

UTILIZING REAL WORLD EVIDENCE FOR COST-EFFECTIVENESS ANALYSIS OF THE DISEASE MANAGEMENT PROGRAM FOR CHRONIC HEART FAILURE HERZMOBIL TIROL

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Introduction

Health-economic analyses of disease management programs (DMP) for chronic heart failure (CHF) with and without telemedicine have been conducted demonstrating considerable variations. HerzMobil Tirol (HMT) is a 3-month transitional, telemedical-assisted, post-discharge DMP for CHF implemented in routine care in Tyrol/ Austria. Our study aimed to assess the effectiveness and cost effectiveness of the DMP HMT compared to usual care (UC)

Methods

Framework Cost-Effectiveness Analysis "Along the Trial"

Target population: People with chronic heart failure after hospital stay

Compared strategies: DMP CHF (HerzMobil Tirol, Fig. 1) vs. Usual Care

Perspective: Health care system

Study design: Cost-effectiveness analysis

Time horizon: 12 months

Outcomes: Years of life without hospitalization, remaining lifetime, avoided hospitalizations and hospital days, costs, incremental cost-effectiveness ratio (ICER)

Analysis approach: "along the trial"

Discounting: none

DRG point value: 1.363 EUR (weighted, DRG diagnosis related groups)

Figure 1: Disease management program CHF HerzMobil Tirol (HMT)



Methods Data Analysis

- Retrospective case-control study
- Propensity-score matching, clinical outcomes (Pözl et al. 2021)
- Costs DMP HMT: projection for Austria
- Hospital costs
- Missing-value imputation, winsorizing
- Regression analysis („adjustment for confounding“)
- Base-case analysis
- Cost-effectiveness analysis (costs DMP and hospital costs considered)
- Sensitivity analysis
- Replace costs for people with irrelevant costs with group mean

Results

Table 1: Patient characteristics baseline

Variable	DMP HMT (n=251)	Usual Care (n=257)	P-Value
Age, years (mean ± SD)	69.5 ± 11.9	71.1 ± 10.8	0.127*
Female, n (%)	75 (29.9%)	83 (32.3%)	0.557**
Body mass index, kg/m ² , (mean ± SD)	3 Missing; 28.3 ± 5.7	1 Missing; 27.3 ± 5.6	0.0507*
NYHA functional class, n (%)			
I	1 (0.4%)	0 (0%)	0.197**
II	65 (25.9%)	83 (32.3%)	
III	182 (72.5%)	168 (65.4%)	
IV	3 (1.2%)	6 (2.3%)	
NTproBNP ng/l, (mean ± SD)	5 Missing; 5,309 ± 490	15 Missing; 6,328 ± 567	0.174*
HF first diagnosed > 18 m ago, n (%)	102 (40.6%)	113 (44.0%)	0.447**
Ejection fraction classification, n (%)			
HFREF (<40%)	149 (59.4%)	109 (42.4%)	0.0003* +
HFmrEF (40–50%)	47 (18.7%)	56 (21.8%)	
HFpEF (>50%)	55 (21.9%)	92 (35.8%)	
Atrial fibrillation, n (%)	1 Missing; 179 (71.3%)	195 (75.8%)	0.329**
CCI, (mean ± SD)	1 Missing; 2.8 ± 1.54	2.8 ± 1.55	0.989*
CRT and/or ICD, n (%)	51 (20.3%)	43 (16.7%)	0.298**

Table 2: Health outcomes DMP HMT and usual care, per patient

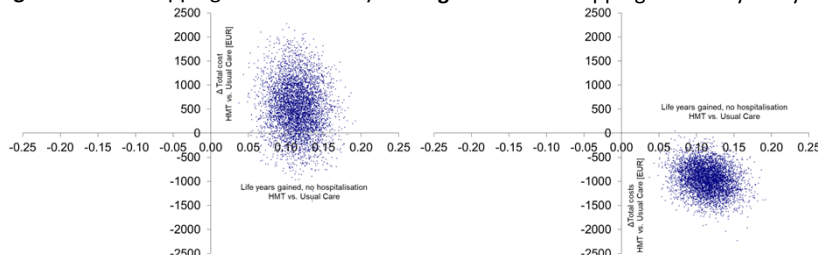
Health outcomes within one year (per patient)	DMP HMT (n=251)	Usual Care (n=257)	Difference (DMP-UC)
Hospital-free survival [days]	343.60	301.72	41.88
Survival days [days]	350.16	309.97	40.19
Number of HF rehospitalizations	0.47	0.59	-0.12

Table 3: Cost-effectiveness analysis and DMP HMT vs. UC sensitivity analysis

	Years of life w/o hospital stay	Δ Hospital free survival years	Total costs [EUR]	Δ Total costs [EUR]	ICER [EUR/HFLYG]
Base-case analysis					
Usual Care	0.83	0.11	6,943	523	4,773
DMP HMT	0.94		7,466		
Sensitivity analysis					
Usual Care	0.83	0.11	5,995	- 955	HMT dominant
DMP HMT	0.94		5,040		

Table 1: + T-Test, ++ Chi-Square-Test, HF heart failure, NYHA New York Heart Association, HFREF heart failure with reduced ejection fraction, HFmrEF heart failure with mid-range ejection fraction, HFpEF heart failure with preserved ejection fraction, CCI Charlson Comorbidity Index, NTproBNP N-terminal pro-B-type natriuretic peptide, CRT cardiac resynchronization therapy, ICD implantable cardioverter-defibrillator, SD standard deviation, n number, UC usual care, m month

Figure 2: Bootstrapping base-case analysis **Figure 3:** Bootstrapping sensitivity analysis



cost effectiveness with n=5000 bootstrap simulations

Table 2&3: ICER incremental cost-effectiveness ratio, HFLYG hospital-free life years gained, HF heart failure, DMP disease management program, HMT HerzMobil Tirol, UC usual care, EUR Euro

Discussion / Limitations

- One-year time horizon of the clinical follow-up only
- Only partly apply weighted end points calculating hospital-free survival
- Nonmedical resources (e.g., transportation to the hospital, patient time not considered) and resources in outpatient care setting not considered (Sydow 2021, no substantial differences)

Conclusion

Our economic evaluation showed that the DMP HerzMobil Tirol is cost effective compared to UC based on the one-year time follow-up horizon. The DMP was cost saving in a sensitivity analysis correcting for "high irrelevant costs". Our findings promote a widespread adoption of telemedical assisted DMP for CHF. Further long-term assessment using a decision-analytic model is needed considering upcoming real-world evidence.

Poelzl G, et al. Feasibility and effectiveness of a multidimensional post-discharge disease management programme for heart failure patients in clinical practice: the HerzMobil Tirol programme. doi: 10.1007/s00392-021-01912-0; Sydow H et al., T. Cost-effectiveness of noninvasive telemedical interventional management in patients with heart failure: health economic analysis of the TIM-HF2 trial. doi: 10.1007/s00392-021-01980-2

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