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ORIGINAL ARTICLE

Drug-related problems vary with medication category and treatment duration in Taiwanese heart failure outpatients receiving case management

Wan-Tseng Hsu [a], Li-Jiuan Shen [b,c,d], Chii-Ming Lee [e,*]

[a] *Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan*
[b] *Graduate Institute of Clinical Pharmacy, College of Medicine, National Taiwan University, Taipei, Taiwan*
[c] *School of Pharmacy, College of Medicine, National Taiwan University, Taipei, Taiwan*
[d] *Department of Pharmacy, National Taiwan University Hospital, Taipei, Taiwan*
[e] *Division of Cardiology, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan*

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Background/purpose: Heart failure (HF) patients are at high risk of having drug-related problems (DRPs). We aim to describe the frequency, types, and temporal occurrence of DRPs in Taiwanese HF outpatients receiving case management.

Methods: In this study, we included 141 patients from HF clinics in three hospitals in Taiwan from October 2008 to December 2010. Nurse case managers at each of the participating sites registered case report forms (CRFs) for patients during clinic visits. DRPs were classified using the Pharmaceutical Care Network Europe Foundation (PCNE) classification system and documented by pharmacists after reviewing CRFs and participating in multidisciplinary team discussions.

Results: For 141 clinic participants, the average duration of medication use was 17 months, and 796 DRPs were reported. The DRPs most frequently recorded were the need for laboratory tests (32.7% of total DRPs), followed by potential interaction (29.6%), nonallergic side effects (13.3%), and insufficient awareness of health and disease (9.5%). The drugs most frequently causing a DRP were angiotensin-converting enzyme inhibitors/angiotensin II receptor blockers, diuretics, warfarin, spironolactone, and β-blockers. The incidence rates of total DRPs was maximal during the initial 3 months of medication treatment, whereas the incidence rates of each category of DRPs showed multiform changes over time among various drug classes.

Conflicts of interest: The authors have no conflicts of interest relevant to this article.

* Corresponding author. Division of Cardiology, Department of Internal Medicine, College of Medicine, National Taiwan University, Number 7, Chung-Shan South Road, Taipei 10002, Taiwan.
E-mail address: chiiminglee@ntu.edu.tw (C.-M. Lee).

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Conclusion: In Taiwan where the clinical pharmacist system is not well organized, HF outpatients still had a high prevalence of DRPs despite intensive monitoring by nurse case managers. Clinical pharmacists play critical roles in detecting potential DRPs during long-term medication treatment for this population.

Introduction

A drug-related problem (DRP) is defined as an event or a circumstance involving drug therapy that actually or potentially interferes with desired health outcomes.[1] Strong evidence has shown that the negative outcomes associated with DRPs are a major health issue. A probability model has been used to estimate that morbidity and mortality associated with DRPs account for $76.6 billion in hospital costs, 17 million emergency department visits, and 8.7 million hospital admissions annually in the United States.[2] The majority of hospital admissions and emergency department visits caused by DRPs are preventable, and an effective medication review for the successful detection of DRPs remains an unmet clinical need.

Heart failure (HF) is a global epidemic that affects approximately 6% of people aged between 60 and 86 years.[3–6] It accounts for considerable morbidity, mortality, and health expenditure. The incidence of HF increases twofold for each decade of life.[7] The personal, economic, and health care burden of HF is expected to increase in the future as longevity improves, placing further pressure on finite health care resources. Furthermore, polypharmacy and older age have been identified as critical risk factors for DRPs,[8,9] and these characteristics are present in HF patients. Roughead et al[10] demonstrated that a practitioner–pharmacist collaborative review of home medication is effective in delaying the time to next hospitalization in HF patients. Several studies also provided evidence on the clinical effectiveness of pharmacist intervention in improving medication adherence[11] and controlling of comorbidities of HF patients.[12] Therefore, a comprehensive medication review should be applied in HF care settings to reduce the incidence of DRPs.

To improve the outcomes of HF patients, the care of these patients should be integrated in multidisciplinary management programs, in which patients receive care from practitioners with expertise in HF.[13] These programs are typically led by a case management nurse, and interventions include education of the patient and family, a prescribed diet, social service consultation, a review of medication, and intensive follow up. In practice, most HF patients are treated as outpatients, and their care in this setting is challenging; less time is available for outpatient evaluation, and much more reliance is placed on telemonitoring and phone contact between clinic visits. These clinical scenarios may increase the frequency of DRPs. Therefore, a multidisciplinary approach is warranted for the treatment of HF patients in outpatient clinic settings. The characteristics of DRPs may differ between HF inpatients and outpatients. For example, outpatients with chronic HF may have DRPs that are more closely related to comorbidities than to the specific HF syndrome.[14] However, little is known about the incidence and characteristics of DRPs in outpatients under the care of physicians and nurse practitioners.

In Taiwan, cardiovascular disease was the second most prevalent cause of death in 2014. The prevalence of HF is 5.5%[15] in Taiwan, a rate comparable to that in other countries. The medical resources and health care environment for HF patients differ between Taiwan and Western countries. The majority of residents in Taiwan are covered by the country's National Health Insurance program, in which patients can visit medical specialists directly without referral by family physicians. Therefore, unlike in the United States and Europe, the physicians in charge of the primary care of HF patients are typically cardiologists instead of general physicians. The DRP patterns and the capacity for interventions by pharmacists in the patients actively seeking medical care in Taiwan remain to be clarified.

In the current study, we assessed the incidence and characteristics of DRPs in HF outpatients in multidisciplinary management programs led by cardiologists and nurse case managers. A certified pharmacist retrospectively reviewed medication taken by patients and recorded DRPs. The purpose of this study is to evaluate the need for inclusion of a clinical pharmacist in multidisciplinary care of HF outpatients and provide suggestions for implementation of similar services in Taiwan.

Methods

Setting

Consecutive patients were enrolled from HF outpatient clinics of Keelung Chang Gung Memorial Hospital, Chi Mei Hospital, and China Medical University Hospital in Taiwan between October 2008 and December 2010. This study was approved by the institutional review boards of the participating hospitals. The HF clinics were additionally staffed by nurse specialists who were responsible for case management, scheduled telemonitoring, and communication with pharmacists.

Participants

Patients were eligible if they exhibited HF signs and symptoms and a low left ventricular ejection fraction (LVEF $\leq$ 40%) or preserved LVEF with evidence of structural heart disease, as shown in cardiovascular imaging,