Supplementary Appendix

Effects of Exercise-Based Cardiac Rehabilitation Delivery Modes on Chronic Heart Failure：A Systematic Review and Network Meta-Analysis

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Appendix 1: PRISMA NMA Checklist

Section/Topic	Item #	Checklist Item	Reported on Page #
TITLE			
Title	1	Identify the report as a systematic review *incorporating a network meta-analysis (or relatedform ofmeta-analysis)*.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: **Background:** main objectives **Methods:** data sources; study eligibility criteria, participants, and interventions; study appraisal; and *synthesis methods, such as network meta-analysis.* **Results:** number of studies and participants identified; summary estimates with corresponding confidence/credible intervals; *treatment rankings may also be discussed. Authors may choose to summarize pairwise comparisons against a chosen treatment included in their analysesfor brevity.* **Discussion/Conclusions:** limitations; conclusions and implications of findings. **Other:** primary source of funding; systematic review registration number with registry name.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known*, including mention ofwhy a network meta-analysis has been conducted._*	***4***
Objectives	4	Provide an explicit statement of questions being addressed, with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists and if and where it can be accessed (e.g., Web address); and, if available, provide registration information, including registration number.	5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. *Clearly describe eligible treatments included in the treatment network, and note whether any have been clustered or merged into the same node (withjustification)._*	***5***
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	6
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	7

Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	7
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	7
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	7
Geometry of the network	**S1**	Describe methods used to explore the geometry of the treatment network under study and potential biases related to it. This should include how the evidence base has been graphically summarized for presentation, and what characteristics were compiled and used to describe the evidence base to readers.	*7*
Risk of bias within individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	7
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means). *Also describe the use of additional summary measures assessed, such as treatment rankings and surface under the cumulative ranking curve (SUCRA) values, as well as modified approaches used to present summary findings from meta-analyses.*	7
Planned methods of analysis	14	Describe the methods of handling data and combining results of studies for each network meta-analysis. This should include, but not be limited to: . *Handling of multi-arm trials;* . *Selection of variance structure;* . *Selection of prior distributions in Bayesian analyses; and* . *Assessment of model fit.*	7
Assessment of Inconsistency	**S2**	Describe the statistical methods used to evaluate the agreement of direct and indirect evidence in the treatment network(s) studied. Describe efforts taken to address its presence when found.	7
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	**7**
Additional analyses	16	Describe methods of additional analyses if done, indicating which were pre-specified. This may include, but not be limited to, the following: . Sensitivity or subgroup analyses; . Meta-regression analyses; . *Alternative formulations of the treatment network; and* . *Use of alternative prior distributions for Bayesian analyses (if applicable).*_	9
RESULTS†			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9
Presentation of network structure	**S3**	Provide a network graph of the included studies to enable visualization of the geometry of the treatment network.	***Appendix 4***
Summary of network geometry	**S4**	Provide a brief overview of characteristics of the treatment network. This may include commentary on the abundance of trials and randomized	***9***

		patients for the different interventions and pairwise comparisons in the network, gaps of evidence in the treatment network, and potential biases reflected by the network structure.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	10
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment.	Appendix 4
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: 1) simple summary data for each intervention group, and 2) effect estimates and confidence intervals. *Modified approaches may be needed to deal with information from larger networks.*	***Appendix3***
Synthesis of results	21	Present results of each meta-analysis done, including confidence/credible intervals. *In larger networks, authors may focus on comparisons versus a particular comparator (e.g. placebo or standard care), with full findings presented in an appendix. League tables and forest plots may be considered to summarize pairwise comparisons.* If additional summary measures were explored (such as treatment rankings), these should also be presented.	11
Exploration for inconsistency	**S5**	Describe results from investigations of inconsistency. This may include such information as measures of model fit to compare consistency and inconsistency models, *P* values from statistical tests, or summary of inconsistency estimates from different parts of the treatment network.	***11***
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies for the evidence base being studied.	Appendix 4
Results of additional analyses	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression analyses*, alternative network geometries studied, alternative choice of prior distributions for Bayesian analyses,* and so forth).	***11***
DISCUSSION			
Summary of evidence	24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy-makers).	15
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias). *Comment on the validity of the assumptions, such as transitivity and consistency. Comment on any concerns regarding network geometry (e.g., avoidance of certain comparisons).*	16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. This should also include information regarding whether funding has been received from manufacturers of treatments in the network and/or whether some of the authors are content experts with professional conflicts of interest that could affect use of treatments in the network.	

Appendix 2: Search strategy

Table S1. Search strategy of PubMed

#	Searches
1	((((((((((((Heart failure[MeSH Terms]) OR (Cardiac Failure[Title/Abstract])) OR (Heart Decompensation[Title/Abstract])) OR (Decompensation, Heart[Title/Abstract])) OR (Heart Failure, Right -Sided[Title/Abstract])) OR (Heart Failure, Right Sided[Title/Abstract])) OR (Right-Sided Heart Failure[Title/Abstract])) OR (Right Sided Heart Failure[Title/Abstract])) OR (Myocardial Failure[Title/Abstract])) OR (Congestive Heart Failure[Title/Abstract])) OR (Heart Failure, Congestive[Title/Abstract])) OR (Heart Failure, Left-Sided[Title/Abstract])) OR (Heart Failure, Left Sided[Title/Abstract])) OR (Left-Sided Heart Failure[Title/Abstract])) OR (Left Sided Heart Failure[Title/Abstract])
2	(((((((Cardiac Rehabilitation[MeSH Terms]) OR (Cardiac Rehabilitations[Title/Abstract])) OR (Rehabilitation, Cardiac[Title/Abstract])) OR (Rehabilitations, Cardiac[Title/Abstract])) OR (Cardiovascular Rehabilitation[Title/Abstract])) OR (Cardiovascular Rehabilitations[Title/Abstract])) OR (Rehabilitation, Cardiovascular[Title/Abstract])) OR (Rehabilitations, Cardiovascular[Title/Abstract])
3	((((((((((((((((((((((((exercise[MeSH Terms]) OR (Exercises[Title/Abstract])) OR (Physical Activity[Title/Abstract])) OR (Activities, Physical[Title/Abstract])) OR (Activity, Physical[Title/Abstract])) OR (Physical Activities[Title/Abstract])) OR (Exercise, Physical[Title/Abstract])) OR (Exercises, Physical[Title/Abstract])) OR (Physical Exercise[Title/Abstract])) OR (Physical Exercises[Title/Abstract])) OR (Acute Exercise[Title/Abstract])) OR (Acute Exercises[Title/Abstract])) OR (Exercise, Acute[Title/Abstract])) OR (Exercises, Acute[Title/Abstract])) OR (Exercise, Isometric[Title/Abstract])) OR (Exercises, Isometric[Title/Abstract])) OR (Isometric Exercises[Title/Abstract])) OR (Isometric Exercise[Title/Abstract])) OR (Exercise, Aerobic[Title/Abstract])) OR (Aerobic Exercise[Title/Abstract])) OR (Aerobic Exercises[Title/Abstract])) OR (Exercises, Aerobic[Title/Abstract])) OR (Exercise Training[Title/Abstract])) OR (Exercise Trainings[Title/Abstract])) OR (Training, Exercise[Title/Abstract])) OR (Trainings, Exercise[Title/Abstract])
4	#1 AND #2 AND #3

Appendix 3: Characteristics of included studies

Table 3.1: Baseline of characteristics of included studies

Study ID	Country	Method	Sample size (T/C)	Age (Year, T/C)	types	Intervention		Duration （M）	Outcomes
Corvera-Tindel 2004[17]	USA	Single center	42/37	63.8±10.1/61.3±11.1	HFrEF	CBCR(AE)	UC	3	②⑤
Peng 2018[18]	China	Single center	49/49	≤60 14 ＞60 35/ ≤60 16 ＞60 33	HFrEF	HBCR(AE+RE)	UC	2	②③
Chien 2011[19]	Taiwan, China	Single center	24/27	59/29	HFrEF	HBCR(AE+RE)	UC	2	①②
Oka 2000[20]	USA	Single center	20/20	-/-	HFrEF	HBCR(AE+RE)	UC	3	⑤
Piotrowicz 2019[21]	Poland	Multicenter	425/425	62.6/62.2	HFrEF	HBCR(AE+RE)	UC	2	②⑤⑥
Dracup 2007[22]	USA	Multicenter	86/87	53.3±12.7/54.6±12.5	HFrEF	HBCR(AE+RE)	UC	12	①②⑤⑥
Piotrowicz 2010[23]	Poland	Single center	75/56	56.4±10.9/60.5±8.8	HFrEF	CTR(AE+RE)	CBCR(AE+RE)	2	②⑤⑥
O'Connor 2009[24]	USA	Multicenter	1159/1172	59.2/59.3	HFrEF	CBCR(AE)	UC	3	②⑤⑥
Hambrecht 2000[25]	Germany	Single center	36/37	-/-	HFrEF	CBCR(AE)	UC	6	③④⑤
Hwang 2017[26]	Australia	Single center	24/29	68/67	HFrEF	CTR(AE)	CBCR(AE)	3	①②
Conraads 2004[27]	Belgium	Single center	27/22	59±2/59±2	HFrEF	CBCR(AE+RE)	UC	4	⑤
Belardinelli 1999[28]	Italy	Single center	50/49	56±7/53±9	HFrEF	CBCR(AE+RE)	UC	2	③④⑤
Hambrecht 1995[29]	Germany	Single center	12/10	50±12/52±8	HFrEF	CTR(AE)	UC	6	⑤
Du 2018[30]	Australia	Multicenter	67/65	62/58	HFrEF	HBCR(AE)	UC	6	①②
Chen 2018[31]	Taiwan, China	Single center	19/18	61±11/60±16	HFrEF	HBCR(AE)	UC	3	①②⑤
Dalal 2019[32]	UK	Multicenter	107/109	69.7/69.9	HFrEF	HBCR(AE)	UC	12	①
Piotrowicz 2015[33]	Poland	Single center	75/32	54.4±10.9/62.1±12.5	HFrEF	CTR(AE)	UC	2	①②⑤
Austin 2005[34]	UK	Single center	100/100	71.9/71.8	HFrEF	HCR(AE+RE)	UC	6	①②⑥
Willenheimer 2001[35]	Sweden	Single center	17/20	64±5/64±8	HFrEF	CBCR(AE)	UC	4	⑤
Kiilavuori 1996[36]	Finland	Single center	12/15	52±7/52±9	HFrEF	HBCR(AE)	UC	3	③⑤
Koukouvou 2004[37]	Greece	Single center	16/10	52.3/52.8	HFrEF	CBCR(AE)	UC	6	⑤
Giannuzzi 2003[38]	Italy	Multicenter	45/45	60±7/61±7	HFrEF	HCR(AE)	UC	6	②③
Xueyu 2017[39]	China	Single center	40/38	78/76	HFpEF	CTR(AE)	UC	3	②③
Karapolat 2009[40]	Turkey	Single center	37/37	45.16±13.58/44.05±11.49	HFrEF	CBCR(AE)	HBCR(AE)	2	②③④⑤
Chrysohoou 2015[41]	Athens	Single center	33/39	63±9/56±11	HFmrEF	CBCR(HIIT)	UC	3	①②③
Huang 2014[42]	Taiwan, China	Single center	33/33	60±3/56±4	HFrEF	CBCR(AE)	UC	2	⑤
Fayazi 2013[43]	Iran	Single center	30/30	60.86±9.004/61.76±9.00	HFrEF	HBCR(AE)	UC	2	①②
Brubaker 2009[44]	America	Single center	30/29	70.4±5.3/69.9±6.3	HFrEF	CBCR(AE)	UC	4	①②③
Nagatomi 2022[45]	Japan	Single center	15/15	59.8±10.0/67.7±11.9	HFrEF	CTR(AE+RE)	UC	3	②⑥

Lundgren 2023[46]	Norway	Multicenter	31/30	67.6±10.9/67.7±11.9	HFrEF	CTR(HIIT)	UC	3	②⑤
Kitzman 2021[47]	USA	Single center	175/174	73.1±8.5/72.2±7.7	HFrEF	HCR(AE+RE)	UC	3	②⑥
Yeh 2011[48]	USA	Single center	50/50	68.1±11.9/66.6±12.1	HFrEF	HBCR(AE)	UC	3	①②⑤
Yeh 2004[49]	USA	Single center	15/15	66 ± 12/61±14	HFrEF	HBCR(AE)	UC	3	①②⑤

NOTE: ①Minnesota Living with Heart Failure quality of life(MLHFQ)；②6-Minute Walk Test (6MWT)；③Left Ventricular Ejection Fraction (LVEF)；④Left Ventricular End-diastolic Diameter (LVEDD)；⑤Peak Oxygen uptake(Peak O_2)；⑥Readmission Rate

Center-based CR(HBCR) ;Home-based CR(HBCR);Tele-based CR(CTR);Combined CR(HCR);Aerobic Exercise(AE);Resistance Exercise(RE);High-Intensity Interval Training(HIIT)

Appendix 3: Characteristics of included studies

Table 3.2:Methodological quality evaluation of literature inclusion

Study ID	Random sequence generation	Allocation concealment	Participant blinding	Assessment blinding	Incomplete outcome data	Selective reporting	Other bias	The overall risk of bias
Corvera-Tindel 2004	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk	A
Peng 2018	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk	A
Chien 2011	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Oka 2000	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Piotrowicz 2019	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Dracup 2007	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Piotrowicz 2010	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
O'Connor 2009	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Hambrecht 2000	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Hwang 2017	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	Low risk	B
Conraads 2004	High risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	C
Belardinelli 1999	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Hambrecht 1995	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Du 2018	Low risk	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	A
Chen 2018	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	A
Dalal 2019	Low risk	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	A
Piotrowicz 2015	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Austin 2005	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Willenheimer 2001	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Kiilavuori 1996	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Koukouvou 2004	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Giannuzzi 2003	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Xueyu 2017	Low risk	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	A
Karapolat 2009	Low risk	Low risk	Unclear risk	Unclear risk	Low risk	Low risk	Low risk	A
Chrysohoou 2015	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Huang 2014	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Fayazi 2013	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Brubaker 2009	Low risk	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	A
Nagatomi 2022	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Lundgren 2023	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B
Kitzman 2021	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	Low risk	B
Yeh 2011	Low risk	Low risk	High risk	Low risk	Low risk	Low risk	Low risk	B
Yeh 2004	Low risk	Low risk	High risk	High risk	Low risk	Low risk	Low risk	B

Appendix 3: Characteristics of included studies
Table 3.3:Loop inconsistency test

O	Loop	IF	P value	95％CI down,up
6MWT	A-D-K	0.489	0.442	(0.00,1.74)
	A-F-K	0.416	0.525	(0.00,1.70)
LVEF	A-D-G	0.632	0.137	(0.00,1.47)
Peak VO2	A-C-H	0.633	0.519	(0.00,2.56)

Appendix 4: Risk of bias of randomized clinical trials

Figure 4.1 Flow chart of the search for eligible studies

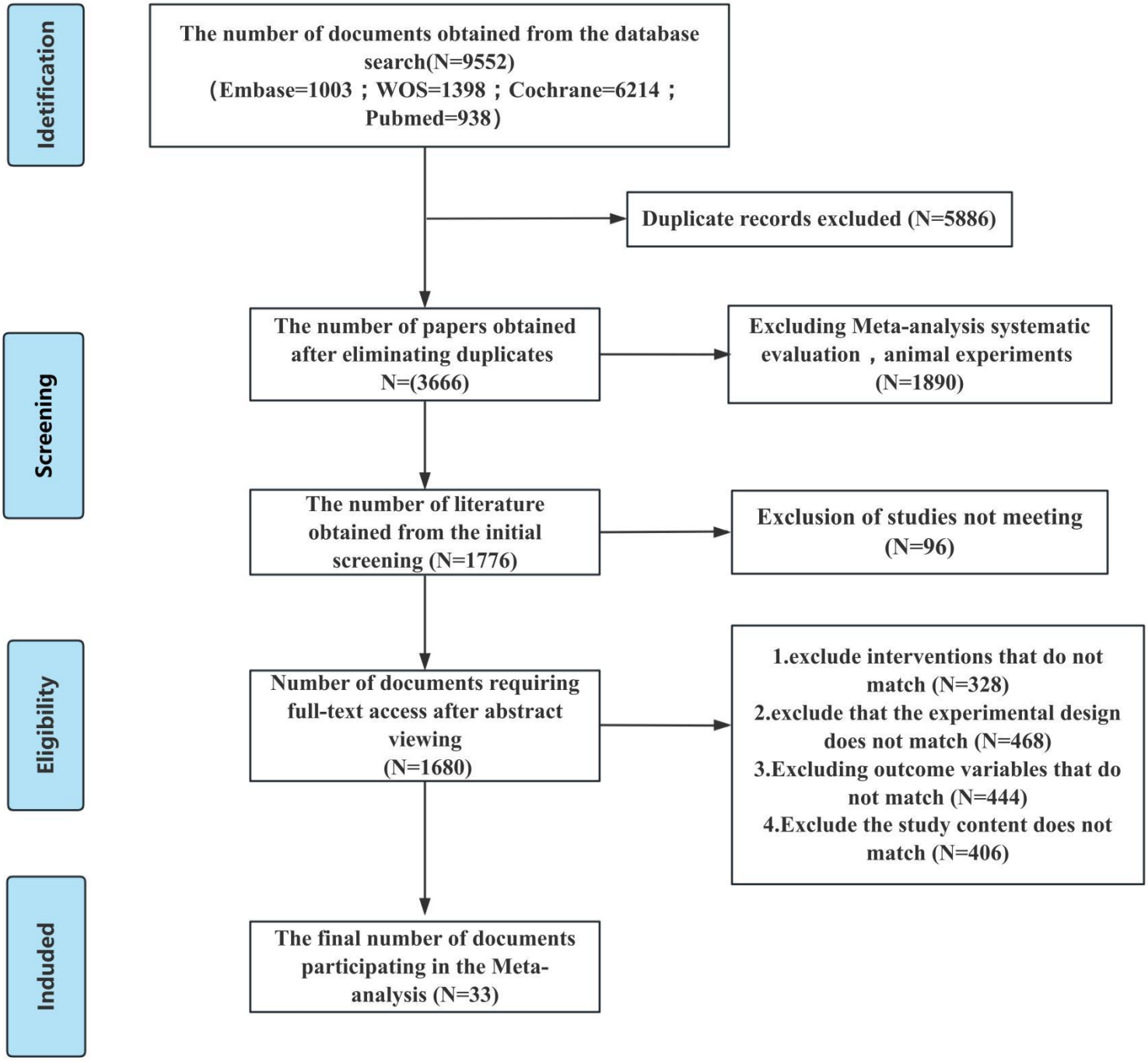


Figure 4.2: Overall risk of bias presented as percentage of each risk of bias item across all included studies.

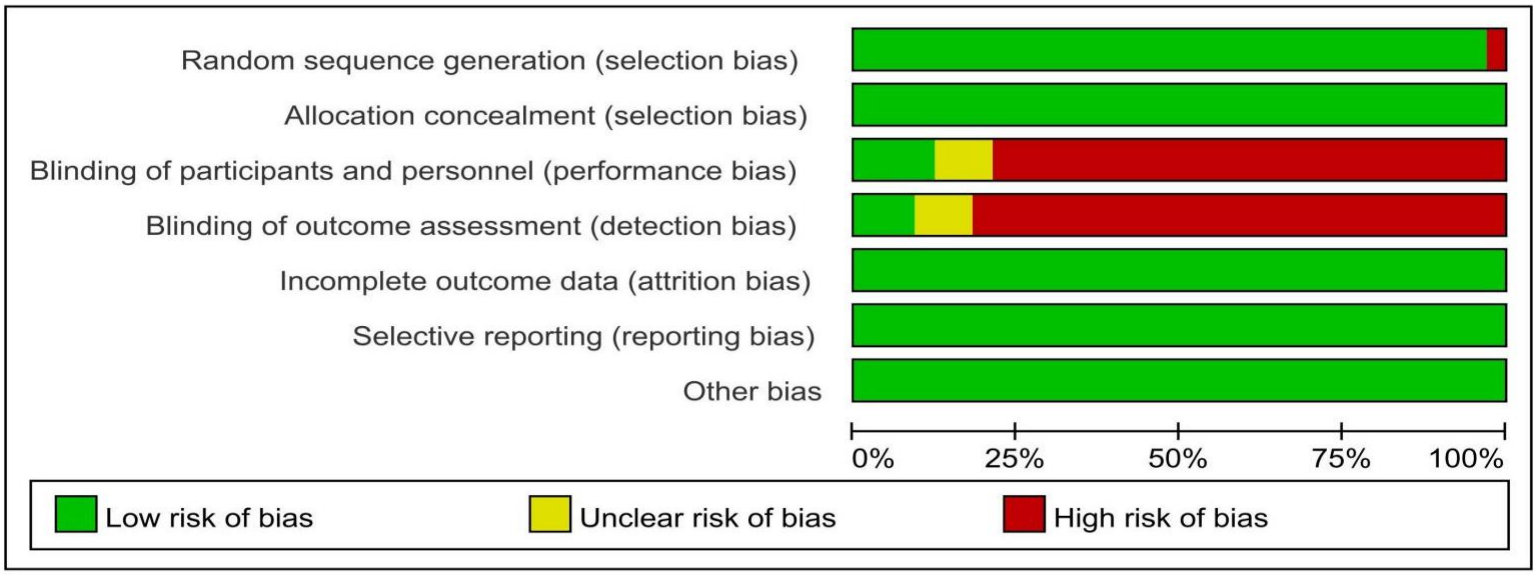


Figure 4.3:Risk of bias summary.

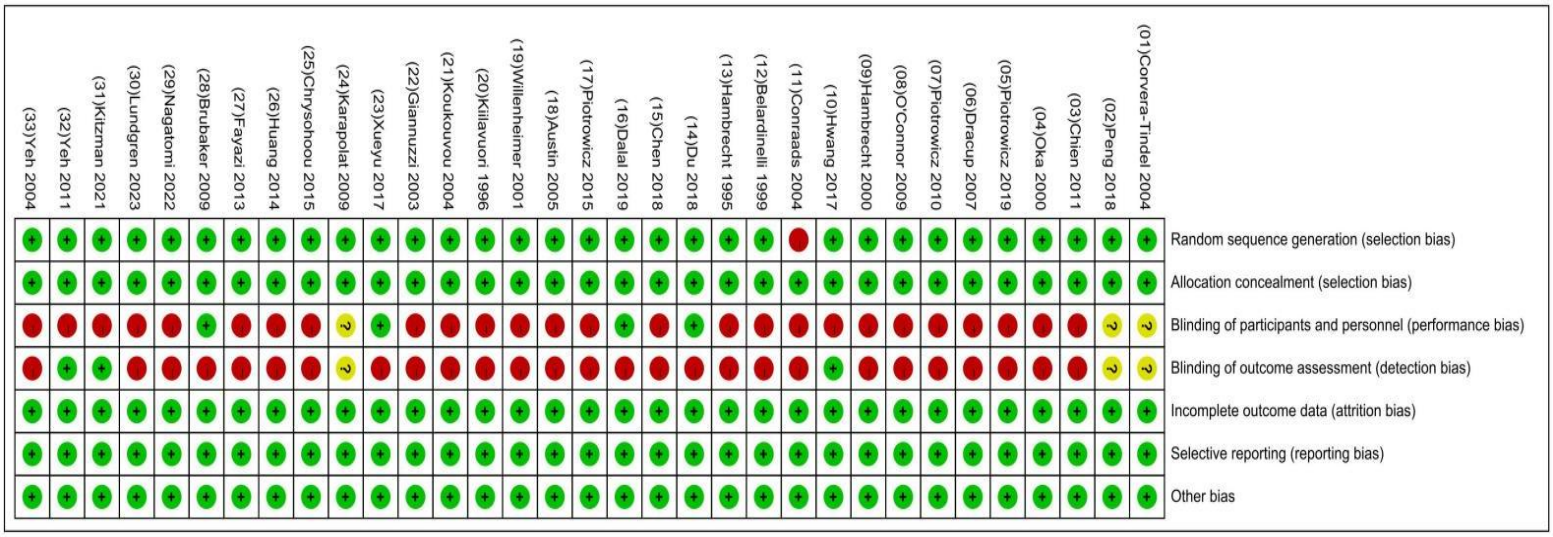
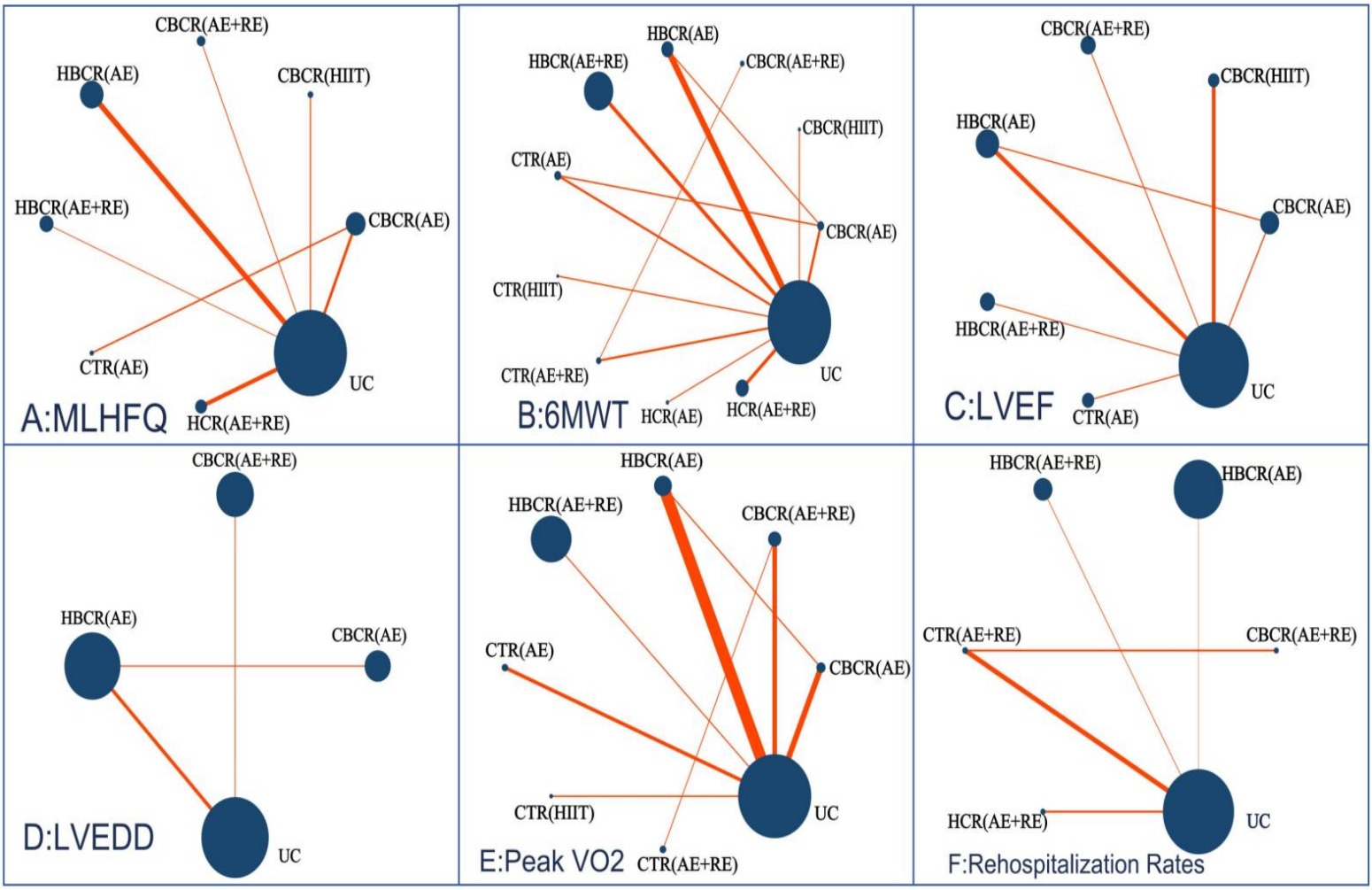


Figure 4.4:Network plot for different interventions.



NOTE: ①Minnesota Living with Heart Failure quality of life(MLHFQ)；②6-Minute Walk Test (6MWT)；③Left Ventricular Ejection Fraction (LVEF)；④Left Ventricular End-diastolic Diameter (LVEDD)；⑤Peak Oxygen uptake(Peak O2)；⑥Readmission Rate Center-based CR(HBCR) ;Home-based CR(HBCR);Tele-based CR(CTR);Combined CR(HCR);Aerobic Exercise(AE);Resistance Exercise(RE);High-Intensity Interval Training(HIIT)

Figure 4.5:The results of network meta-analysis.

A:MLHFQ

CBCR(AE)							
-1.27 (-25.42, 22.7)	CBCR(HIIT)						
-5.16 (-28.64, 18.34)	-3.91 (-32.88, 25.23)	CBCR(AE+RE)					
5.26 (-11.05, 22.82)	6.54 (-16.74, 31.2)	10.41 (-12.39, 34.49)	HBCR(AE)				
3.93 (-20.64, 28.61)	5.16 (-24.65, 35.15)	9.08 (-20.12, 38.45)	-1.38 (-26.43, 22.6)	HBCR(AE+RE)			
-0.94 (-24.19, 22.08)	0.29 (-33.01, 33.4)	4.21 (-28.86, 36.98)	-6.28 (-35.67, 21.75)	-4.89 (-38.74, 28.7)	CTR(AE)		
8.73 (1.98, 32.15)	**10.01 (19.54, 38.71)**	**13.9 (1.52, 42.19)**	**3.5 (12.88,26.27)**	**4.83 (1,34.04)**	**9.7 (1.15, 42.67)**	HCR(AE+RE)	
-5.26 (-17.28, 6.7)	-3.99 (-24.76, 16.73)	-0.1 (-20.31, 20.05)	-10.53 (-23.11, 0.84)	-9.18 (-30.63, 12.05)	-4.31 (-30.2, 21.89)	-13.99 (-34.03, 6.3)	UC

B:6MWT

CBCR(AE)									
1.03 (0.14,7.83)	CBCR(HIIT)								
0.56 (0.04,8.85)	0.54 (0.02,12.55)	CBCR (AE+RE)							
1.15 (0.39,3.41)	1.12 (0.16,7.72)	2.05 (0.14,30.12)	HBCR(AE)						
1.48 (0.40,5.44)	1.43 (0.20,10.44)	2.62 (0.17,40.10)	1.28 (0.40,4.08)	HBCR (AE+RE)					
1.70 (0.50,5.73)	1.64 (0.20,13.17)	3.01 (0.18,49.39)	1.47 (0.41,5.26)	1.15 (0.29,4.62)	CTR(AE)				
1.66 (0.22,12.66)	1.61 (0.13,20.10)	2.95 (0.13,68.24)	1.44 (0.21,10.04)	1.13 (0.15,8.28)	0.98 (0.12,7.90)	CTR (HIIT)			
0.56 (0.07,4.72)	0.54 (0.04,7.35)	1.00 (0.17,5.77)	0.49 (0.06,3.76)	0.38 (0.05,3.09)	0.33 (0.04,2.93)	0.34 (0.02,4.60)	CTR (AE+RE)		
0.88 (0.12,6.57)	0.85 (0.07,10.45)	1.55 (0.07,35.58)	0.76 (0.11,5.20)	0.59 (0.08,4.29)	0.52 (0.06,4.10)	0.53 (0.04,6.54)	1.55 (0.12,20.82)	HCR(AE)	
0.01 (0.00,0.03)	0.00 (0.00,0.04)	0.01 (0.00,0.16)	0.00 (0.00,0.02)	0.00 (0.00,0.02)	0.00 (0.00,0.02)	0.00 (0.00,0.03)	0.01 (0.00,0.09)	0.01 (0.00,0.05)	HCR(AE+RE)
2.11 (0.81,5.52)	2.05 (0.34,12.16)	3.75 (0.28,49.62)	1.83 (0.86,3.89)	1.43 (0.59,3.46)	1.25 (0.42,3.65)	1.27 (0.21,7.62)	3.75 (0.56,25.00)	2.42 (0.41,14.21)	**421.73 (112.63,1579.08)**	UC

C:LVEF

CBCR(AE)						
0.00 (0.00,0.01)	CBCR(HIIT)					
0.30 (0.00,19.65)	3672.34 (27.25,494842.47)	CBCR (AE+RE)				
1.55 (0.12,20.22)	18904.04 (280.23,1.28e+06)	5.15 (0.10,261.41)	HBCR(AE)			
0.61 (0.01,39.54)	7397.46 (54.94,995965.69)	2.01 (0.02,212.96)	0.39 (0.01,19.85)	HBCR (AE+RE)		
0.58 (0.01,37.92)	7060.06 (52.22,954458.00)	1.92 (0.02,204.13)	0.37 (0.01,19.04)	0.95 (0.01,101.25)	CTR(AE)	
0.60 (0.05,7.85)	7330.82 (194.36,276501.13)	2.00 (0.07,53.92)	0.39 (0.05,3.28)	0.99 (0.04,26.74)	1.04 (0.04,28.19)	UC

D:LVEDD

CBCR(AE)			
0.85 (0.40,1.81)	CBCR(AE+RE)		
0.99 (0.61,1.59)	1.16 (0.65,2.09)	HBCR(AE)	
0.94 (0.49,1.79)	1.10 (0.74,1.64)	0.95 (0.61,1.46)	UC

E:Peak VO2

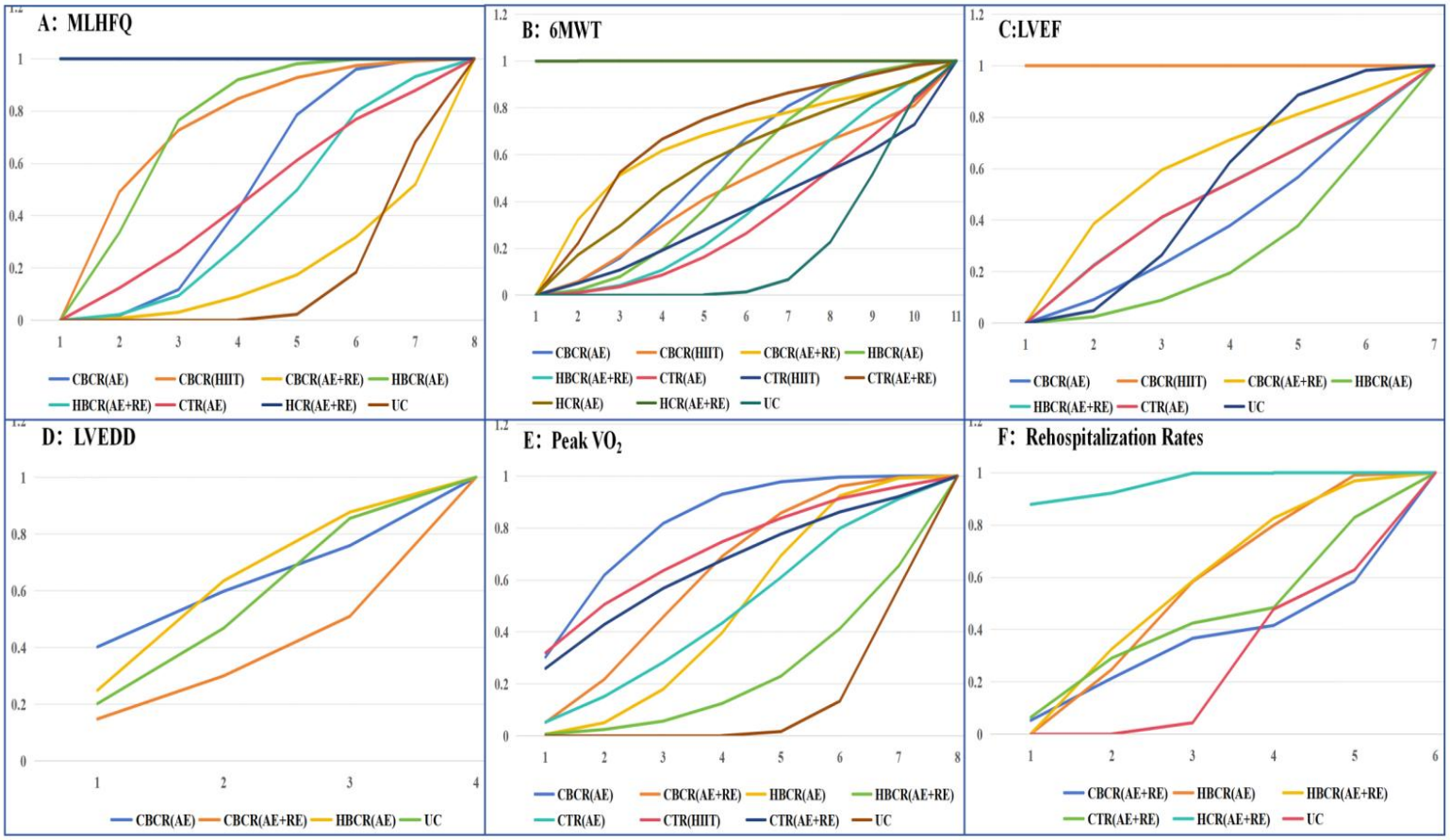
CBCR(AE)							
1.48 (0.46,4.78)	CBCR(AE+RE)						
1.92 (0.81,4.55)	1.30 (0.46,3.65)	HBCR(AE)					
3.21 (0.91,11.31)	2.17 (0.58,8.11)	1.67 (0.54,5.17)	HBCR(AE+RE)				
1.93 (0.51,7.36)	1.31 (0.32,5.27)	1.01 (0.30,3.39)	0.60 (0.14,2.61)	CTR(AE)			
1.11 (0.21,5.92)	0.75 (0.13,4.19)	0.58 (0.12,2.80)	0.35 (0.06,2.05)	0.57 (0.09,3.60)	CTR(HIIT)		
1.28 (0.20,8.09)	0.87 (0.21,3.59)	0.67 (0.12,3.87)	0.40 (0.06,2.77)	0.66 (0.09,4.85)	1.16 (0.12,10.75)	CTR(AE+RE)	
3.64 (1.66,7.95)	**2.46 (1.03,5.89)**	**1.89 (1.10,3.28)**	1.13 (0.42,3.04)	1.88 (0.64,5.56)	3.28 (0.75,14.41)	2.83 (0.54,14.99)	UC

F:Rehospitalization Rates

CBCR(AE+RE)					
1.37 (0.20,9.33)	HBCR(AE)				
1.40 (0.20,9.70)	1.03 (0.74,1.43)	HBCR(AE+RE)			
1.14 (0.58,2.25)	0.84 (0.14,5.04)	0.81 (0.13,4.98)	CTR(AE+RE)		
4.16 (0.53,32.59)	**3.04 (1.39,6.65)**	**2.96 (1.32,6.67)**	3.64 (0.52,25.43)	HCR(AE+RE)	
1.14 (0.17,7.74)	0.84 (0.70,1.00)	0.81 (0.61,1.08)	1.00 (0.17,5.98)	0.27 (0.13,0.59)	UC

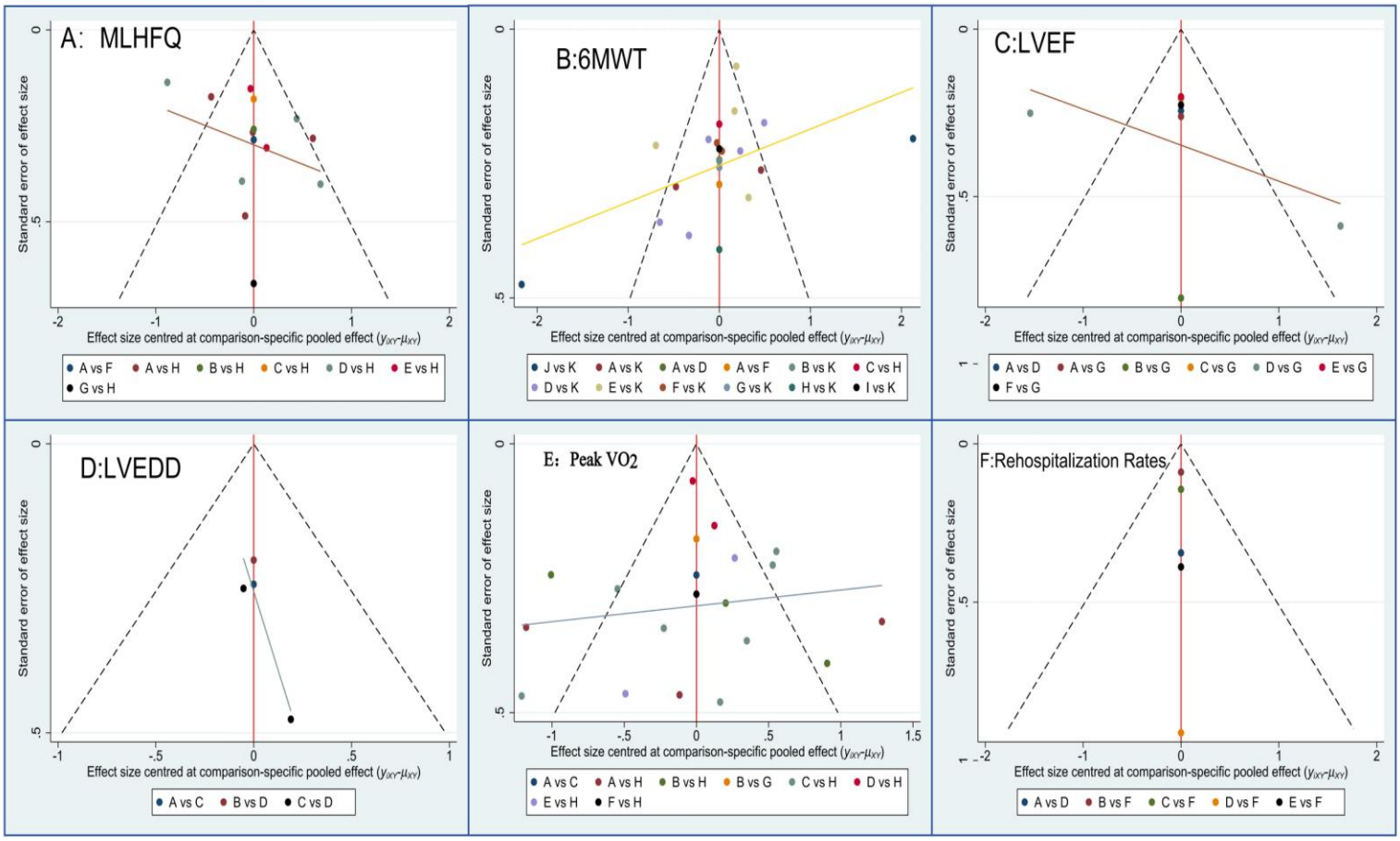
NOTE: ①Minnesota Living with Heart Failure quality of life(MLHFQ)；②6-Minute Walk Test (6MWT)；③Left Ventricular Ejection Fraction (LVEF)；④Left Ventricular End-diastolic Diameter (LVEDD)；⑤Peak Oxygen uptake(Peak O2)；⑥Readmission Rate Center-based CR(HBCR) ;Home-based CR(HBCR);Tele-based CR(CTR);Combined CR(HCR);Aerobic Exercise(AE);Resistance Exercise(RE);High-Intensity Interval Training(HIIT)

Figure 4.6:SUCRA line for outcomes.



NOTE: ①Minnesota Living with Heart Failure quality of life(MLHFQ)；②6-Minute Walk Test (6MWT)；③Left Ventricular Ejection Fraction (LVEF)；④Left Ventricular End-diastolic Diameter (LVEDD)；⑤Peak Oxygen uptake(Peak O2)；⑥Readmission Rate Center-based CR(HBCR) ;Home-based CR(HBCR);Tele-based CR(CTR);Combined CR(HCR);Aerobic Exercise(AE);Resistance Exercise(RE);High-Intensity Interval Training(HIIT)

Figure 4.7:Pairwise meta analysis funnel plot.



NOTE: ①Minnesota Living with Heart Failure quality of life(MLHFQ)；②6-Minute Walk Test (6MWT)；③Left Ventricular Ejection Fraction (LVEF)；④Left Ventricular End-diastolic Diameter (LVEDD)；⑤Peak Oxygen uptake(Peak O2)；⑥Readmission Rate Center-based CR(HBCR) ;Home-based CR(HBCR);Tele-based CR(CTR);Combined CR(HCR);Aerobic Exercise(AE);Resistance Exercise(RE);High-Intensity Interval Training(HIIT)

Appendix 5: Evaluation of consistency and heterogeneity

Table 5.1

Parameters	Outcomes	Study	Consistency
			I^2
Indicators	High intensity	6 studies, n = 287	6%
	Medium intensity	9 studies, n =1386	4%
	Low intensity	2 studies, n = 241	25%
	＜3 times/week	2 studies, n =110	25%
	3-5 times/week	14 studies, n = 1717	9%
	＞5 times/week	3 studies, n =217	25%

Table 5.2

Parameters	Outcomes	Study	Consistency			
			Totresdev	pD	DIC	I^2
Indicators	MLHFQ	12 studies, n = 1183	28.10259	26.58735	54.68995	4%
	6MWT	23 studies, n = 2914	44.86834	40.20854	85.07688	4%
	LVEF	9 studies, n = 670	16.06300	15.86747	31.93047	7%
	LVEDD	3 studies, n = 246	7.330726	7.129255	14.459981	5%
	Peak VO_2	20 studies, n =4412	40.97511	36.72600	77.70111	5%
	Rehospitalization Rates	7 studies, n = 4064	10.17139	10.17129	20.34268	12%

NOTE:Minnesota Living with Heart Failure quality of life(MLHFQ)；6-Minute Walk Test (6MWT)；Left Ventricular Ejection Fraction (LVEF)；Left Ventricular End-diastolic Diameter (LVEDD)；Peak Oxygen uptake(Peak O2)；Exercise time；Readmission Rates

Appendix 6: The meta-regression of the factors that may lead to differences to the main outcome indicators

Factors	Peak VO_2				
	Coefficient	std err	t	P value	95%CI
HFrEF	0.080	0.220	0.364	0.726	-0.350 to 0.510
HFmrEF	-0.500	0.430	-1.163	0.248	-1.331 to 0.320
HFpEF	0.035	0.180	0.194	0.846	-0.320 to 0.390

Factors	6MWT				
	Coefficient	std err	t	P value	95%CI
HFrEF	0.030	0.280	0.107	0.915	-0.520 to 0.580
HFmrEF	-0.580	0.460	-1.261	0.210	-1.480 to 0.320
HFpEF	-0.020	0.190	-0.105	0.920	-0.400 to 0.360