Empagliflozin Compliance and Influencing Factors in Patients with Heart Failure and Diabetes

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Abstract

Introduction: Treatment paradigms for patients with type 2 diabetes mellitus (T2DM) and heart failure (HF) have changed. Sodium glucose cotransporter 2 inhibitors, such as empagliflozin, are now considered potential first line therapies. Compliance to empagliflozin and the factors that may influence compliance are unknown.

Methods: We assessed compliance and associated factors in patients with T2DM and HF from Veterans Affairs national data from 2015-22. Compliance was calculated using proportion of days covered (PDC). Compliance to empagliflozin was defined as PDC > 80%. Patients whose compliance could not be calculated were excluded. Generalized linear models were constructed to evaluate 1) demographic, 2) patient level, and 3) system level data.

Results: Total 28,581 patients exposed to empagliflozin were included. Proportion of empagliflozin compliance was 66.2%. Table 1 displays the significant demographic, patient, and system level factors associated with poor empagliflozin compliance.

Conclusions: There were demographic, patient, and system level factors that were associated with poor empagliflozin compliance.

Introduction

- Empagliflozin has shown cardiovascular (CV) protection in patients with T2DM(1)
- Empagliflozin, when added to guideline recommended therapy, has been shown to decrease CV death or hospitalization for HF(2)
- Guidelines suggest SGLT2is are a potential first line therapy for subgroups of patients with T2DM(3)
- Adherence to daily medications, such as those often used in T2DM and HF, is important to realize the benefits
- Previous conceptual models have identified patient and system level factors that influence adherence(4)
- Factors influencing empagliflozin adherence in this subgroup of high-risk patients is unknown

Scientific Aim

Examine system level and patient level factors that influence initiation and compliance in patients with T2DM and HF.

Methods

- **Study Design**: Population-based, new-user cohort study
- **Data Source**: VA Corporate Data Warehouse (CDW) which holds data for Veterans receiving care throughout the US. CDW includes all data from Veterans Health Information Systems and Technology Architecture (VistA). Data included in the CDW includes inpatient and outpatient diagnosis/procedure codes, pharmacy, and laboratory data.
- **Patients**: Adult patients (≥18 years) with T2DM and HF treated at VA medical centers with a new prescription for any glucose lowering medication during FY 2015-22. T2DM was identified using a validated algorithm that uses both administrative claims and pharmacy data.(5) Patients with HF were identified using a validated algorithm that uses both inpatient and outpatient ICD-9-CM and ICD-10 codes.(6)
- **Initiation and Adherence Measures**:

Measure: Conceptual Definition	Operational Definition
Adherence: Taking the correct dosage at a prescribed frequency	Proportion of days covered (PDC): fills and refills divided by the number of days in the study period. Adherent is considered a PDC > 80%
Initiation: Filling first prescription of empagliflozin	First fill of empagliflozin after incident diagnosis of T2DM and HF. No exposure in the 2-years prior to diagnosis

- **Factors:**
  - **Demographic:** Patient age, sex, race, ethnicity
  - **Patient:** marital status, medications at baseline, comorbidities, socioeconomic status (by VA priority status)
  - **System level:** Provider type

Methods

- **Statistical Analysis:** Generally, dichotomous variables are described as counts and proportions of the total sample. Continuous variables are described as mean and standard deviation (SD).
  - Derived 3 models to identify independent factors that influence adherence: demographic, patient, and provider factors
  - General linear models were used to calculate odds ratios (OR) and 95% confidence intervals (95% CI) for each factor controlling for the other factors in the model

Results

- 28,581 patients were included in the study.
- The majority of patients were white (75.8%) males (97.3%).
- The mean (SD) age at cohort entry was 67.8 (8.4).
- The majority of patients were not Hispanic or Latino (90.2%).
- Most patients were either married (59.1%) or divorced (24%).
- 52.6% of patients had a VA priority status of 1.
- The mean PDC was 0.83 and 66.2% of patients were adherent.
- African American and Native American/Alaskan patients were at a higher risk of non-adherence.
- Hispanic patients were at a higher risk of non-adherence.
- Patients who were divorced, single, separated or widowed were at a higher risk of non-adherence.
- Table in panel 3 has all significant factors

Conclusion and Discussion

- **There are independent demographic, patient, and system factors that influence adherence.**
- **Additional factors that need to be examined: number of medications, distance to nearest VA health center, rural vs. urban, interactions of differing factors to identify subgroups at risk**
- **There is a need to identify barriers to adherence using these data such as cost, side effects, convenience, misunderstanding benefit/risks**

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Acknowledgements
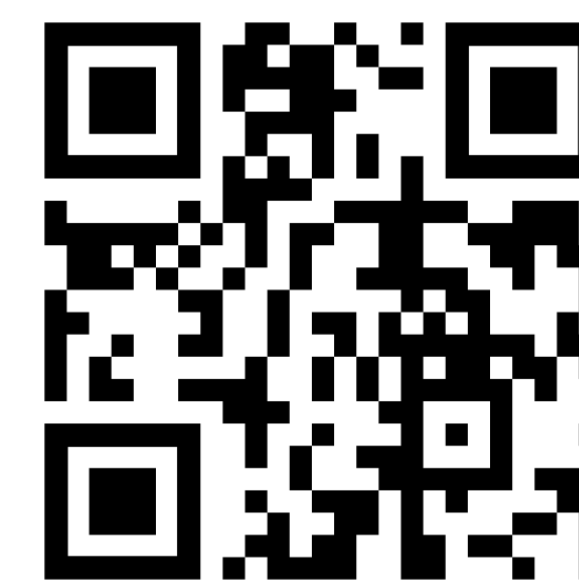
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Results

Characteristics	Model 1† OR (95% CI)	Model 2‡ OR (95% CI)	Model 3# OR (95% CI)
Age >65	1.29 (1.22-1.36)		
Female sex	1.01 (0.87-1.18)		
Race			
White	Reference		
African American	1.77 (1.65-1.89)		
Native American/ Alaskan	1.34 (1.03-1.74)		
Ethnicity			
Non-Hispanic	Reference		
Hispanic or Latino	1.25 (1.13-1.38)		
Marital Status			
Married	Reference		
Divorced	1.21 (1.14-1.28)		
Single	1.28 (1.16-1.40)		
Separated	1.40 (1.23-1.61)		
Widowed	1.17 (1.04-1.31)		
Medications at Baseline			
Angiotensin receptor/ neprilysin inhibitor		1.41 (1.24-1.60)	
Aspirin		1.06 (1.01-1.12)	
Comorbidities			
Depression		1.08 (1.01-1.15)	
Myocardial Infarction		1.13 (1.01-1.27)	
Smoker		1.22 (1.12-1.33)	
Socioeconomic status			
VA priority status 1 or 2			1.19 (1.13-1.25)
Provider Type			
Physician			Reference
Nursing			0.89 (0.80-0.99)
Pharmacy			0.73 (0.68-0.79)
Unknown			1.14 (1.02-1.28)

* Only significant findings reported. † Adjusted for age, sex, race, ethnicity, marital status. ‡ Adjusted for 16 medication variables, and 17 comorbidity variables. # Adjusted for socioeconomic status, provider type, and provider specialty.

SC-US-76207