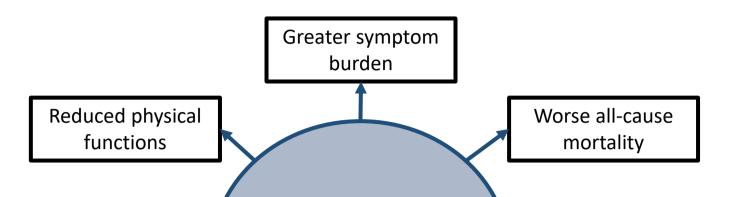


THE USE OF TECHNOLOGY TO IMPROVE **MEDICATION ADHERENCE IN HEART FAILURE** PATIENTS: A SYSTEMATIC REVIEW

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BACKGROUND

- Heart failure (HF) in the UK affects approximately 1 in 35 people from the ages of 65-74.^[1]
- Incidence of heart failure increases drastically with age and the heart failure population continues to increase over time.^[1]



QUALITY ASSESSMENT

- The Cochrane Collaboration's **Risk of Bias Tool**
- Low risk of bias:
 - Random sequence generation (n=6)
 - Allocation concealment (n=2)
 - Blinding participants and personnel (n=0)
 - Blinding outcome assessment (n=3)
 - Incomplete outcome data (n=6)
 - Selective reporting (n=7)
 - Other bias (n=7)

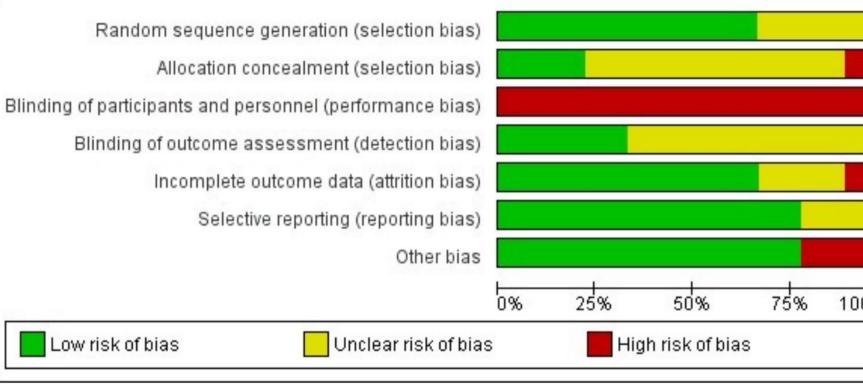
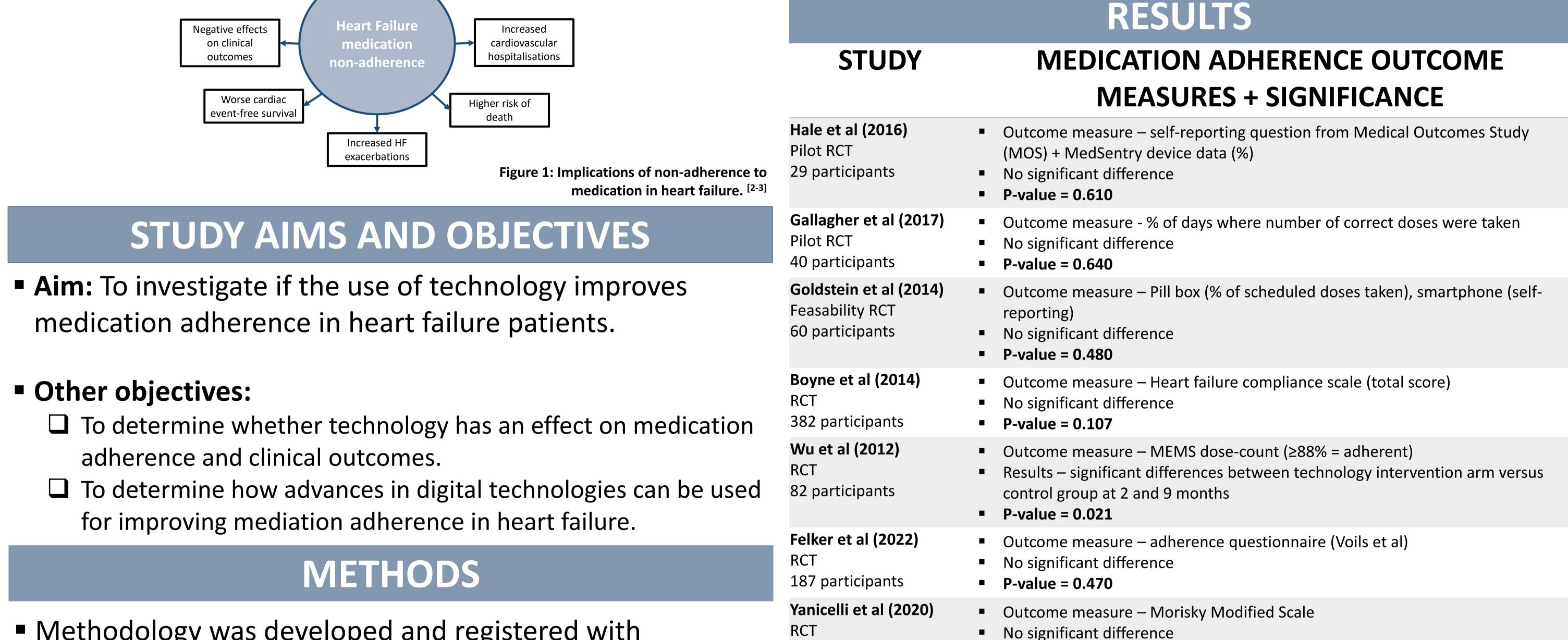


Figure 3: Risk of bias graph presented as percentages across all included studies.



40 participants

RCT

RCT

Young et al (2016)

105 participants

Ross et al (2004)

107 participants

methodology was acceleped and registered with	
PROSPERO (ID: CRD42022371865).	

SEARCH STRATEGY AND ELIGIBILITY

Inclusion criteria

- Published in English from 2000-2022
- Randomised controlled trials (RCTs)
- Use of technology to improve medication adherence
- Patients \geq 18 years old
- Patient at any stage of the NYHA classification of HF
- Patients taking at least one medication related to their HF

Exc	usion	criteria	

- Patients ≤ 18
- × Non-RCTs
 - E.g., observational studies, systematic X reviews, grey literature, etc.

Databases used:

PubMed

- Embase (Ovid)
- MEDLINE (Ovid)
- PsycINFO (Ovid) 0 **CINAHL** Plus
- Cochrane Library

SCREENING	Total number of records identified (n = 1157)	Additional records identified through other sources (searching of article reference lists) (n=0)		
	Duplicates removed			
	(n=332)			

P-value = 0.800

- Outcome measure self-reporting as part of self-management adherence (days missed any medication doses in the past 7 days)
- Results intervention group reported significantly fewer days missing any doses of medication. Estimated marginal mean was 0.3 (intervention) versus 0.8 (control). 95% CI : -0.51 (-0.97, -0.05).
- P-value = 0.030
- Outcome measure questions derived from the Morisky scale
- No significant difference
- P-value = 0.150

Table 1: Results of included studies with their adherence measures and significance.

			> REMOTE MEDICATION MONITORING SYSTEM		<u>RESULTS</u> ✓ Increased medication
			> TELEMONITORING DEVICE		adherence (n=2)
	TECHNOLOGY INTERVENTIONS	I	> ELECTRONIC PILL BOXES		 Increased quality of life (n=1)
			MOBILE HEALTH/APPS/TEXT MESSAGING	F	✓ Increased cardiac event-
1			ELECTRONIC PILL ORGANISER REMINDER		free survival (n=1) ✓ Increased self-care (n=4)
			WEB-BASED TECHNOLOGY		Increased disease-specific
					knowledge (n=1)

DISCUSSION & CONCLUSION

- Most studies showed increase in medication adherence with interventions but they did not reach statistical significance. This could be due to:
 - Pilot/feasibility/small randomised control trials (n=4)
 - Self-reporting tools used as a measure (n=7)

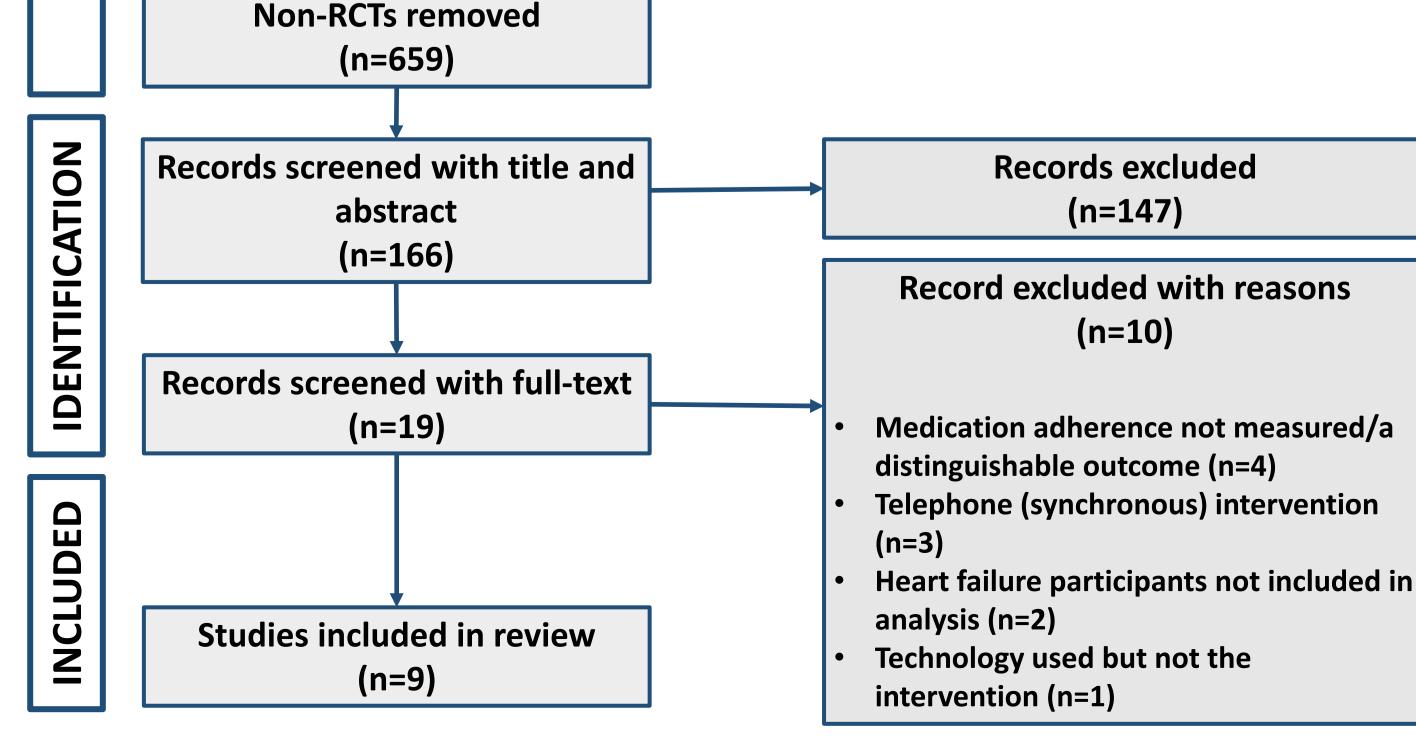


Figure 2: PRISMA flow diagram of the study selection process.

- Using majority already adherent/motivated patients (n=5) Ο
- Other clinical outcomes such as self-care showed significant improvements as a result of the interventions.
- Results are similar to a previous systematic reviews specifically evaluating mobile health which showed uncertainty in effectiveness on many of the same outcomes, due to low quality studies.^[4]
- Therefore, better quality trials are needed as there is limited evidence on the effectiveness of technology interventions.
- Future studies also need to address potential reasons for the lack of significant improvements in medication adherence with the intervention groups (for e.g., motivation).



- Heart Failure- chronic [Internet]. NICE. 2022 [cited 20 November 2022]. Available from: https://cks.nice.org.uk/topics/heart-failure-chronic/background-information/prevalence/
- Wu J-R, Moser DK. Medication adherence mediates the relationship between heart failure symptoms and cardiac event-free survival in patients with heart failure. Journal of Cardiovascular Nursing [Internet]. 2018 [cited 20 November 2022];33(1):40–6. Available from:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5714687/#:~:text=There%20was%20an%20association%20between,did%20not%20report%20HF%20symptom

- Ruppar TM, Cooper PS, Mehr DR, Delgado JM, Dunbar-Jacob JM. Medication adherence interventions improve heart failure mortality and readmission rates: Systematic Review and meta-analysis of controlled trials. Journal of the American Heart Association [Internet]. 2016 [cited 20 November 2022];5(6). Available from: https://www.ahajournals.org/doi/10.1161/jaha.115.002600
- Allida S, Du H, Xu X, Prichard R, Chang S, Hickman LD, et al. MHealth education interventions in heart failure. Cochrane Database of Systematic Reviews [Internet]. 2020 [cited 2022Nov22];2020(7). Available from: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD011845.pub2/full?highlightAbstract=technolog%7Cadherenc%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedication%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc%7Cfailure%7Cadher%7Cmedic%7Cmedic%7Ctechnologv%7Cfailure%7Cadherenc% r%7Cheart