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Cost-Effectiveness Analysis of ARNI Compared to ACEI Among Heart Failure Patients With Reduced Ejection Fraction in Malaysia

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BACKGROUND

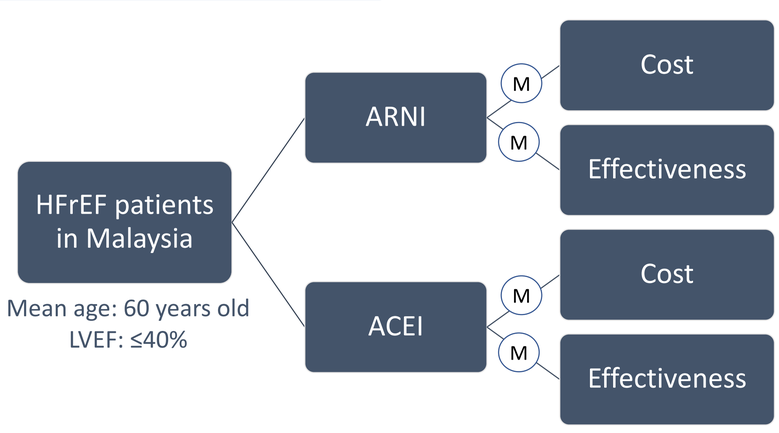
- Sacubitril/valsartan, the first-in class angiotensin receptor neprilysin inhibitor (ARNI), has been shown to reduce heart failure (HF) hospitalisation and cardiovascular (CV) mortality, and improve health-related quality of life in patients with heart failure with reduced ejection fraction (HFrEF) when compared with enalapril, an angiotensin-converting enzyme inhibitor (ACEI).[1-3]
- Despite proven benefit of ARNI over ACEI, the utilisation of ARNI in Malaysia is low and the standard of care remains ACEI.[4-6]
- The main barriers to utilisation of ARNI in Malaysia are costs and limited access.

OBJECTIVE

To compare the costs and effectiveness of ARNI with ACEI in treating HFrEF population from the Malaysian Ministry of Health's (MoH) perspective.

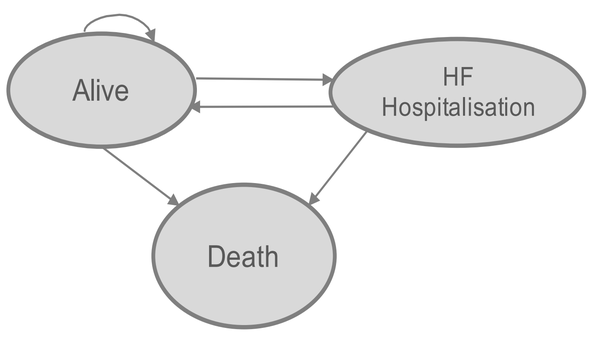
METHODS

F.1



- A 3-state Markov model with a monthly cycle was constructed to estimate the lifetime healthcare costs, hospitalisations, life years, quality-adjusted life years (QALY) and incremental cost-effectiveness ratio (ICER) of ARNI and ACEI for HFrEF patients (Figure 1 and 2).
- The monthly baseline risks for all-cause mortality and HF hospitalisation were age-adjusted to the Malaysian population. The relative treatment effects were obtained from the PARADIGM-HF trial.
- The utility values were derived from local observational studies.
- The cost of medicines, disease management and HF hospitalisation were derived from MoH hospitals. The cost of CV death was estimated from the ADVANCE trial (Malaysia datasets). All costs were adjusted to 2023 Malaysian Ringgit.
- The ICER was compared to RM55,426 per QALY (one-time Gross Domestic Product per capita).

F.2



RESULTS

T.1

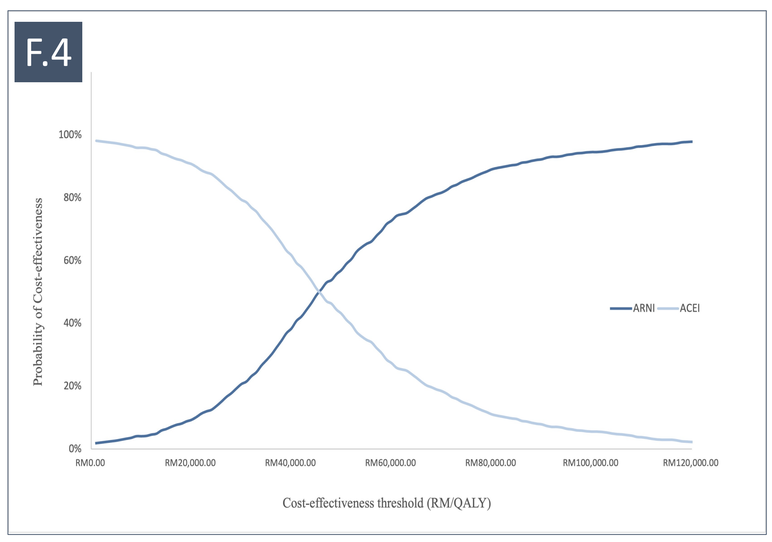
Base-case analysis	ARNI	ACEI	Difference
Costs	RM 42,372	RM 19,495	RM 22,876
Hospitalisation per 1000 patients	853	986	-261
Life years	6.86	6.22	0.65
QALYs	4.58	4.09	0.49
ICER (Cost per life year gained)			RM 35,406
ICER (Cost per QALY gained)			RM 46,498

T.2

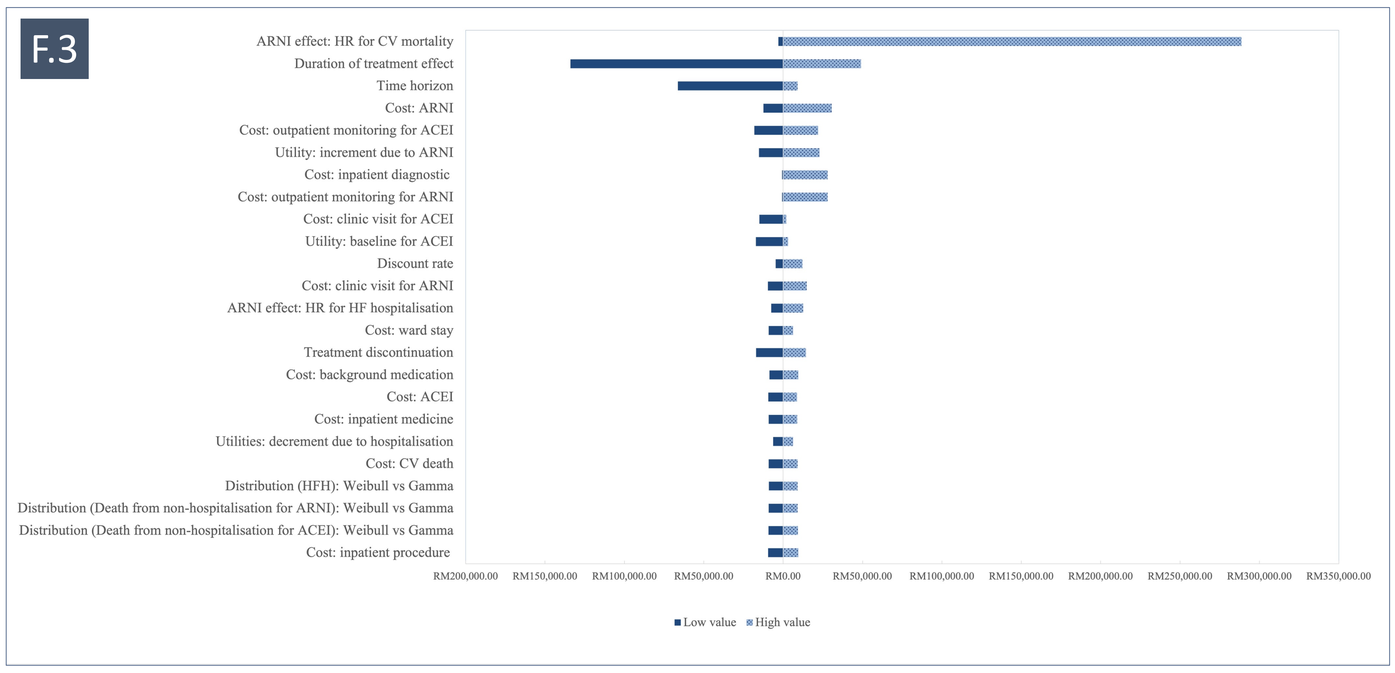
Scenario: Adding SGLT2-i into the background	ARNI	ACEI	Difference
Costs	RM 51,451	RM 19,495	RM 31,955
Hospitalisation per 1000 patients	511	986	-474
Life years	7.90	6.22	1.68
QALYs	5.36	3.66	1.26
ICER (Cost per life year gained)			RM 19,004
ICER (Cost per QALY gained)			RM 25,304

- Despite ARNI being more expensive than ACEI, it gained more QALYs (Table1).
- Replacing ACEI with ARNI incurred an additional cost of RM46,498 per QALY gained.
- One-way sensitivity analysis (Figure 3) found that the the ICER was sensitive to
  1) the relative treatment effect on CV mortality
  2) duration of treatment effect
  3) time horizon
- At cost-effectiveness threshold of RM55,426 per QALY, ARNI was cost-effective in 66% simulations (Figure 4).
- Scenario analysis demonstrated that initiation of SGLT-2i alongside ARNI was more cost-effective than ARNI alone (Table 2).

F.4



F.3



CONCLUSIONS

- At cost-effectiveness threshold of RM55,426 per QALY, replacing ACEI with ARNI for HFrEF patients in Malaysia is likely a cost-effective use of resources.
- Addition of SGLT-2i in the backbone therapies with ARNI should be considered to maximise the value of ARNI.

FULL ABSTRACT

References: 1) McMurray, et al. New Eng J Med; 2014;371:993-1004; 2) Lewis EF, et al. Circulation Heart failure. 2017;10(8). 3) Song Y, et al. Front Cardiovasc Med. 2022;9:922721. 4) Lim YMF, et al. Glob Heart. 2022;17(1):20. 5) Lam CSP. ESC Heart Failure. 2015;2:46-49. 6) Brownell NK, et al. Card Fail Rev. 2021;7(e18).

Abbreviations: ACEI: angiotensin-converting enzyme inhibitor; ARNI: angiotensin receptor neprilysin inhibitor; CV: cardiovascular; F: Figure; HFrEF: heart failure with reduced ejection fraction; HF: heart failure; HFH: heart failure hospitalisation; HR: hazard ratio; ICER: incremental cost-effectiveness ratio; MoH: Ministry of Health; QALY: quality-adjusted life year; RM: Ringgit Malaysia; SGLT-2i: sodium-glucose co-transporter 2 inhibitor; T: Table. Disclosure: This study did not receive any external funding for the conduct.