

Opportunities and Challenges in the New Emerging Role of Clinical Pharmacists in Ethiopia: Systematic Review

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Abstract

Introduction: The availability of large number of medicines and the constant efflux of new information make them practically impossible for any health care professional to be updated in all aspects. This leads to the emergency of the concept of pharmaceutical care. The role of clinical pharmacists in the hospital setting have the potential to positively impact the quality of patient care and provide cost savings.

Methods: A number of papers done in Ethiopia were used to see how pharmaceutical care is practiced in Ethiopia.

Opportunities: Pharmaceutical care is given high value starting from our country's health policy to stalk holders (hospitals, schools, other governmental and non-governmental institutions). The importance of pharmaceutical care services in saving lives and protecting public health is particularly relevant in resource-limited settings with a high prevalence of major medicine-treatable diseases and systems wide opportunities related to pharmaceutical care. Pharmaceutical care providers participate in ward rounds. Their clinical knowledge and skill has been improved and they have also trying to do more clinical based researches (complex case reports, drug therapy problem identification and intervention. Thus 'Clinical Pharmacists' is the heart of pharmaceutical care.

Challenges: Resistance of health care professionals to work with Pharmaceutical Care providers, unable to uphold responsibilities in their job, unable to get benefits for their activity, inadequate clinical skills, almost no role and responsibility of clinical pharmacist (lecturers) in their university hospitals, curriculum related problem and lack of sufficient number of specialists pose challenge for the emerging role of pharmacists.

Keywords Pharmaceutical care; Clinical pharmacists; Drug therapy problem; Health care professional

Abbreviations

ADR: Adverse Drug Reactions; AED: Antiepileptic Drug; AMCH: Adama Medical College Hospital; ART: Antiretroviral Therapy; ARV: Antiretroviral; BP: Blood Pressure; DTP: Drug Therapy Problem; EHRIG: Ethiopian Hospital Reform Implementation Guidelines; FBS: Fasting Blood Sugar; FIP: International Pharmaceutical Federation; FMHACA: Ethiopian Food, Medicines and Health Care Administration and Control Authority; FMOH: Federal Ministry of Health; HCT: Hydrochlorothiazide; TB: Tuberculosis

Introduction

Background

Drug treatment is an essential component of medical care to prevent, cure and control disease. Managing medicines safely, effectively and efficiently is central to the delivery of high-quality care that is focused on the patient and gives value for money [1,2].

The availability of large number of medicines and the constant efflux of new information make them practically impossible for any health care professional to be updated in all aspects. This leads to the emergency of the concept of pharmaceutical care. The International Pharmaceutical Federation (FIP) defines pharmaceutical care as 'the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patient's quality of life'. It blends a caring orientation with specialized therapeutic knowledge, experience, and judgment for the purpose of ensuring optimal patient outcomes. It is practiced in hospitals, community pharmacies, nursing homes, home-based care services, clinics and any other setting where medicines are prescribed and used. Its role is to ensure that a patient's medicine therapy is appropriately indicated, the most effective available, the safest possible, and convenient for the patient [3].

Evolution of pharmaceutical care in Ethiopia

Before many years, growing evidence from within and outside the United Kingdom has demonstrated that clinical pharmacy service resulted in positive impact on patient outcomes; the Department of Health recognized that pharmacists' clinical skills and expertise are an integral part of delivering better services to patients in the 2008 pharmacy White Paper, and reinforced this in 2010, identifying their

role in optimizing the use of medicines [4,5]. Examples include reductions in medication-related adverse events, lower treatment costs, and better patient outcomes, reduced length of stay and reduced readmission rates [6-8].

Recognizing this global change, various efforts have been made in Ethiopia to introduce clinical pharmacy services in the health care system and education. They include: revision of the undergraduate pharmacy curriculum in public universities in 2008; launching of the clinical pharmacy postgraduate program at Jimma University and practice postgraduate program at Addis Ababa University and at University of Gondar in 2015; inclusion of clinical pharmacy services in the Pharmacy Section of the Ethiopian Hospital Reform Implementation Guidelines (EHRIG) by the Federal Ministry of Health (FMOH) in 2010. Ethiopian Food, Medicines and Health Care Administration and Control Authority (FMHACA) in 2012 endorsed that pharmaceutical care should be provided as a minimum regulatory standard [9].

According to the Minimum Standards for Hospitals and EHRIG, all hospitals are expected to provide clinical pharmacy services as part of their pharmaceutical services. EHRIG expects pharmacists to carry out the following functions:

- Provide advice to doctors, nurses, and other health care workers on the clinical use of medicines, economic medicine use, and safety.
- Offer direct patient care services through, for example, medication history-taking, medicines education, and advice.
- Offer hospital managers, including clinical managers, appropriate advice and support to enable them to make informed decisions with respect to medicines policy, procedures, and guidelines designed to ensure safety, effectiveness, and economy in medicine use.

Schools of pharmacy in Ethiopia have changed their curricula from being product-focused to being patient-oriented, with the inclusion of a one-year clerkship as well as many clinical courses. The first three batches of students taught under the new curriculum have graduated. Most of the new pharmacists are assigned to public hospitals thereby strengthening the service provision.

As a result of these efforts, many hospitals are currently providing clinical pharmacy services, which is a new development in the practice of health care in the country. As it is a new phenomenon, it poses some opportunities and major obstacles from different stakeholders. We will try to illustrate these as follows. However, the services are not being provided in a standardized and uniform manner [9].

Positive impacts of clinical pharmacy service in Ethiopia

The importance of pharmaceutical care services in saving lives and protecting public health is particularly relevant in resource-limited settings with a high prevalence of major medicine-treatable diseases and systems wide opportunities related to pharmaceutical care. Areas where the pharmaceutical care approach might be applied to sub-Saharan Africa include medicine use evaluation, medication adherence and Pharmacovigilance [10].

Low-income countries have insufficient human resources for meeting their pharmaceutical care needs. Task shifting has been proposed as a strategy to free-up the pharmacy workforce to provide pharmaceutical care services [11].

For review of prescription's medication dosing errors, appropriateness of administration route, drug interactions, prescription ambiguities, inappropriate prescribing and many other potential problems. Formal assessments of prescription charts in hospitals have shown that there are wide variations in the quality of prescribing and pharmacists are able to identify and resolve many clinical problems. Patients can be questioned on their medication histories, including allergies and intolerances, efficacy of prescribed treatment, side-effects and adverse drug reactions (ADRs). The routine presence of medical and nursing staff on the ward allows the pharmacist to communicate easily with other members of the healthcare team who value the prescription-monitoring service that clinical pharmacists provide [12].

Success Story of Clinical Pharmacy Service

Patients admitted to hospital are at high risk for experiencing medication errors and there is a high potential to improve their drug therapy. By reducing medication history errors and improving medication appropriateness, clinical pharmacy services within a multi professional healthcare team improved the quality and safety of patients' drug therapy. The effect of routine implementation of medication reconciliation and review on healthcare visits will need further evaluation; the results from this thesis suggest that drug related hospital revisits could be reduced [13].

Clinical pharmacists participate in hospital wards

The role of pharmacists in the hospital setting has the potential to positively impact the quality of patient care and provide cost savings. Previous studies have shown that integrating pharmacists into rounding teams can enhance patient care through interventions at the point of assessment and prescribing [14].

Case report: The medication therapy of 100% of hospital inpatients with complex and high-risk medication regimens will be monitored by a pharmacist [15].

Cases: Study in Jimma University specialized hospital, showed that a total of 149 drug related interventions conducted for 48 patients were documented; among which 133 (89.3%) were clinical pharmacists initiated interventions and 16 (10.7%) interventions were initiated by other health care professionals [16].

Improvement in clinical knowledge and skill

Pharmacist-provided drug use evaluation: Studies in Ethiopia showed that clinical knowledge and skill of newly emerging pharmacists have improved. Study on antiepileptic drugs in Bishoftu general hospital, Ethiopia showed 54.4% of AED use was in accordance with the indication set in the national standard treatment guideline while 2.9% were inappropriate. Also, 121 (44%) of the indications were found to be difficult to know whether they are correct or incorrect indications since the type of epilepsy was not identified and written on the patient card. There were 16.5% under dose, 1.1% over dose and 12.7% AED use was with incorrect duration. There were potential drug-drug interactions in 5% [17].

Another study done on gentamicin (Ambo general hospital) and ceftriaxone (Dessie referral hospital) use evaluation showed that the use of these drugs was appropriate in 47.25% and 55.8% patients respectively. Maintenance fluid was co-administered medications with gentamicin (67.75%) and ceftriaxone (62.16%). Consistencies of

prescriber to the national standard treatment guideline were found to be low [18,19].

Interventions on drug-related problems and acceptance by the prescriber: The identification and suggestions for interventions by clinical pharmacists on clinically significant drug-related problems, and further, the acceptance of the interventions by the prescribers, are evidence of the major contribution of clinical pharmacists in reducing the frequency of drug-related problems, thus implying better pharmacotherapy for the patient. Interventions to reduce the occurrence of these problems are principally an indirect measure of their effects on patients.

Studies have shown that the majority (50-80%) of drug-related problems can be prevented [20,21], which strongly supports that these problems should be addressed.

Study on problems of using hydrochlorothiazide diuretic in adult diabetic patient in AMCH showed of patient with hypertension and type-2 diabetes, 82% and 90% of them had increased FBS after HCT administration and decreased FBS after HCT discontinuation respectively [22].

Another study on Drug related problems among hypertensive patients on follow up in AMCH showed that 155 (80.7%) patients have at least one drug therapy problem and a total of 452 drug therapy problems were identified. The most common drug therapy problem identified was drug interaction (n = 259, 58.7%), followed by non-adherence and adverse drug interaction constituting 19.5% and 18.6% respectively. Number of complications and number of drugs significantly affect drug therapy problems [23].

Another study on drug therapy problem among patients with cardiovascular diseases in Felege Hiwot Referral Hospital, Ethiopia indicated that a total of 73 (96.1%) patients had one or more drug therapy problem (DTP). The mean number of DTP was 1.38 + 0.8 per patient [24].

Interventions suggested by clinical pharmacists to solve or prevent drug-related problems are to a large degree accepted and acted on by the prescribers. An acceptance rate of 41-96% has been reported [25-27].

Effects of pharmacist interventions on different clinical outcomes: Different studies done with inferred evidence of an important role of the clinical pharmacist. A more direct measurement of the influence of clinical pharmacists is based on observations of the patient's clinical outcomes. Preferably, hard end-points should be evaluated, these being mortality, disease events and prevention of disease. These end-points are for practical reasons difficult to assess in clinical practice and research.

Interventions on adherence (Clinical pharmacists identify factor for non adherence): Given that the prescribing is optimal for the individual patient, efforts should be made to enhance adherence to medications. Adherence to a drug regimen could be assessed, as well as reduction in the frequency of adverse drug reactions. Another aspect of clinical outcome is to increase or maintain the individual's quality of life. Different studies have focused on different outcomes. In this review, the term, which corresponds to the term used in each paper, is used. A study on non-adherence and contributing factor in diabetic patients, Ethiopia showed that, 21.8% of the participants ascribed their non-adherence to forgetting to take their medications. Patients with duration of diabetes \leq 5 years (82.07%) were more compliant to their medication than those with $>$ 5 years (60.8%), which was found to be

statistically significant (= 0.003). The proportion of male patients adherent to their anti-diabetic medications was found to be lower than 69.78% compared to the female patients (74.81%), but the difference was not statistically significant ($>$ 0.05) [28]. Studies on hypertensive patients showed that among 96 respondents of hypertensive patients in Adama Referral Hospital 44 (45.8%) were non adherent to the prescribed medication [29].

Study on highly active antiretroviral therapy and predictors of non-adherence among pediatrics, Ethiopia showed that 84.2% of the participants had taken their prescribed ARV drugs fully for the past 7 days. Considering individuals who had ever missed their dose regardless of time reference, overall adherence rate is 66.7% was obtained. Most frequently mention a reason of missing their dose in the last one week was forgetting (40%) [30]. Other study on schizophrenic patients showed that, 56% of patients adhere to their medication. The most common reason for non-adherence were forgetfulness (43.5%), being busy (17.7%), lack of sufficient information about medication (14.5%) and pill burden (8%), duration of maintenance therapy, social drug Use and medication side effects each had a statistically significant association with medication adherence ($p <$ 0.05) [31].

In prospective, randomized, controlled study among patients with *Helicobacter pylori*, Al-Eidan et al., showed that patients in the clinical pharmacist intervention group had significantly higher compliance to the medication regimen compared to the control group (92.1% versus 23.7%, $P = 0.02$) [32]. The authors concluded that it is difficult to increase adherence among patients with chronic health problems. However, interventions to increase short-term adherence are relatively successful. This was the result regardless of which health professional carried out the interventions. Helping patients to understand their medicines and how to take them is a major role of clinical pharmacy service [33]. Adherence to treatment, particularly for long-term chronic conditions, can be poor and tends to worsen as the number of medicines and complexity of treatment regimens increase. NICE noted that between a third and half of all medicines prescribed for long-term conditions are not taken as recommended and estimated that the cost of admissions resulting from patients not taking medicines as recommended was between £36 million and £196 million in 2006-2007 [34,35].

Optimizing treatment outcome of the patients: Study on self care practice among ambulatory diabetes mellitus patients in Ambo general hospital illustrates that the level of knowledge about diabetes and self care practices amongst diabetic patients was low. In addition, it showed that respondents' level of physical activity, their educational status and time of insulin injection was low [36]. Study done on blood pressure control showed that the average mean of BP in 12 months was 140.58/80.92 mmHg; the overall control rate was 43.6%. Most of the patients had uncontrolled BP. There was mean BP difference among eight months [37].

Retrospective Cohort Studies on Mortality of Adults on Antiretroviral Therapy with and without TB co infection in Ethiopia showed that in crude analysis, all-cause mortality of TB co-infected patients was higher by 6.5% ($P = 0.004$). However, multivariate analysis showed that TB co-infection didn't increase mortality (AHR, 1.31 (0.573-3.007), $P = 0.52$). Instead, factors which increased death were low baseline functional status, malnutrition, CD4 count $<$ 100 cells/mm³ at the initiation of ART [38].

Challenges and opportunities

'Clinical Pharmacy' needs no further introduction to pharmacists as it is the heart of pharmaceutical care. It has significantly peripheral specialized pharmacy knowledge that is equally vital to optimize the quality of health care. It is a global issue in the pharmacy world. It is important for us to first accept the fact that the task in facing the challenges is the responsibility of the individual professionals forming the profession. This purely means it is our responsibility. Many of us, for many reasons, regard the responsibility entirely to the pharmacy professionals, Ministry of Health or the individuals holding certain posts and positions in the managerial level - an irresponsible dogma that should be eliminated as it brings more harm than good to us all.

Some of the challenges or potential opportunities (depending to our individual perspective) that the profession or precisely we need to tackle in order to place clinical pharmacy in the ground of our health care system,

1. **Leadership:** It is an important to initiate and sustain the wind of progressive changes. Strong leadership is the foundation of any

successful organization. A successful organization has leadership qualities at all levels. All levels must be willing to be lead to achieve the clearly stated realistic vision.

2. **Innovations:** When is the last time we initiated something new? When is the last time we challenged ourselves to do something out of the norm?
3. **Clinical developments:** Are we joining the front line of the growing clinical developments? In the scientific world where evidence based is the only communicable language, we must be more than just a commentator. Pharmacists should be looking across the boundaries and grab the opportunities to be hands-on in research. It is high time for us to be loud professionally otherwise we will always be the profession that has a history of rewarding clinical experience with management that does not reach any extraordinary potential.
4. **Education and training:** Professional training and education is a vital investment. Many efforts have been put forward and are still taking place in our local system (Table 1).

When	How often	Activity	Responsibility	Tool
At admission	Once for each Patient	Admission medication reconciliation	Clinical pharmacists	Medication Interview Questionnaire: Part 1: identification of the most accurate medication list for the patient Part 2: addition of questions concerning the patient's practical handling, knowledge of the medications and adherence to the medical regimen Part 3: addition of more detailed questions concerning the patient's adherence to the medical regimen and beliefs about medications.
During hospital stay	At regular intervals for each patient	Medication review and Monitoring Symptom assessment Lead the team and organize a treatment plan based on the symptom assessment, medication review and reconciliation results	Clinical pharmacists Nurse or Physician	Medication Review Form Symptom Assessment Form Documented in the patient health record
At discharge	Once for each Patient Occasionally	Discharge medication Reconciliation Quality control of discharge medication reconciliation	Physician or clinical pharmacists	Discharge Information Form, including a Medication Report and a Medication List Quality Control form for Discharge Medication Reconciliation

Table 1: Activities performed in the hospital wards for each patient, the responsible professional groups, and the tools used to perform the activities.

Author's Contribution

BKG has made substantial contributions to conception and gathering of information and has been involved in drafting the manuscript or revising it critically for important intellectual content; and has given final approval of the version to be published. GTT has made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data. ADD and GAA have been involved in drafting the manuscript or revising it critically for important intellectual content. All Authors read and approved the final manuscript.

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