guideline adherence index as an objective evaluator of appropriate prescribing in heart failure: a meta-analysis

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Abstract
Introduction: In clinical practice, prescribing for heart failure (HF) patients may not always reflect the recommendations of international guidelines. Tools have been developed for assessing guideline adherence in HF. The Guideline Adherence Index (GAI) is the most frequently used and applied quantitative tool for this purpose.

Aim: To perform a meta-analysis of studies utilising the GAI to assess adherence to prescribing guidelines, the effect of guideline adherence on clinical outcomes and clinical associates of guideline adherence.

Research Design and Methodology: A systematic search of 11 electronic databases (including Medline, Science Direct and Web of Knowledge) was performed in order to identify all quantitative studies reporting the GAI as a tool to measure guideline adherence in HF patients aged ≥18 years. All full-text GAI-based studies were included. Risk of bias was assessed using the GRACE checklist.

Results: Twelve observational studies using GAI were identified. One study was excluded from the meta-analysis due to poor quality. The original GAI was developed to reflect the 2001 European HF guidelines and subsequent modifications have reflected guideline updates since then. Ten of the studies were performed in Europe. Patients with HF with preserved ejection fraction were included in seven studies. The GAI considers patient eligibility for the indicated therapy regarding the top three (GAI-3) or five (GAI-5) recommended HF medications. The ranges of GAI-3 and GAI-5 were 14% - 95% and 3% - 65% respectively across the 12 studies. The rate of achievement of high GAI-3 rose from 38% in 2005 to 71% in 2016. Six studies reported the association between high GAI and patient mortality (overall Hazard Ratio, HR = 0.29, 95%CI 0.06 - 0.51). Two studies compared the estimated mortality risk between patients with high GAI compared to those with medium–low GAI scores (7.7% vs. 16.5% respectively, Log rank p-value ≤0.005) and demonstrated lower mortality risk in those with high GAI score. One-year mortality rates per 100 persons were reported in five studies. Mortality rate was lower for patients with high GAI scores compared to those with medium-low GAI scores in all five studies. One study reported rehospitalisation rates and found that patients with a high GAI score were at significantly reduced risk of rehospitalisation over a 6-month follow-up period compared to those with medium-low GAI score (HR = 0.64, 95%CI 0.41 - 1.00). The average rehospitalisation rate per 100 persons was reported in four studies and was consistently lower for those with high GAI score compared to those with medium-low GAI scores (22.5% vs. 24.5% respectively). In multivariable analysis, high GAI score was significantly associated with implantation of a cardioverter defibrillator, previous revascularisation, chronic obstructive lung disease, hypertension, dyslipidaemia and ejection fraction ≤30% while low GAI level was associated with worsening kidney function, lower NYHA class, anaemia and older age.

Conclusion: Guideline adherence measured by GAI varies between settings however no study has reported an optimized GAI greater than 71%. High GAI is associated with reduced mortality and rehospitalisation. Improving guideline adherence may have a role in improving HF patient outcomes.