Commentary

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

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

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

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<td>Stewart et al. [16,17]</td>
<td>Intervention prior to discharge with follow-up</td>
<td>Randomized controlled study</td>
<td>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 a) By pharmacist and nurse</td>
<td>Fewer unplanned readmissions and out-of-hospital deaths in the intervention group</td>
</tr>
<tr>
<td>Rainville [18]</td>
<td>Interventions prior to hospital discharge with follow-up</td>
<td>Randomized controlled study</td>
<td>b) Identification of hospital readmission risk factors, recommendation of medication changes to physicians if necessary</td>
<td>Less heart failure readmission</td>
</tr>
<tr>
<td>Patel et al. [19]</td>
<td>Intervention prior to discharge and follow-up</td>
<td>Controlled study</td>
<td>a) By pharmacist</td>
<td>No difference in number of readmissions</td>
</tr>
<tr>
<td>Varma et al. [20]</td>
<td>Outpatient clinic service</td>
<td>Randomized controlled study</td>
<td>a) By pharmacist</td>
<td>Improved exercise capacity, better compliance with drug therapy, fewer hospital readmissions</td>
</tr>
<tr>
<td>Gattis et al [21]</td>
<td>Outpatient clinic service</td>
<td>Randomized controlled study</td>
<td>a) By pharmacist b) Drug therapy evaluation, counselling over the telephone, recommended drug therapy changes to the physicians</td>
<td>Reduction of clinical events, hospitalization, and death rates</td>
</tr>
<tr>
<td>Whellan et al. [22]</td>
<td>Outpatient clinic service</td>
<td>Nonrandomized</td>
<td>a) By pharmacist b) Reviewed medications with patients, provided medication appraisals for physicians</td>
<td>Increased beta blocker use, decreased hospitalization rate</td>
</tr>
<tr>
<td>Goodyer et al. [23]</td>
<td>Home-based intervention</td>
<td>Randomized controlled study</td>
<td>a) By pharmacist b) Intensive counselling using a standard written protocol</td>
<td>Intervention group patients showed significantly higher compliance and improved medication knowledge</td>
</tr>
<tr>
<td>Lowrie et al. [24]</td>
<td>Outpatient clinic service</td>
<td>Randomized controlled study</td>
<td>a) By pharmacist b) Medication initiation and dose titration</td>
<td>Improved prescribing of disease-modifying medications but did not improve patient clinical outcomes</td>
</tr>
<tr>
<td>Gwadry-Sridhar et al. [25]</td>
<td>Outpatient clinic service</td>
<td>Randomized controlled study</td>
<td>a) By pharmacists and nurse educators b) Education on medication adherence, dietary, and lifestyle modification</td>
<td>Improved quality of life but did not improve patient clinical outcomes</td>
</tr>
<tr>
<td>López Cabezas et al. [26]</td>
<td>Intervention prior to discharge and follow-up</td>
<td>Randomized controlled study</td>
<td>a) By pharmacists b) Education on disease, diet, and drug therapy</td>
<td>Reduction in hospitalization at 2, 6, and 12 months</td>
</tr>
</tbody>
</table>

Table 3. Comparison between clinical roles established by international standards versus current clinical roles of Ghanaian Pharmacists in the Management of heart failure patients.
based on functional integrity of certain vital organs. 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 prescribe heart failure medication. This type of patient's compliance, and enhance medication safety and therapeutic drug monitoring protocols for some therapies; all adjustment of dosages of certain therapies, implement therapeutic drug monitoring for some therapies; all based on functional integrity of certain vital organs.

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, 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. 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. 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 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 Ghana 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.

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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.

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