Contemporary characteristics and treatment patterns of patients with HFmrEF and HFpEF in Germany: a cross-sectional survey

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INTRODUCTION & PURPOSE

- Patients with heart failure (HF) and left ventricular ejection fraction (LVEF) >40% account for >50% of HF cases, yet real-world data describing their characteristics and treatment patterns are limited.
- Since March 2022, sodium–glucose cotransporter 2 inhibitors (SGLT2i) have been approved for the treatment of HF across the full spectrum of LVEF (**Fig. 1**). Dapaglifozin and empaglifozin have a class 1 recommendation in HF with mildly-reduced ejection fraction (HFmrEF) and HF with preserved ejection fraction (HFpEF) in the ESC 2023 guideline update for the treatment of acute and chronic HF.
- We sought to characterize a contemporary cohort of patients with HF and HFmrEF or HFpEF in routine care from Germany, and describe their management and treatments received. In addition, we identified predictors of receiving treatment with an SGLT2i.

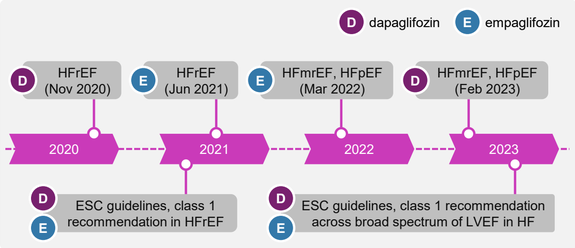

Fig. 1. EMA approvals (*shown above timeline*) and ESC guideline recommendations (*shown below timeline*) for use of SGLT2i in adults with HF.

METHODS

- This was a cross-sectional study using electronic health records from 51 ambulatory cardiology practices participating in the Bundesverband Niedergelassener Kardiologen network across Germany.
- We included patients with a HF diagnosis confirmed by a hospital or a cardiologist practice, an LVEF >40%, documentation of NYHA functional class >1, treatment in a cardiology practice during 2022–2024, and with ≥6 months' available treatment data. A total of 3000 patients were included (~1000 per calendar year).
- Patients with distinct aetiologies such as cardiac amyloidosis, hypertrophic cardiomyopathy, Fabry disease, or improved LVEF (i.e. any prior LVEF measurement of <40%) were excluded.
- Patient records from 2022–2024 were reviewed to obtain information on demographics, medical history, comorbidities, echocardiography findings, and medications.
- To identify predictors of SGLT2i therapy, we used multivariable logistic regression adjusted for demographics, medications, and comorbidities.

RESULTS

Characteristics of the study cohort

- Among the 3000 patients with HF and LVEF >40%, one third had HFmrEF and two-thirds had HFpEF. Demographic and clinical characteristics of the study cohort are shown in the **Table**.
- Arterial hypertension was the most common comorbidity: 81% in patients with HFmrEF and 89% in patients with HFpEF.
- Median time since HF diagnosis was longer in patients with HFmrEF (41 months) than HFpEF (33 months).
- The severity of HF, as evidenced by NYHA stage, natriuretic peptides, or recent HF hospitalisation, was similar between patients with HFmrEF and HFpEF.

Table. Characteristics of the study cohort.

	HFmrEF N = 1001	HFpEF N = 1999
Males	68.4	49.8
Age, mean (SD), years	73.8 (11.1)	76.5 (9.7)
LVEF, mean (SD)	45.1 (2.1)	57.2 (6.2)
Time since HF diagnosis, median (Q1, Q3), months	41 (17, 82)	33 (16, 67)
NYHA Class II	71.5	72.6
NYHA Class III	27.5	26.5
NHYA Class IV	1.0	0.9
BNP, median (Q1,Q3), pg/ml	184 (47, 381)	187 (90, 292)
NT-proBNP, median (Q1,Q3), pg/ml	966 (403, 2527)	1013 (414, 2302)
Recent HFH (within last 12 months)	7.3	7.2
Comorbidities		
Obesity[a]	34.2	35.8
Arterial hypertension	80.5	88.5
Coronary heart disease	59.4	48.1
History of STEMI	39.0	20.2
History of NSTEMI	15.8	19.1
Diabetes mellitus	29.7	26.0
Hyperlipoproteinaemia	63.6	55.4
Chronic kidney disease	26.5	30.4

Data are % unless otherwise stated. [a]BMI ≥30 kg/m^2

Treatments received

- HF treatments prescribed during the 2022–2024 study period are shown in **Fig. 2**). Less than 50% of patients with HFmrEF and HFpEF received an SGLT2i.
- Prescribing of sMRA, ARNi, SGLT2i, and ACEi was more common to patients with HFmrEF vs. HFpEF. Prescribing of ARB was more common in patients with HFpEF vs. HFmrEF.

Predictors of receiving treatment with an SGLT2i

- Results of the Cox regression analysis to identify predictors of treatment with an SGLT2i are shown in **Fig. 3**. Treatment with ARNi was associated with a 3-fold higher odds of receiving treatment with an SGLT2 (adj. OR 3.18 [95% CI: 1.96–5.16]). Other factors associated with higher odds of SGLT2i treatment were having COPD, diabetes or CKD, current treatment with an sMRA, later calendar year, and higher HbA1c%.
- Factors associated with a lower odds of receiving an SGLT2i were having hyperlipidaemia (48% lower odds) and receiving treatment with a calcium antagonist (44% lower odds).

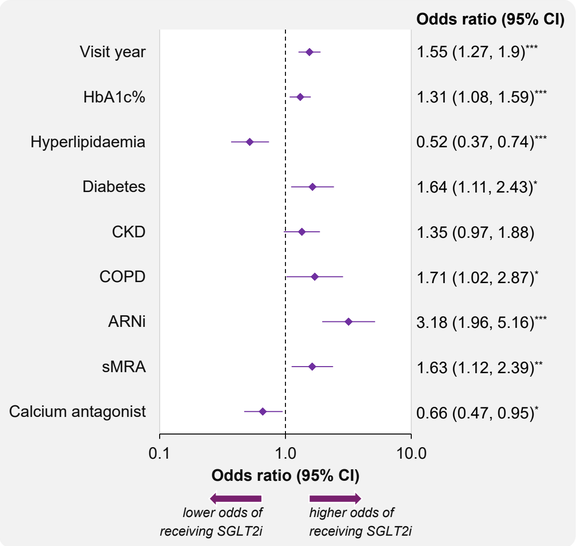

Fig. 3. Factors associated with SGLT2i treatment during 2022–2024 in patients with HFmrEF/HFpEF. [a]Modelled as a continuous variable. *p-value <0.05, **p-value <0.01, ***p-value <0.001

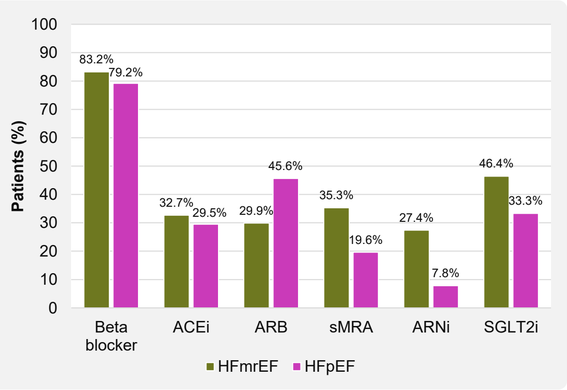

Fig. 2. Heart failure medications prescribed to patients with HFmrEF and HFpEF during 2022–2024.

CONCLUSIONS

- As expected, the characteristics of patients with HFmrEF were more similar to those seen in HFrEF than HFpEF, including the majority being men, younger age at diagnosis. and a high level of coronary artery disease and hyperlipoproteinaemia,
- The increased odds of SGLT2i prescription with calendar year was in line with expectations given successive approvals in HFmrEF and HFpEF from 2022 onwards and inclusion in the ESC guidelines in 2023.
- However, SGLT2i prescribing to patients with HFmrEF and HFpEF, especially the latter, was suboptimal, given that both have a class 1 recommendation in ESC guidelines.
- The lower odds of SGLT2i prescription in HF patients with comorbid hyperlipidaemia or use of calcium antagonists warrants further exploration.

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