sessions", rates varied from 70% to 100% in the intervention groups. Studies where adherence was defined as attendance to more than 80% of sessions, rates varied from 71% to 95% in experimental group. In all studies, authors considered that they obtained high rates of adherence.

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. We also analyzed the risk of intensive monitoring and feedback influence adherence to the intervention. For that topic, 8 studies were considered to have low risk, 2 were unclear and 5 had high risk.
b. Some studies had a intense follow up with daily or weekly calls which might lead to higher adherence rates
c. Four studies defined adherent as a patient who attend to more than 80% of sessions, while six studies assumed an adherent patient attended to all sessions. The rest of the studies didn't used any specific measure

Figure 6.2. Home TR compared to Control in Functional Capacity

Outcome: Functional Capacity ;

Setting: Heart Failure ; **Intervention**: Home TR ; **Comparison**: Usual Care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Anticipated absolute effects	
			Risk with Control	Risk difference with Home TR
Six-minute walk test (6MWT) assessed with: Patients are asked to walk as far as possible in 6 min along a flat corridor. The distance in meters is recorded follow up: range 2 months to 26 months	1509 (10 RCTs)	⨁⨁⨁◯ MODERATE [a,b]	The mean six-minute walk test was **20.7** m	MD **15.86 m more** (7.23 more to 24.49 more)
Peak VO2 (pVO2) assessed with: Cardiopulmonary exercise test follow up: range 2 months to 24 months	1408 (8 RCTs)	⨁◯◯◯ VERY LOW [a,c]	The mean peak VO2 was **-0.78** mL/kg/min	MD **1.85 mL/kg/min higher** (0.16 higher to 3.53 higher)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **MD:** Mean difference

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. All studies were classified as high risk for performance bias because all were non-blinded due to the natures of trials. Considering detection bias almost half of the studies were clasified as "unclear risk"
b. There is a important heterogeneity across studies (I2=75%) and one study wuth high weight showed results a lot different from the others.
c. There is an important heterogeneity across studies (I2=94%)

Figure 6.3. Home TR compared to Control in Quality of Life

Outcome: Quality of Life (HFRQL)

Setting: Heart Failure; **Intervention**: Home TR; **Comparison**: Usual Care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Anticipated absolute effects	
			Risk with Control	Risk difference with Home TR
Quality of Life (MLHFQ) assessed with: Minnesota Living With Heart Failure Questionnaire follow up: range 2 months to 26 months	1459 (10 RCTs)	⊕⊕⊕⊕ HIGH [a]	The mean quality of Life was **-2.25**	MD **6.62 lower** (11.4 lower to 1.84 lower)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **MD:** Mean difference

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. All studies were classified as high risk for performance bias because all were non-blinded due to the natures of trials. Considering detection bias, the most frequent classification was “unclear risk”.

Figure 6.4. Home TR compared to Control in Quality of Life (SF-36)

Outcome: Quality of Life (SF-36)

Setting: Heart Failure; **Intervention**: Home TR; **Comparison**: Usual Care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Anticipated absolute effects	
			Risk with Control	Risk difference with Home TR
Quality of Life (SF 36 - PCS) assessed with: 36-Item Short Form Survey follow up: range 2 months to 26 months	256 (4 RCTs)	⨁◯◯◯ VERY LOW [a,b,c]	The mean quality of Life was **0**	MD **0.24 higher** (5.79 lower to 6.26 higher)
Quality of Life (SF-36 MCS) assessed with: 36-Item Short Form Survey follow up: range 2 months to 26 months	256 (4 RCTs)	⨁◯◯◯ VERY LOW [a,b,d]	The mean quality of Life was **0**	MD **0.38 higher** (4.93 lower to 5.7 higher)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **MD:** Mean difference

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. All studies were classified as high risk for performance bias because all were non-blinded due to the natures of trials. Considering detection bias, the most frequent classification was “unclear risk”.
b. 2 studies showed an small improvement in physical score but 1 showed an important decrease
c. The lack of effects on patients evaluation of his/hers physical function might be explain by the shorter period of follow-up because it takes some time for patient to note these changes
d. The lack of effects on patients evaluation of his/hers mental function might be explain by the shorter period of follow-up because it takes some time for patient to note these changes

Figure 6.5. Home TR compared to Control for Safety

Outcome: Safety

Setting: Heart Failure; **Intervention**: Home TR; **Comparison**: Usual Care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Impact
Safety of Home Cardiac Telerehabilitation (Safety) assessed with: reported events follow up: range 2 months to 26 months	2206 (17 RCTs)	⨁⨁⨁⨁ HIGH [a,b]	Considering safety outcomes, none trial used a specific measure to evaluate the safety of training program (most of them only reported clinical adverse). In spite of this high imprecision, in all trials, authors concluded physical programmes were safe because the majority of clinical events were minor and not exercise related.

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. All of the trials showed they were safe because the majority of clinical events were minor and not exercise related.
b. Considering safety outcomes, none trial used a specific measure to evaluate the safety of training program. Most of them only reported clinical adverse events but two didn't mention that topic.

Figure 6.6. Home TR compared to Control for Cost-analysis

Outcome: Cost-analysis

Setting: Heart Failure; **Intervention**: Home TR; **Comparison**: Usual Care

Outcomes	№ of participants (studies) Follow up	Certainty of the evidence (GRADE)	Impact
Cost-analysis (Costs) assessed with: cost per patient follow up: range 2 months to 26 months	(4 RCTs)	⨁◯◯◯ VERY LOW [a,b]	Two studies calculated a total cost per patient in intervention and control group. One reported a cost of 3252€ and 4140€, respectively, saving 888€ per patient with telerehabilitation program and other presented a cost of 2325€ in telerehabilitation group and 3915€ in controls, leading to a save of 1590€ saving per patient with telerehabilitation. Two studies only reported the cost per patient in telerehabilitation group: one reported a 370,59€ cost and the second a 462,42€ cost per patient in telerehabilitation program.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

a. studies showed very different values of cost per patient (one calculated a cost per patient 3252€ for intervention, and the other calculated a cost of 370,59€ per patient; b. Authors didn't clarify what topics were included in this analysis

Figure 7.1. Sensitivity Analysis of heterogeneity for 6MWT Outcome

6MWT		
Studies included	**Mean Difference (95%IC)**	**I^2 (%)**
Without Babu	15.74 [6.99, 24.49]	77
Without Bernocchi	11.58 [4.81, 18.36]	**61**
Without Chen	15.05 [6.41, 23.70]	76
Without Hwang	16.27 [7.39, 25.15]	77
Without Karapolat	17.07 [8.12, 26.02]	77
Without Keast	14.81 [6.35, 23.27]	75
Without Peng	26.66 [4.90, 48.42]	76
Without Piotrowicz 2010	18.20 [9.57, 26.83]	74
Without Piotrowicz 2015	12.34 [4.62, 20.06]	**68**
Without Piotrowicz 2019	27.05 [5.48, 48.63]	75
All	15.86 [7.23, 24.49]	74

Table 7.2. Sensitivity Analysis of heterogeneity for Peak VO2 Outcome

Peak VO2		
Studies included	**Mean Difference (95%IC)**	**I^2 (%)**
Without Chen	1.45 [-0.28, 3.18]	93
Without Frederix	1.94 [-0.02, 3.89]	94
Without Karapolat	2.24 [0.42, 4.07]	94
Without Keast	2.01 [0.19, 3.83]	94
Without Piotrowicz 2010	2.14 [0.17, 4.11]	94
Without Piotrowicz 2015	2.10 [0.06, 4.14]	94
Without Piotrowicz 2019	2.00 [-0.12, 4.12]	94
Without Servantes	**0.85 [-0.33, 2.04]**	**78**
All	1.85 [0.16, 3.53]	93

Table 7.3. Sensitivity Analysis of heterogeneity for QoL Outcome

QoL (MLHFQ)		
Studies included	**Mean Difference (95%IC)**	**I^2 (%)**
Without Bernocchi	-6.11 [-11.15, -1.07]	99
Without Chen	-6.25 [-11.31, -1.19]	99
Without Cowie	-7.39 [-12.37, -2.42]	99
Without Dalal	-6.45 [-11.82, -1.08]	**90**
Without Hwang	-6.38 [-11.39, -1.37]	99
Without Lang	-7.03 [-11.99, -2.08]	99
Without Peng	-6.60 [-11.72, -1.48]	99
Without Piotrowicz 2019	-7.97 [-10.75, -5.19]	**53**
Without Servantes	-5.08 [-10.02, -0.15]	99
Without Zielinska	-7.08 [-12.10, -2.06]	99
All	-6.62 [-11.40, -1.84]	99

Table 7.4. Sensitivity Analysis of heterogeneity for SF-36 Score

QoL (SF-36 PCS)		
Studies included	**Mean Difference (95%IC)**	**I^2 (%)**
Without Babu	**-2.05 [-6.23, 2.13]**	**40**
Without Cowie	1.49 [-6.02, 8.99]	83
Without Karapolat	1.90 [-4.57, 8.37]	83
Without Piotrowicz 2010	-0.30 [-10.41, 9.82]	86
All	0.24 [-5.79, 6.26]	80
QoL (SF-36 MCS)		
Studies included	**Mean Difference (95%IC)**	**I^2 (%)**
Without Babu	**-2.01 [-6.00, 1.98]**	**61**
Without Cowie	1.44 [-5.63, 8.52]	86
Without Karapolat	2.25 [-3.61, 8.11]	81
Without Piotrowicz 2010	0.26 [-8.66, 9.18]	88
All	0.38 [-4.93, 5.70]	81