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The Impact of a Virtual Cardiology Program for Post-Discharge Patients with Cardiovascular Disease: A Randomized Clinical Trial

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A virtual cardiology program led to a **reduction** in **all-cause (44%)** and **cardiac (53%) readmissions.**

Improvements in **patient education, functional status,** and **blood pressure** were noted in **intervention group.**

Robust **randomized controlled trials** are necessary to define the role of telehealth in high-risk and costly **transitions of care.**

BACKGROUND

Hospital readmissions are a common and costly occurence in patients with cardiovascular disease.

1 in 4
Heart failure patients are readmitted within 30 days of discharge

$16,000
Average cost of a cardiovascular-related readmission

42%
of Medicare beneficiaries have at least 1 heart condition

RESEARCH QUESTION

Could a virtual cardiovascular care program reduce the all-cause & cardiac readmission rates for patients with cardiovascular disease (CVD)?

STUDY DESIGN

Between **February 2021** and **May 2022**, **Heartbeat Health,** a digital health company, conducted an **open-label prospective randomized study** evaluating a virtual care program focused on reducing **hospital readmissions** in the 3-month post-discharge period.

Patients continued visits with traditional, ambulatory cardiologist during a virtual care program.

Control patients received standard-of-care outpatient follow-up alone during study period.

1. Initial outreach and onboarding for recently admitted patients with known CVD
2. HBH televisit with care team in post-discharge setting
3. Clinical management per HBH in conjunction with usual cardiology care
4. Additional televisits as clinically indicated for 3-month period

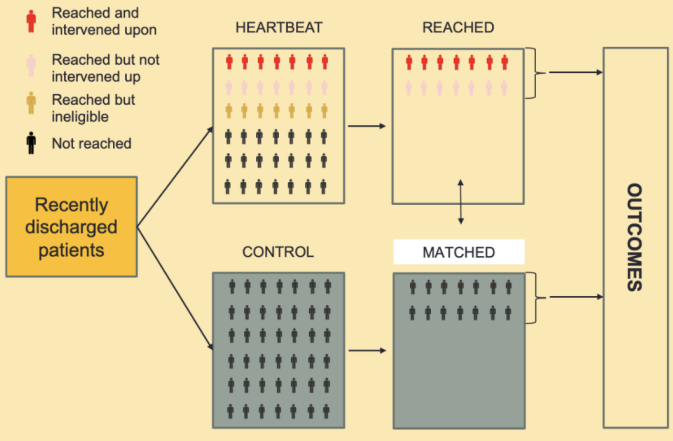
INCLUSION CRITERIA

- Recent hospital discharge
- Age ≥ 18 and < 89 years
- Established clinical care relationship with outpatient cardiologist
- Enrolled and onboarded within 30 days after discharge

EXCLUSION CRITERIA

- Unable or unwilling to consent to treatment
- Living in a rehabilitation or long-term care facility
- Lack of a smartphone
- Not fluent in English
- Receiving palliative care
- In-hospice care

Figure 1. Schematic for Propensity Score Matching



95 Heartbeat patients in discharge telemedicine program.

95 control patients identified through **propensity score matching.**

90 day cardiac and all-cause readmisison risk was **primary.**

Results

BASELINE CHARACTERISTICS

	INTERVENTION (N=95)	CONTROL (N=95)
Age (in years)	68.6 (11.1)	69.6 (12.1)
Gender (Female)	43 (45.3)	42 (44.2)
HFpEF	31 (32.6)	36 (37.9)
HFrEF	30 (31.2)	21 (22.1)
HTN	77 (81.1)	86 (90.5)
CAD	56 (58.9)	56 (58.9)
Diabetes	38 (40.0)	38 (40.0)
CKD	24 (25.3)	24 (25.3)
All Cause 90 Day Readmission	15 (15.8)	27 (28.4)
Cardiac 90 Day Readmission	8 (8.4)	17 (17.9)
Medication changes	4.1 (3.8)	N/A
Number of televisits	10.3 (1.8)	N/A

Mean (SD) or N (%)

Figure 2. Cox proportional hazard survival functions for cardiac and all-cause readmission plotted against a 90 day period for treatment and control groups. Log rank test was used to calculate significance.

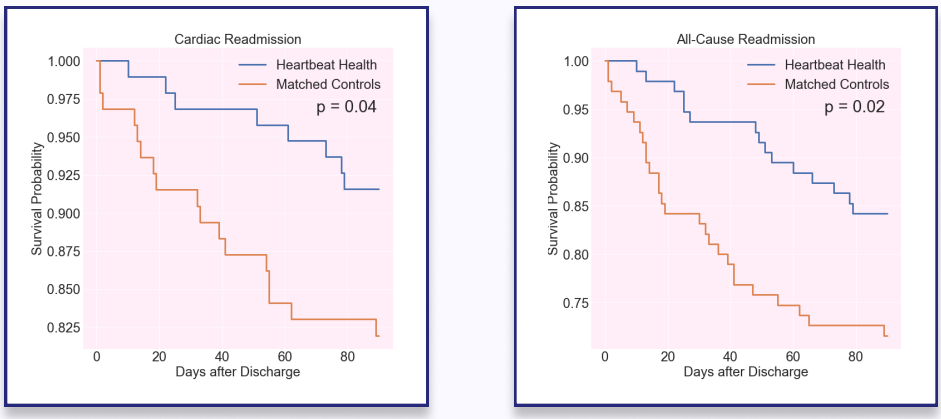
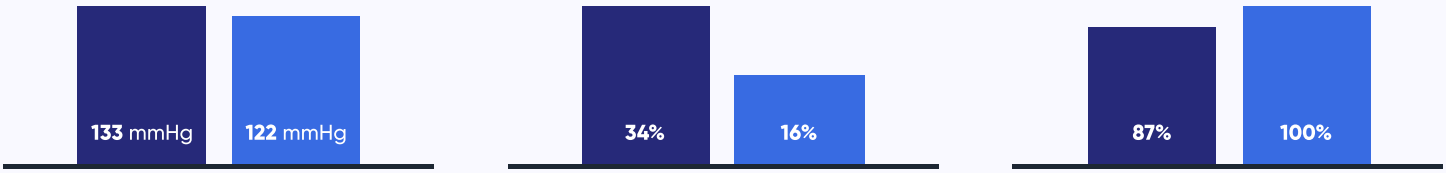


Figure 3. Subset of pre- and post-survey and vital sign data in the intervention groups. Reported results were significant ($p < 0.001$). Significance was evaluated with a paired t-test for numerical data and McNemar's test for categorical variables.



Conclusion

We demonstrate that a **virtual care management program** can effectively **reduce readmission risk** in patients with cardiovascular disease.

Patients with **high-frequency telemedicine visits** had **90-day improvement** in **functional status, blood pressure control,** and **patient education.**

Additional **randomized trials** are necessary to quantify the impact on **secondary outcome measures.**

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