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Introduction

- Malaysia spent USD 194 million on HF-related cost in 2014. [1]
- The economic burden of heart failure (HF) has significant impact on Malaysia's total healthcare expenditure, because of increasing incidence of HF over the years.
- Economic effectiveness is important for decision making especially in improving patient access to new innovative HF treatments

Objectives

- To estimate the cost of HF treatment from the Ministry of Health's perspective, categorised according to ejection fraction (EF) and the New York Heart Association (NYHA) functional classification.

Methods

Study Design

- A prevalence-based, bottom-up cost analysis study was conducted in HF clinics of three tertiary hospitals (North, Central and East Malaysia) from 2016-2018 and included HF patients followed up in these clinics.
- Resources utilised were collected up to 1 year from first HF visit between 1 January 2016 and 31 December 2018.
- Direct cost of HF = unit cost × frequency of resources utilisation

Cost Calculation

- Mean annual cost = Mean annual inpatient cost + mean annual outpatient cost

The study was financially supported by Boehringer Ingelheim (Malaysia) Sdn. Bhd.

Inpatient cost	Outpatient cost
Hospitalisation	Clinic visit
Diagnostic test	Diagnostic test
Medication	Medication
Procedure	

- Costs were inflated to 2021 values using the Malaysian consumer price index (health domain) and reported in USD (USD 1 = RM 4.134).

Statistical Analysis

- Parametric tests [analysis of variance (ANOVA)] were employed to compare the difference between groups

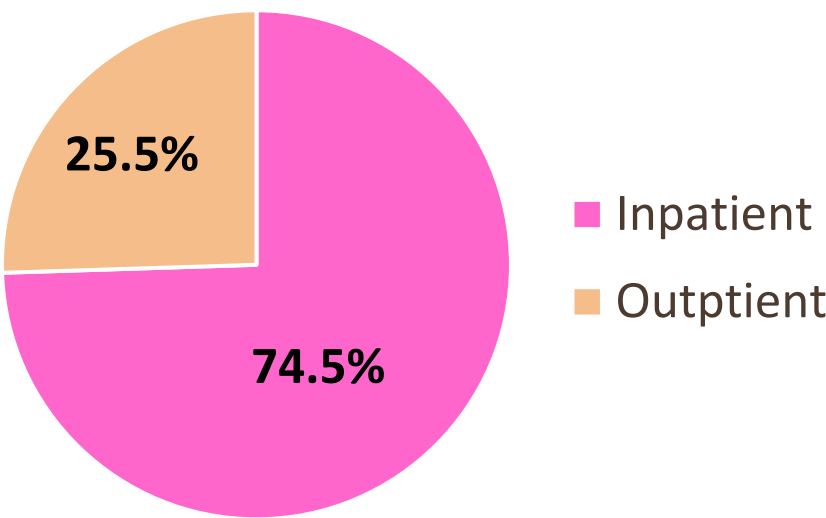
Results

Table 1: Baseline characteristics of HF patients.

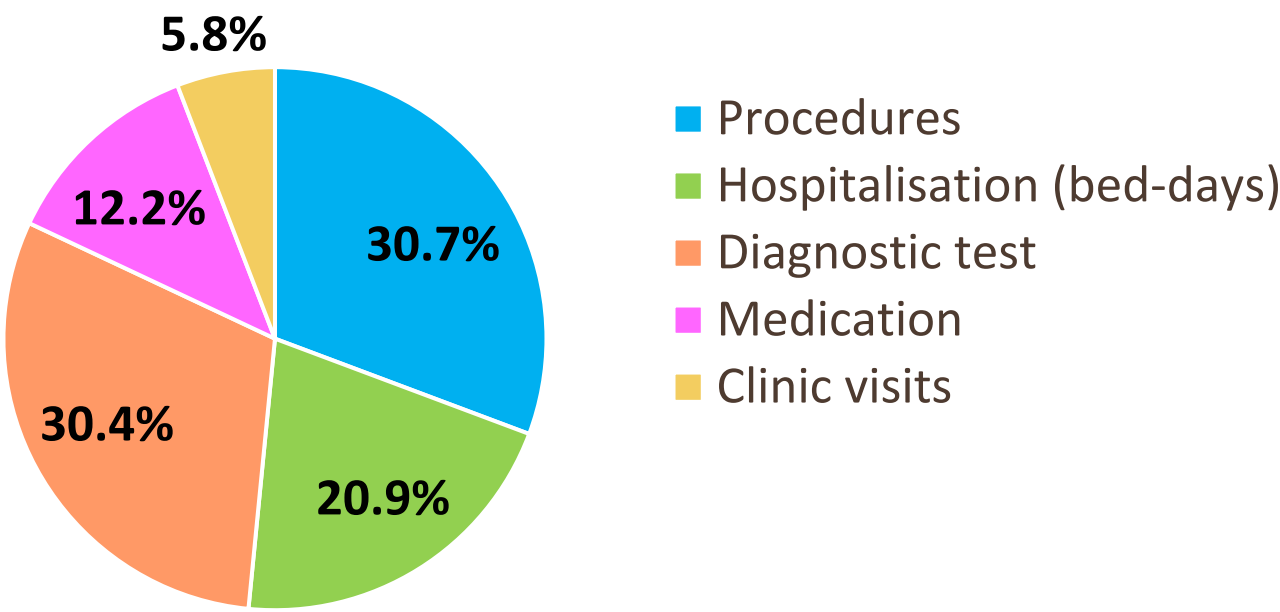
Patient characteristics	Patients, (n=329)
Gender, n (%)	
Male	270 (82.1)
Female	59 (17.9)
Age (years), mean (SD)	54.6 (11.7)
Comorbidities, n (%)	
Coronary artery disease	185 (56.2)
Hypertension	225 (68.4)
Type II diabetes mellitus	143 (43.5)
Dyslipidaemia	155 (47.1)
Chronic kidney disease	44 (13.4)
Atrial fibrillation	46 (14.0)
Baseline EF, n (%)	
HFrEF (≤40%)	264 (80.2)
HFmrEF (41-49%)	34 (10.3)
HFpEF (≥50%)	31 (9.4)
Baseline NYHA Class, n (%)	
Class I	154 (46.8)
Class II	128 (38.9)
Class III	32 (9.7)
Class IV	5 (1.5)

Mean annual cost [SD] per patient: **USD 1,956 [1,251]**

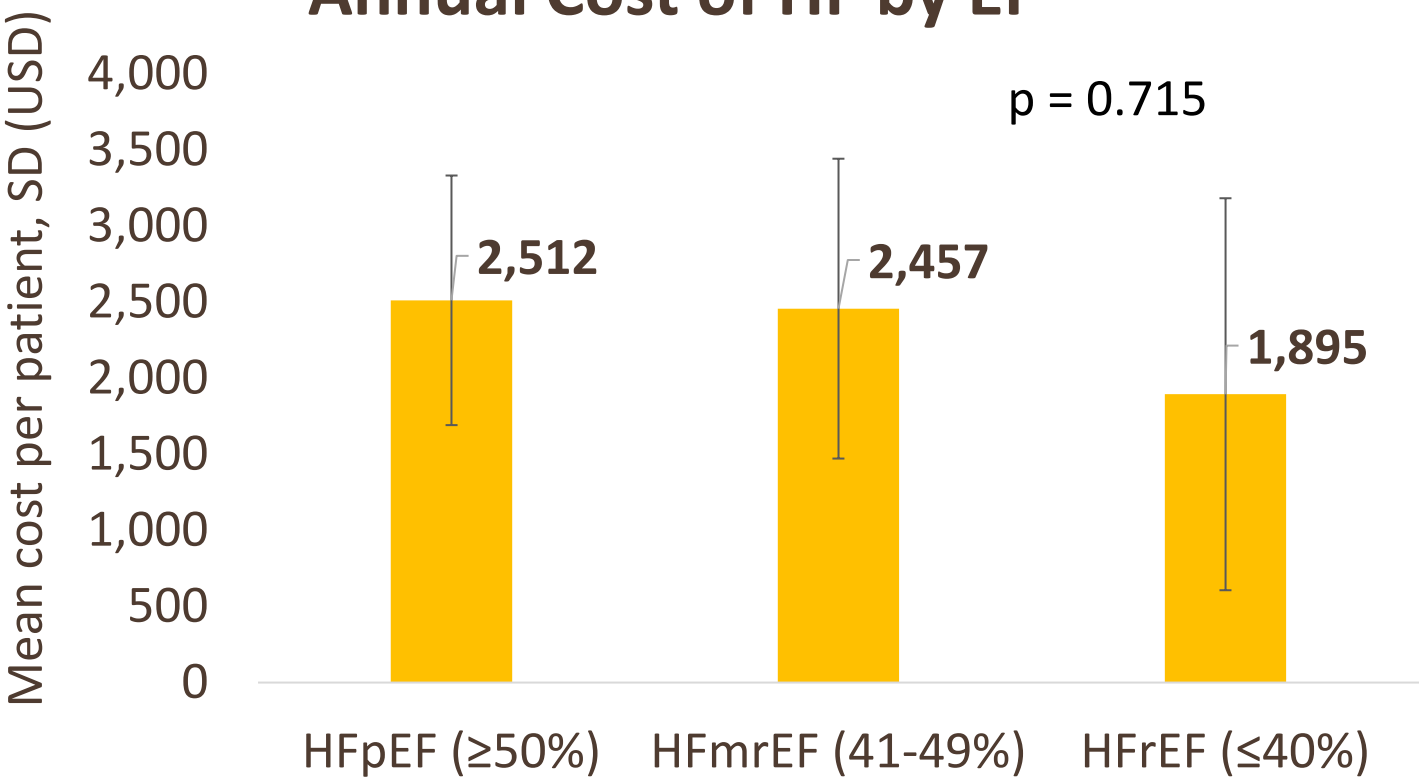
Annual Cost of HF per Patient



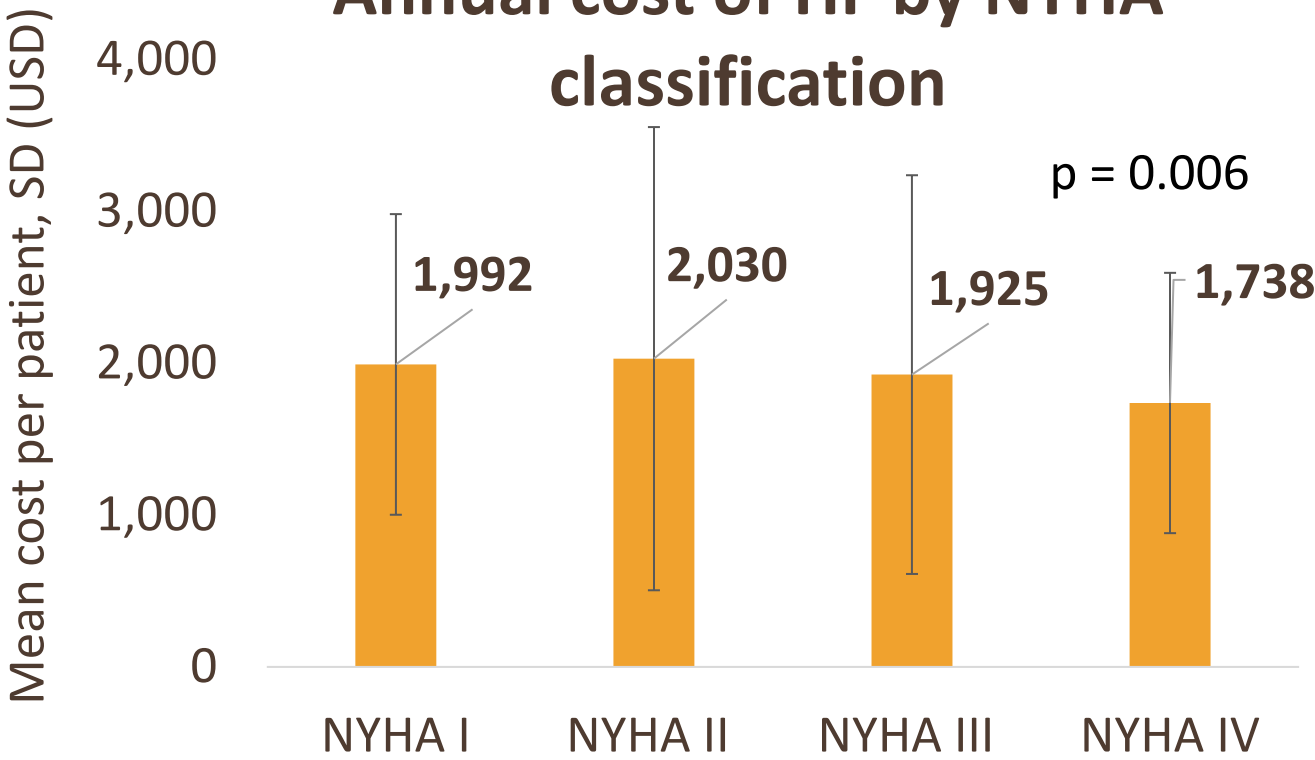
Total Cost of HF by Components



Annual Cost of HF by EF



Annual cost of HF by NYHA classification



Discussion

- HF cost was driven by inpatient cost (74.5%).
- Procedure (30.7%), diagnostic tests (30.4%) and hospitalization (20.9%) were the major components of the total HF cost.
- Higher cost in HFpEF because duration of hospitalisation was the longest (6.8 days) compared to HFrEF (5.1 days) and HFmrEF (3.6 days).
- The mean annual procedures performed in HFmrEF (0.4) were higher than HFrEF (0.2) and HFpEF (0.2).
- Higher cost in mild HF (NYHA I and II) contributed by expensive procedures (angiogram, percutaneous coronary intervention and device implantation) to inhibit disease progression.

Conclusion

- HF can significantly impact the health care cost considering increasing prevalence of risk factors for HF in Malaysia.
- Cost-effective treatments are needed to better manage the increasing economic burden of HF in Malaysia.

Reference

- Cook C, Cole G, Asaria P, Jabbour R, Francis DP. The annual global economic burden of heart failure. Int J Cardiol. 2014;**171**(3):368-76.