Polypharmacy and Fragmented Prescribing in Older Adults with Heart Failure: Impacts on Treatment Prioritization and Clinical Outcomes

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INTRODUCTION

- Cardiovascular disease is the leading cause of death worldwide, making heart failure a major clinical concern in older individuals.
- Heart failure rarely occurs alone in elderly patients. Many are also treated for diabetes, hypertension, CKD, COPD, depression, or other chronic conditions.
- Polypharmacy is the concurrent use of multiple medications and is often defined as five more medications being used at once. In older adults with heart failure, this number can rise because each conditions adds its own treatment plan.
- Polypharmacy is a two-sided coin. A high medication burden can protect heart failure care when needed therapies are preserved, but it can become harmful when prescriptions are added without coordination.
- Drug-drug interactions are part of the concern, but the larger issue is fragmented prescribing that makes regimens harder to follow and makes heart failure treatments harder to prioritize.

CENTRAL ARGUMENT

- Polypharmacy in older individuals with heart failure should be evaluated by the purpose and coordination of the medication plan, not by medication count alone. A higher medication burden may be clinically appropriate when it preserves essential heart failure therapies such as ACE inhibitors and beta blockers, while also addressing other chronic conditions safely. The concern arises when prescriptions are added from separate care plans without checking how they affect heart failure treatment. Some medications may help one condition, but will still delay needed cardiac therapies or make adherence difficult towards the care plan itself. The key issue becomes how each medication fits into the patient's full care plan rather than why it was added for one condition alone.

Figure 1 + Figure 2

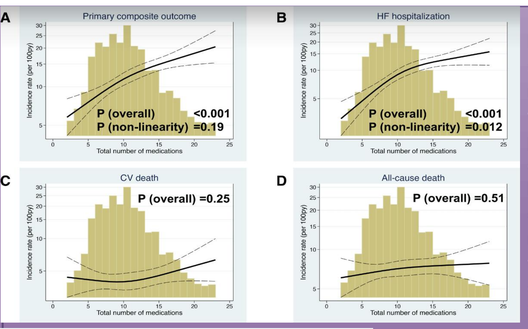


Fig 1): Crude model showing higher number of medications being associated with increased incidence of primary composite cardiovascular events and HF hospitalization, whereas CV death and all-cause death did not show a clear association with increasing medication count (Minamisawa et al. 2021).

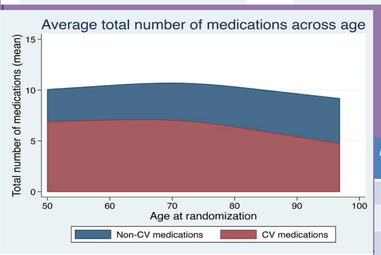


Fig 2): Average total number of medications across age, with CV indicating cardiovascular. (Minamisawa et al. 2021).

Average number of medications per 10 years age	β-coefficient (95% CI)	P-value
Total medications	-0.11 (-0.34, 0.11)	0.31
CV medications	-0.38 (-0.5, -0.26)	<0.001
Non-CV medications	0.26 (0.10, 0.43)	0.001

METHODS AND TECHNQIUES

- For this literature review PubMed, Springer, UW Library, and ScienceDirect were used to find 20 primary research articles on polypharmacy in older adults with heart failure. Advanced search filters were used in these databases, with terms such as "elderly", "polypharmacy", and "cardiovascular disease". Results were then narrowed down further with clinical and observational studies, so the focus could be on real patient outcomes. The articles were then analyzed for how medication burden, comorbid disease care, prescribing patterns, hospitalization, and mortality were connected in older heart failure patients.

FINDINGS

- After heart failure hospitalization, medication burden often exceeded ≥ 10 prescriptions. In one cohort of adults 65 and older, 99.27% were discharged on more than ten medications (Li et al. 2023).
- Comorbid treatment can crowd heart failure therapy. Renal dysfunction, hypokalemia, and diabetes added around 5-9 medications, while ACE inhibitors and mineralocorticoid receptor antagonists were delayed or underused (Onyebeke et al. 2024).
- Interaction risk was medication-specific. Aspirin with enalapril and enalapril with furosemide affected blood pressure, while digoxin with clarithromycin with heparin increased toxicity or bleeding risk (Assefa et al. 2020).
- Hospital risk increased when ACE inhibitors, ARBs, and NSAIDs were combined for different comorbidities with hospitalization rates rising by 31% (Perreault et al. 2022).
- In a national Medicare analysis, 56.7% of patients over 65 with systolic heart failure averaged 5.6 drugs, and 88% of prescriptions came from a single physician trying to manage multiple conditions. (Ellenbogen et al. 2019).
- Medication review improved care without simply adding more drugs. Baseline nonadherence was 66%, and after two pharmacist visits, patients with four or more heart failure symptoms dropped by nearly 23% (Lee et al. 2015).

REFERENCES

https://docs.google.com/document/d/10upuHbjq1mqxWn64V9m9rSw-eEm34BUCWLBA8YdKAgo/edit?tab=t.0

https://docs.google.com/document/d/10upuHbjq1mqxWn64V9m9rSw-eEm34BUCWLBA8YdKAgo/edit?tab=t.0

Figure 3 + Table 1

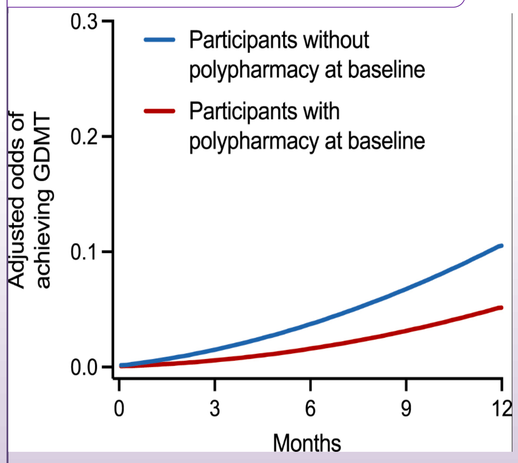
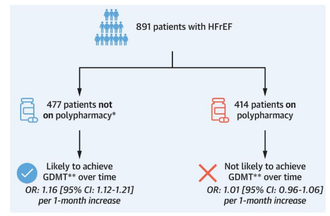


Fig 3): Exponential Curve illustrating Odds of Uptitration to Optimal GDMT Over Time Among Participants With Vs Without Non-GDMT Polypharmacy at Baseline. (Khan et al. 2023).

Table 1): Association of non-GDMT polypharmacy with adverse clinical outcomes including composite outcome, all-cause mortality, and HF hospitalization. The table compares patients with and without polypharmacy across three adjusted models.

CENTRAL ILLUSTRATION: The Association of Non-GDMT Polypharmacy at Baseline With the Odds of Achieving Optimal GDMT in Patients With HFrEF in the GUIDE-IT Trial

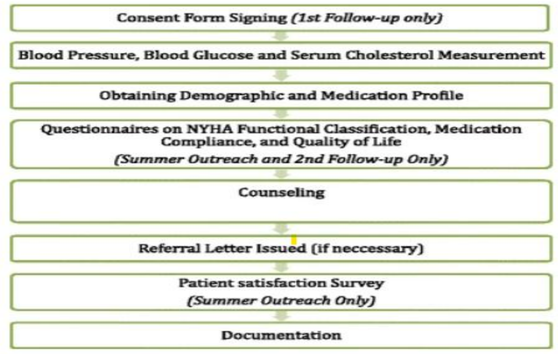


Khan MS, et al. J Am Coll Cardiol HF. 2023;11(11):1507–1517.

	Polypharmacy		Model 1		Model 2		Model 3	
	Yes	No	HR (95% CI)	*P* Value	HR (95% CI)	*P* Value	HR (95% CI)	*P* Value
Composite outcome	187 (45.2)	140 (29.4)	1.67 (1.34-2.10)	<0.001	1.24 (0.98-1.57)	0.07	1.20 (0.94-1.53)	0.15
All-cause mortality	82 (19.8)	60 (12.6)	1.43 (1.02-2.00)	0.039	1.04 (0.73-1.48)	0.83	0.94 (0.65-1.36)	0.74
HF hospitalization	162 (39.1)	125 (26.2)	1.65 (1.30-2.10)	<0.001	1.21 (0.94-1.55)	0.14	1.17 (0.90-1.52)	0.23

Figure 4

Fig 4): Pharmacist intervention workflow showing how each visit used screening and medication review to guide counseling and support heart failure prevention in high-risk elderly patients (Lee et al. 2015).



FUTURE DIRECTIONS

- An automated prescribing tool should be implemented where it flags cardiac therapeutics when they are being delayed due to other conditions being prioritized within the treatment plan itself.
- Older patients with CKD, diabetes, hypertension, or any other chronic condition should be studied separately because each condition changes which heart failure medications are safest.
- Hospitals should test pharmacist follow-up within the first month after discharge to see if it lowers readmission risks and improves adherence.
- A patient-friendly medication summary could help older individuals understand which drugs protect the heart and which drugs require closer monitoring.