

Commentary

Role of the Ghanaian Clinical Pharmacist in Providing Evidence-based Pharmacotherapy for Heart Failure Patients: The Way Forward

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To cite this article:

Martin Mumuni Danaah Malick, Botah Baafi Adomako, Kwame Agyepong. Role of the Ghanaian Clinical Pharmacist in Providing Evidence-based Pharmacotherapy for Heart Failure Patients: The Way Forward. *Cardiology and Cardiovascular Research*. Vol. 4, No. 3, 2020, pp. 146-151. doi: 10.11648/j.ccr.20200403.20

Received: June 21, 2020; **Accepted:** July 23, 2020; **Published:** August 20, 2020

Abstract: *Background:* Heart failure is extensively characterized as a disorder arising from a complex interaction between impaired ventricular performance and neurohormonal activation. In order to achieve optimal therapeutic outcomes, all heart failure patients must be managed by a multidisciplinary team of healthcare providers, using evidence-based Pharmacotherapy. *Purpose:* The aim of this article is to assess the clinical role of the Ghanaian Pharmacists in optimizing Pharmacotherapy for heart failure patients based on internationally established clinical roles of Pharmacists. *Methods:* A literature search was conducted via google scholar using the “search engine” terms: Pharmacist, Clinical Role, Heart failure to look for all studies published in English. The search revealed a total of 98 studies. Only the studies that discussed the role of the clinical Pharmacists specific to heart failure or generally for patients with cardiovascular diseases were included; All other studies were excluded. A Total of 54 studies were used for data analysis. Clinical Pharmacists who are somehow involved in the management of heart failure patients were interviewed to ascertain their roles as members of a multidisciplinary team and their responses documented. *Conclusions:* A Multidisciplinary team approach including a Clinical Pharmacists with expertise in cardiovascular therapeutics, is required in the management of heart failure patients in order to improve therapeutic outcomes. The current clinical role of the Ghanaian Pharmacist in the management of heart failure patients is substandard.

Keywords: Heart Failure, Pharmacist, Clinical Role, Evidence-based Pharmacotherapy

1. Introduction

Heart Failure is a low cardiac output disease that can either manifests itself acutely or chronically and is characterized as a disorder arising from a complex interaction between impaired ventricular performance and neurohormonal activation [1]. Clinical Pharmacists possess advanced training, certification and experience in a specific practice setting and or disease; and are usually important members of a multidisciplinary team of healthcare providers [2-5] Clinical Pharmacists caring for heart failure patients provide optimized evidence- based

Pharmacotherapy which improves therapeutic outcomes [6] Despite available evidence supporting the mortality benefits provided by some prescribed therapies for heart failure, it is well documented that, these therapeutic options are not optimally prescribed in real clinical practice [7]. This creates an opportunity for Clinical pharmacists to recommend drug therapy interventions that will maximize outcomes. Clinical Pharmacists Responsibilities in the management of heart failure patients are diverse and well documented in the literature [8]. Although each practice environment creates a peculiar opportunity for different types of clinical pharmacist's

interventions, there are a few important aspects of services that appear to be consistently performed across different practice settings [9]. The aim of this article is to assess the clinical role of the Ghanaian Pharmacists in optimizing Pharmacotherapy for heart failure patients based on the internationally established clinical roles for Pharmacists.

2. Methods

A literature search was conducted via google scholar using the “search engine” terms: Pharmacist, Clinical Role, Heart failure looking for all studies published in English. The search revealed a total of 98 studies. Only the studies that discussed the role of the clinical Pharmacists specific to heart failure or generally in patients with cardiovascular diseases were

included, all other studies were excluded. A Total of 54 studies were used for data analysis. Clinical Pharmacists who are somehow involved in the management of heart failure patients were interviewed to ascertain their roles as members of a multidisciplinary team and their responses documented.

3. Results

As it is common with all clinical Pharmacists in general, the aim of the heart failure clinical pharmacist is to identify and resolve any drug therapy problems associated with anti-heart failure Pharmacotherapy. Table 1. Summarizes the internationally established the general drug therapy problems categories with pertinent examples in heart failure patients [10-13].

Table 1. Summary of categories of drug related problems.

Drug Related Problems	Description	Example in Heart Failure (HF)
Untreated Indication	Patient has an indication that requires drug therapy but not receiving any drugs for that indication.	Omission of ACE inhibitor from discharge medication list in a patient with reduced LVEF without documentation of contraindication or plan for when to restart after discharge
Improper drug selection	Patient is taking the wrong drug for stated indication	Patient with acute decompensated heart failure receiving verapamil for atrial fibrillation
Subtherapeutic dosage	Patient is being treated with too little of the correct drug for their medical problem	Patients with HF and blood pressure > 135/85mmHg and heart rate > 75bpm on 2.5 mg lisinopril daily and 3.125ng carvedilol twice daily
Failure to receive drugs	Patient has a medical problem resulting from not receiving a drug (e.g. for pharmaceutical care, psychological, sociological or economic reasons)	Patient is unable to fill prescribed medications after discharge from HF admission due to cost or inability to get to the Pharmacy
Over dosage	Patient is being treated with too much of the correct drug (Toxicity)	Patients with NYHA functional class IV HF and reduced LVEF on digoxin with a trough serum concentration of 1.7ng/ml
Adverse drug reactions	Patient has a medical problem resulting from an adverse drug reaction or adverse effect	Patient with NYHA functional Class III experiencing increased edema after initiation of pioglitazone
Drug Interactions	Patient has a patient problem resulting from a drug-drug, drug- food or drug – Laboratory interaction	Patient with worsening renal function in a setting of combination of ACE Inhibitor and over the NSAIDs use.
Drug use without indication	Patient is taking a drug for no medically valid indication	Continuation of proton-pump inhibitor after discharge when initiated for stress ulcer prophylaxis during HF admission, in the absence of other documented indication

Legend: ACE=Angiotensin Converting Enzyme; bpm=beats per minute; LVEF=Left Ventricular Ejection Fraction; NYHA=New York Heart Association; NSAID=Non-Steroidal Anti-inflammatory Drugs; Adapted from references [10-13].

Several studies have been conducted to assess the impact of clinical Pharmacists interventions on outcomes in the management of heart failure patients. These studies described the role of pharmacists in the management of patients with heart failure; and discussed various services performed by

pharmacists in diverse spectrum in different practice settings, using several outcomes measure. The content of Table 2 depicts a summary of some of the relevant trials evaluating Pharmacists intervention in heart failure [13-26].

Table 2. Summary of studies evaluating the interventions of Pharmacists in management of heart failure patient.

References	Study Characteristics	Design	Intervention	Outcomes
Eggink et al. [13]	Intervention prior to discharge	Randomized controlled study	a) Medication education b) Medication reconciliation, communication with community pharmacists and patients' primary care doctors c) By pharmacists	Reduce medication discrepancies and errors
Kripalani et al [14]	Intervention prior to discharge with follow-up	Randomized controlled study	a) Medication education b) Medication reconciliation, communication with community pharmacists and patients' primary care doctors c) By pharmacists	No difference between groups
Jain et al. [15]	Outpatient clinic service	Before and after intervention comparison	a) Dose titration of heart failure medications based on a protocol b) By pharmacist or nurse	a) Improvement in drug prescribing rate b) Improvement in target dose b) achievement c) Improvement in symptoms

References	Study Characteristics	Design	Intervention	Outcomes
Stewart et al. [16,17]	Intervention prior to discharge with follow-up	Randomized controlled study	a) Single home visit within 1 week of discharge from hospital by nurse or pharmacist b) Optimize medication management, identify early clinical determination, intensify necessary medical follow-up	Fewer unplanned readmissions and out-of-hospital deaths in the intervention group
Rainville [18]	Interventions prior to hospital discharge with follow-up	Randomized controlled study	a) By pharmacist and nurse b) Identification of hospital readmission risk factors, recommendation of medication changes to physicians if necessary	Less heart failure readmission
Patel et al. [19]	Intervention prior to discharge and follow-up	Controlled study	a) By pharmacist b) Drug therapy evaluation, counselling over the telephone, recommended drug therapy changes to the physicians	No difference in number of readmissions
Varma et al. [20]	Outpatient clinic service	Randomized controlled study	a) By pharmacist b) Education on heart failure, prescribed drugs and symptom management, contacted physician if needed	Improved exercise capacity, better compliance with drug therapy, fewer hospital readmissions
Gattis et al. [21]	Outpatient clinic service	Randomized controlled study	a) By pharmacist b) Extensive education and counselling on medications, discussed and optimized patients' drug regimens with physicians, necessary recommendations regarding heart failure therapy, discussed changes made in drug therapy with patients, telephone follow-up	Reduction of clinic events, hospitalization, and death rates
Whellan et al. [22]	Outpatient clinic service	Nonrandomized	a) By pharmacist b) Reviewed medications with patients, provided medication appraisals for physicians	Increased beta blocker use, decreased hospitalization rate
Goodyer et al. [23]	Home-based intervention	Randomized controlled study	a) By pharmacist b) Intensive counselling using a standard written protocol	Intervention group patients showed significantly higher compliance and improved medication knowledge
Lowrie et al. [24]	Outpatient clinic service	Randomized controlled study	a) By pharmacist b) Medication initiation and dose titration	Improved prescribing of disease-modifying medications but did not improve patient clinical outcomes
Gwadyr- Sridhar et al. [25]	Outpatient clinic service	Randomized controlled study	a) By pharmacists and nurse educators b) Education on medication adherence, dietary, and lifestyle modification	Improved quality of life but did not improve patient clinical outcomes
López Cabezas et al. [26]	Intervention prior to discharge and follow-up	Randomized controlled study	a) By pharmacists b) Education on disease, diet, and drug therapy	Reduction in hospitalization at 2, 6, and 12 months

Table 3. Comparison between clinical roles established by international standards versus current clinical roles of Ghanaian Pharmacists in the Management of heart failure patients.

Nature of Clinical Role	International Standard	Ghanaian Standard
Ward rounding with Multidisciplinary Team	YES	YES
Medication Initiation	YES	NO
Dosage titration	YES	NO
Dosage adjustment based on vital organ dysfunction	YES	NO
Therapeutic drug monitoring	YES	NO
Discharge Planning	YES	NO
Medication reconciliation	YES	NO
Adherence counselling and education	YES	YES
Post-hospital discharge follow-up visit (Clinic or Home)	YES	NO
Medication Reviews at Community Pharmacy Level	YES	NO
Total Score	10/10	2/10
Percentage of services provided	100%	20%

4. Discussion

Intentionally established roles of the clinical Pharmacists in the management of heart failure patients

Clinical Pharmacists Provide evidence-based Pharmaceutical care for patients with heart failure through numerous drug therapy interventions [27].

Medication reconciliation and education

Medication reconciliation is a process of comparing patients medications orders to all of the medications that they may have been taking in order to avoid errors such as omissions, duplications, dosing errors and interactions especially during transition of care [28]. Medication reconciliation and education constitute 2 major responsibilities of clinical Pharmacists that are now

established to positively impact clinical outcomes of patients with different diseases including heart failure patients [29].

Complex medication regimens for heart failure coupled with other comorbidities increase the likelihood of medication reconciliation discrepancies. Clinical Pharmacists leading the medication reconciliation process, perform medication reviews, communicate prescribing errors with the cardiologist, prepare written overviews of discharge medications and communicate with community pharmacists and patients primary care physicians about their medications in order to establish continuum of care so as to significantly reduce medication discrepancies [30-40].

Medication initiation, dosage titration, adjustment and monitoring.

Although several evidence-based clinical practice guidelines have established that treatment of heart failure patients with certain drug therapies improve mortality [41-45], these therapies are suboptimally prescribed. Therefore, under these compromising circumstances, Clinical Pharmacists seize the opportunity to initiate therapies that are omitted, recommend titration of improper dosages, make recommendations for adjustment of dosages of certain therapies, implement therapeutic drug monitoring protocols for some therapies; all based on functional integrity of certain vital organs [46]. This approach definitely optimizes therapeutic outcomes.

Post Hospital discharge follow up clinic or home visit

The involvement of clinical Pharmacists in the management of heart failure patients in the “outpatients” or “post-discharge” settings, is perhaps the most researched and documented [47]. During post hospital discharge follow up visits, Clinical Pharmacists perform an assessment of the patient’s knowledge about prescribed medications, screen for all possible interactions, adverse drug reactions and ease of access to prescribed heart failure medication. This type of patient centered care has the potential to reduce the rate of hospital readmission due to decompensated heart failure, promotes patients’ compliance, and enhance medication safety and effectiveness.

Assessment of the current role of the Ghanaian Clinical Pharmacists in the management of heart failure patients

Currently there are a very limited number of Ghanaian clinical Pharmacists with expertise in cardiovascular therapeutics providing evidence-based Pharmacotherapy for heart failure patients.

The depth of clinical services provided by Ghanaian Pharmacists to heart failure patients is considered substandard (20%) as compared to international standards (Table 3). This very limited clinical role will definitely not yield any clinically meaningful and measurable therapeutic outcomes.

5. Limitations

Since we limited our search engine to only studies published in the English, is it highly likely that we might have missed out on pertinent studies published in non-English languages which could have potentially add more scientific value to the content of this manuscript. Also, the nature of this

research did not allow us to assess the impact of the substandard role of the Ghana clinical on morbidity and mortality in heart failure patients. Further research is required in this area.

6. Conclusion

A Multidisciplinary team approach including a Clinical Pharmacists with expertise in cardiovascular therapeutics, is required in the management of heart failure patients in order to improve therapeutic outcomes. The current clinical role of the Ghanaian Pharmacist in the management of heart failure patients is substandard.

7. Recommendations

- 1) The Ministry of Health of Ghana in collaboration with the Ghana health services and Ghana Medical Association should task the Ghana College of Physicians and Surgeons with the responsibility of training More Specialist Cardiologists for the public healthcare institutions.
- 2) The Ministry of Health of Ghana in collaboration with the Ghana Health Service should ensure that Heart Failure Clinics are established and well equipped within the Teaching and Districts Hospitals across the country.
- 3) The Ministry of Health of Ghana in collaboration with the Pharmaceutical Society of Ghana must task the Ghana Post Graduate College of Pharmacists with the responsibility of training more Clinical Pharmacists with expertise in the area of Cardiovascular therapeutics. This initiative will equip these Pharmacists with the relevant skills and competences to provide evidence-based Pharmacotherapy for all heart failure in Ghana.
- 4) The Ministry of health of Ghana should consider formulating and implement a comprehensive job description for all Clinical Pharmacists caring for heart failure patients in collaboration with the Head of the clinical Pharmacy Faculty of the Ghana post graduate college of Pharmacists and all the directors of Pharmacy from all the Teaching Hospitals across the country.

Source of Funding

Not applicable.

Data Availability Statement

Not applicable.

Authors Contributions

The research idea was coined by MMDM and accepted by all authors putting the topic through a re-wording analysis. BBA and KA conducted a very comprehensive literature search and the selected studies were reviewed, synthesized and analyzed by all authors. The manuscript was written by

MMDM, revised and approved by all authors.

Declaration of Conflict of Interest

The authors declare that they have no competing interests.

Acknowledgements

The authors wish to officially acknowledge Mr. Bismarck Apraku of the ICT Department of the University for Development Studies for providing a conducive environment for the literature search and for assisting with proofreading the final manuscript.

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