

Information about the Critically Appraised Topic (CAT) Series

The objective of the Doctor of Nursing Practice (DNP) program at George Mason University is to prepare graduates for the highest level of nursing practice. Emphasis is placed on evaluating and applying the evidence that supports practice, understanding and creating practice delivery systems based on patient outcomes, and assuming leadership roles in practice settings. Graduates of the program will be able to assume many roles in the health care system, including direct patient care, clinical nursing faculty, practice management, and policy development.

All DNP students take an evidence-based practice course titled Evidence Based Practice in Nursing and Healthcare (NURS 883). This hallmark course for the DNP program builds on knowledge of research methodologies to analyze the selection and evaluation of research underlying evidence based practice. Emphasis is placed on the translation of research in practice, the evaluation of practice and the improvement of the reliability of health care practice and outcomes.

The first assignment students complete is a Critically Appraised Topic (CAT). CATs are mini-systematic reviews and considered a snapshot of the literature on a topic of interest. Students critically appraise literature related to a focused clinical question and summarize the best available research evidence on the topic of interest. CATs conclude with clinical bottom lines for practitioners to quickly take away for consideration in practice.

The CATs published in MARS (Mason Archival Repository Service; mars.gmu.edu) are submitted by students after they have been reviewed, revised, and approved by their instructor. All CATs are current at the time of original publication but will not be updated over time.

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Does guideline adherence improve patient outcome in outpatient settings?

Purpose: Heart Failure (HF) is a chronic disease associated with substantial morbidity, mortality and healthcare expenditure. According to a study done by Their et al. (2008), the two main reasons that lead to less than optimal outcome, increased cost and higher utilization in patient with chronic diseases like HF are patient medication non-adherence and provider variation in delivery of guideline based care. The question then arises; will the patient have a better prognosis if the providers adhere to standard guidelines in managing HF? The purpose of this CAT is to review the relationship between adherence to outpatient Heart Failure pharmacological guidelines and clinical outcome.

Appraised by: Prithvi Ghimire

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Question: Does adherence to pharmacological treatment guidelines in outpatient settings improve the prognosis of heart failure patients?

Search Strategies and Results: Medline, CINAHL and Proquest nursing databases were searched for the key terms “heart failure” and “guideline adherence” or “care measures”. The search was limited from 2008 to 2012. Forty-five articles were retrieved of which 3 articles with the best level of evidence and relevance to the topic of interest were selected. Three prospective cohort studies were used for the review as they are the best observational designs for questions of prognosis. Randomized controlled trials (RCTs), the best design for inferring causality, have not been conducted in this area. For prospective cohort studies, duration of ≥ 6 months was required for inclusion in the review in order to ensure that sufficient follow-up time was provided to effectively evaluate the relationship.

Evidence retrieved:

Fonarow, G. C. et al. (2011). Associations between outpatient heart failure process-of-care measures and mortality. *Circulation*, 123, 1601-1610. doi: 10.1161/CIRCULATIONAHA.110.989632

Frankenstein, L. et al. (2010). The association between long-term longitudinal trends in guideline adherence and mortality in relation to age and sex. *European Journal of Heart Failure*, 12, 574-580. doi: 10.1093/eurjhf/hfq047

Stork, S., Hense, H. W., Zentgraf, C., Uebelacker, I., Jahns, R., Ertl, G., & Angermann, C. E. (2008). Pharmacotherapy according to treatment guidelines is associated with lower mortality in a community-based sample of patients with chronic heart failure a prospective cohort study. *European Journal of Heart Failure*, 10, 1036-1045.

Critical appraisal:

Fonarow et al. (2011):

Fonarow, et al. (2011) conducted a prospective longitudinal cohort study which concluded that current and emerging outpatient HF process measures or guidelines are positively associated with patient survival. Performance on 7 HF process measures and 2 summary measures (all or none-care and composite care) was assessed at baseline in 15177 patients with reduced left ventricular ejection fraction (35%) and chronic HF or post-myocardial infarction from 167 US outpatient cardiology practices with patients prospectively followed up for 24 months. Multivariable analyses were performed to assess the process-outcome relationship for each measure in eligible patients. Chi-square tests and t tests were used to evaluate statistical associations for categorical and continuous data, respectively. At the 24 months assessment, the baseline process measure conformity was significantly lower in patient who died (63.4%) compared to who survived (70.0%) for 5 of the seven individual measures ($p < 0.0001$). Five of the seven quality measures evaluated separately that were significantly associated with improved survival rate were, ACEI/ARB ($p < 0.001$), B-blocker ($p < 0.001$), anticoagulation for Atrial Fibrillation ($p = 0.001$), ICD/CRT-D ($p < 0.001$), and HF education ($p < 0.001$)

Strengths and limitations: The study included a diverse group of patient from a wide variety of outpatient cardiology practices and the registry contained detailed information on patient characteristics, presenting symptoms, diagnostic studies, treatments and outcome which increases the internal validity and generalizability to a different population. Appropriate statistical measures with p-values listed for each outcome supports the strength of the conclusion. The major limitation of the study is medical chart with data abstraction was the source of patient clinical data and it is possible that errors and omissions could have occurred. More importantly the study did not include the process of randomization and blinding.

Frankenstein et al. (2010):

A prospective, longitudinal multi-site study in an independent real-life population performed by Frankenstein, et al. (2010) established that the complete use of medication according to guidelines in outpatient setting is associated with substantial improvement in survival irrespective of age, sex or co-morbidities (adjusted HR:0.73; 95% CI:0.52-0.92; $p = 0.007$). All patients attending the outpatient cardiology clinics of 'Herzzentrum Ludwigshafen' or the university hospital Heidelberg between November 1994 and December 2007 were included in this observational study {Cohort I (1994-2000): $n = 1481$; Cohort II (2001-07): $n = 1811$ }. The HELUMA heart failure registry formed the basis for the analysis. Guideline adherence to medication was calculated using two approaches, complete adherence (yes or no) and by calculating the guideline adherence indicator (GAI). Chi-square test were performed to compare frequencies, two-tailed t test with p-value of less than 5% was regarded as statistically significant. Two-sample Wilcoxon test and one-way analysis of variance were used to test for significant difference in groups. Survival for the patient in Cohort I differed significantly from that of patient in Cohort II; log-rank chi-square 162.9, $p < 0.001$ because the medication guideline was updated in 2001 and thus were more in practice, the co-morbidity corrected GAI significantly increased from 1994-2000 to 2001-07 ($p < 0.001$). The 1 and 3-year mortality decreased (14.1-4.8 and 29.5-10.9%, respectively, $p < 0.001$ each). The percentage level of

GAI/medication according to guidelines was also significantly associated with decreased mortality (adjusted HR per 10% increase: .092; 95% CI: 0.88-0.97; $p < 0.001$).

Strength and limitations: The sample was appropriately described and appropriate statistical measures were used to reach the conclusion. The study had a large sample and accounted for age, sex and co-morbidity, which has a huge possibility of generalizability. But the population studied was of white Caucasian origin. Applying the results therefore to populations from different ethical/racial backgrounds may not be reliable. Also, due to the observational nature of the study randomization and blinding were not performed. The study was conducted in Germany and its generalizability to the United States could be questionable.

Stork et al. (2008):

In a prospective cohort study done by Stork et al., (2008) better implementation of pharmacotherapy was associated with better prognosis in patient with reduced LVEF, irrespective of age or sex. A total of 1054 in and out patients were included from a tertiary care hospital. Groups were compared using t-test after Levine's test, Mann-Whitney U-test, and Chi-square test or Fisher's exact test, as appropriate. In multivariable Cox regression, high GAI-3 was Independently predictive of lower mortality risk: hazard ratio (HR) 0.50 (95% confidence interval [CI] 0.32–0.74; $p > 0.001$) vs. low GAI-3 {the quality of pharmacotherapy was assessed by calculating the GAI (range from 0% to 100%) as number of drugs taken divided by number of drugs indicated}. This association was also observed in subgroups of high age (HR 0.42, 95%CI 0.27–0.66; $p > 0.001$) and women (HR 0.42, 95%CI 0.23–0.79; $P = 0.007$). A relative risk reduction of 63% and 44% for GAI-3 and GAI-5 (guideline adherence indicator based on 3 and 5 substance classes) respectively was observed. This supports the concept that a combination therapy, consisting of beta blocker, ACE inhibitor/ARB and MR blocker, may be beneficial regardless of the type of CHF (i.e. reduced vs. normal LVEF)

Strength and limitations: The study had strong statistical data to support the conclusion. The study was conducted prospectively and a large sample size ($n = 1054$) was used. Both inpatients and outpatients were included in the study, which threatens the validity of the study in just an outpatient setting. A potential threat to external validity exists by using convenience sampling and it lacks randomization due to its observational nature.

Conclusion:

Although none of the studies were randomized controlled trials (RCTs), the clinical significance of these studies is still important. The studies have shown that adherence to pharmacological guidelines in outpatient settings has favorable outcome in terms of patient survival. These findings emphasize the importance of meticulous implementation of guidelines in clinical settings irrespective of age, sex or comorbidities. The primary care providers can be supplied with quick reference guide to the guidelines, or an electronic checklist to ensure that proper steps are followed. However, there is a great need for further research on this subject matter not only for patient survival as an outcome but also for heart-related quality of life, symptom controls, functional capacity, patient satisfaction, and hospitalization rates that may be associated with guideline adherence.

Reference:

Thier, S. L., Yu-Isenberg, K. S., Leas, B. F., Cantrell, C. R., Cantrell, C. R., DeBussey, S., & Goldfarb, N. I. (2008). In chronic disease, nationwide data show poor adherence by patients to medication and by physicians to guidelines. *Managed Care*, Retrieved from http://www.managedcaremag.com/sites/default/files/imported/0802/0802.peer_evidence.pdf