



The Metamorphosis of Pharmacy Education in Ethiopia: The Case of Mekelle University

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Research Article

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Abstract

Objective: Ancient Ethiopians relied on traditional and herbal medications and modern drugs were unknown to them until the turn of the 19th century. Earlier, education was under the monopoly of the church and medical practices were characterized by ritual healings. In the mid-20th century, the country established higher learning institutions which started teaching pharmacy and other sciences at tertiary levels. The curriculum was however the so called “product-centered” which until recently remained to be the guiding principle of the country’s pharmaceutical education. The trend in global context of pharmacy education and practice has been changing with the adoption and extension to a much more “patient-centered” philosophy. The recent organized move by most public-funded Pharmacy Schools and Departments in the country has witnessed some changes on their curricula which aimed at producing pharmacists with better clinical expertise.

This article critically analyses the changes on the curricular contents that have resulted due to the curricular amendments at the Department of Pharmacy, Mekelle University.

Methods: Systematic analyses of all the curricular documents (new and old) used by both the Mekelle and Addis Ababa University were carried out. International contexts of Pharmacy teaching were benchmarked to indicate future training directions in Ethiopia.

Results: The newly devised curriculum is “patient-centered” by the global standards though the Degree awarded remained to be the traditional B.Pharm. There are significant changes on the proportions of Professional, Supportive and General education courses as stipulated

on the curricular documents.

Conclusion: With slight refinement to its curriculum, the Department can launch the Pharm.D program. The commitment of the government in resource allocation and training the badly needed experts to make it a reality will indeed remain to be the key.

Key words: Pharmacy, education, curriculum, Ethiopia, patient-centered.

Introduction on Historical perspectives of Pharmacy in Ethiopia

The introduction of Pharmaceutical products to the Ethiopian community dates back to the early 16th century. Historical accounts put this time to the reign of King Libnedingil (1520-1526). Every white man was considered as a Physician and hence referred to as *Hakim* which literally means “a healer”. Travelers like James Bruce who came to Ethiopia following the course of the Blue Nile were considered by much of the then rural Ethiopians as medical practitioners because they used to distribute different drugs to the community. Drugs like Epsom Salt (laxative), Epecacuhna (inducer of emesis), were distributed to complaints of every intestinal distress¹.

The establishment of retail outlets of modern drug products however took the stage at considerably latter times during the reign of king Minilik II (1889-1913). Until the eve of the Italian occupation in 1935, very few such modern drug retail outlets had been operational only in some parts of the capital Addis Ababa; notably around and dedicated to the inner circles of the royal families. Most of the owners of these early drug retail outlets were foreigners and Pharmacie La Georgie, owned by Dr Mareb, a Georgian and one of the private Doctors of the King, is historically credited as the first modern Pharmacy opened in Ethiopia². There were however court Pharmacies up in the Palace of King Minilik II before they were opened in the downtown of the then flourishing Addis Ababa. Richard Pankhurst in his brief account entitled “Ethiopia’s Historic Quest for Medicine”² wrote the following on the King’s Palace Pharmacies: “Besides giving moral support to the Italians, and later to the Russians, Menilek had his own medical facilities, situated at the palace”.

These were described over the years by at least three foreign observers. The first was the French traveler Jules Borelli. Describing the situation in 1894, he noted that



Menilik had several portable pharmacies, as well as a set of surgical instruments presented to him by the Italian, Dr Traversi. The second description was in a Russian report of 1897.

It confirms that the palace contained a fairly extensive court pharmacy, where each medicine was carefully labeled with its Latin name, translated into Amharic characters. The third account of the palace pharmacy was written almost two decades later by an Italian physician Dr Lincoln De Castro. He noted in 1915 that the Emperor had been supplied by the foreign missions with every kind of medicine. They were jealously guarded by the official in charge, and each bottle or container had, he confirms, an Amharic label stating the contents, as well as a note on its use, e.g. cough medicine, medicine for tapeworm, medicine for dysentery, for syphilis, scabies, etc².

After the end of the brief Italian occupation that lasted for some five years, all the foreign-owned pharmacies were confiscated by the then government of Ethiopia and some Italians were employed to work in these Pharmacies afterwards¹.

Currently, drug distribution and retailing activities in Ethiopia are carried out by a combination of public sector, private sector, city councils and the Ethiopian Red Cross Society (ERCS). There were some 375 drug shops (run by pharmacy Diploma graduates) 275 pharmacies (run by pharmacy Degree graduates), and 1783 rural drug vendors (run by nurses or health assistants or pharmacy technicians) in the country in 2004. Most public and private health care facilities have their own medicine retail outlets. By the same year, there were 37 medicine wholesalers, 54 importers and 13 local manufacturers operating in Ethiopia³.

The commencement of Pharmaceutical Education in Ethiopia

The first auxiliary medical training in Ethiopia was launched by the then Ministry of Interior in Minilik II hospital in 1943 in which some 12 students are known to have been enrolled⁴. The requirements for entrance have never been clear but the students enrolled had some ability of foreign languages and those completed (only 4) were awarded "Hospital Dispensary Certificates"⁴. Few other attempts were also made then after, which took a bit longer time to complete and had a clearly known entrance requirements. The 1947 one year long training coordinated by the then Imperial Medical Research Institute can be the case in point. In this training, students were required to complete 6th grade and also pass an English entrance exam. Basic sciences and some Pharmacy courses were given to the 11 students admitted to the program who were awarded a "Pharmacy Assistant Certificate" after completion. All the courses were offered

by only one Swedish man who was a diploma holder in the field⁴.

The Ethiopianization of the modern Pharmaceutical education was however heralded by the establishment of a Pharmacy Technicians School in the compound of the Current Minilik II hospital. Completion of 9th grade was the requirement for entrance and the school thought all the important Pharmacy and other basic sciences courses like Physiology for two years. In 1961, the School of Pharmacy, Addis Ababa University was launched as one academic unit of the University and after four years, the first batch was graduated with B.Pharm Degree⁵.

Currently, there are more than a dozen of institutions in Ethiopia (private and public) which train students in Pharmaceutical education at different levels, Mekelle University being one. Most of these institutions have recently tried to institute some sorts of revisions to their respective academic curricula amid the dynamic changes under way in the Pharmaceutical education and practices nationally as well as globally. The proceedings of the changes instituted as a result of the curricular revisions in the current Pharmacy education system in Ethiopia haven't been reported so far.

The objective of this article is therefore to analyze the changes instituted in the curricular contents of the Mekelle University (MU), Department of Pharmacy as part of the progressive amendments to the Pharmacy education in Ethiopia. It critically evaluates the changes made to the course compositions of the curriculum in the context of the contemporary global scenarios of Pharmacy education.

Methodology

Systematic analysis of all the curricular documents (new and old) used by both the Mekelle and Addis Ababa University were carried out in depth.

International contexts of Pharmacy teaching were benchmarked to indicate future training directions in Ethiopia. The School of Pharmacy, Addis Ababa University itself (the oldest in the nation) has made amendments and refinements in its B.Pharm curriculum a number of times ever since its establishment in 1961.

However, the so and so revised curriculum remained to be the classical "product-centered" for quite long up until recently when it was swiftly redesigned to gear towards the contemporary "patient-centered" curriculum. The article therefore focuses on the curricular contents of the so called "patient-centered" curriculum document which has already been officially adopted by both Addis Ababa and Mekelle Universities (as their curricula have been harmonized on a nationally coordinated curriculum



harmonization workshop) and the earlier “product-centered” curricula that had been on use for exactly half a century of Pharmacy education in Ethiopia.

Results and Discussion:

The foundations of Pharmacy education in Ethiopia

In the rationale and background given for the B.pharm program in the curricular documents, strong arguments have been made on various philosophical points. Accordingly, it has been indicated that Pharmacists provide their services in a variety of settings in response to a dynamic and evolving set of primarily local health care priorities and needs. There are also regional, national and international policies and factors, which dictate the need for developments in pharmacy education and practice. Within this context, pharmacists are medication experts in the treatment of disease and in health promotion. According to the thesis, this expertise, in its broadest sense, encompasses the preparation, supply and control of medicinal products and assurance of desired outcomes of treatment by medication. It thus begins with the medicine development process and continues through to medication’s ultimate benefit to the individual and to society. This expertise has its foundations in the pharmaceutical sciences and related research, and has its focus on the individual and populations⁶.

To be effective health care team members, pharmacists need skills and attitudes enabling them to assume many different functions. The concept of the “seven-star pharmacist” was introduced by the WHO and then adopted by International Pharmaceutical Federation (FIP) in 2000 in its policy statement on Good Pharmacy Education Practice to cover the following roles: caregiver, decision-maker, communicator, manager, life-long learner, teacher and leader. The function of the pharmacist as a researcher was later on added⁷.

These roles of the pharmacist are described below and include the following functions:

- Caregiver: Pharmacists provide caring services. They must view their practice as integrated and continuous with those of the health care system and other health professionals.
- Decision-maker: The appropriate, efficacious, safe and cost-effective use of resources (e.g., personnel, medicines, chemicals, equipment, procedures, and practices) should be the foundations of the pharmacist’s work. At the local and national levels, pharmacists play a role in setting medicines policy. Achieving this goal requires the ability to synthesize ideas, evaluate data and information and decide upon the most appropriate course of action⁷.
- Communicator: The pharmacist is in an ideal position to provide a link between prescriber and patient, and to communicate information on health and medicines to the public. He or she must be knowledgeable and confident while interacting with other health professionals and the

public. Communication involves verbal, non-verbal, listening and writing skills⁸.

- Manager: Pharmacists must be able to manage resources (human, physical and financial) and information effectively; they must also be comfortable being managed by others, whether by an employer or the manager/leader of a health care team. More and more, information and its related technology will provide challenges as pharmacists assume greater responsibility for sharing information about medicines and related products and ensuring their quality⁷.

- Life-long-learner: It is impossible to acquire in pharmacy school all the knowledge and experience needed to pursue a life-long career as a pharmacist. The concepts, principles and commitment to life-long learning must begin while attending pharmacy school and must be supported throughout the pharmacist’s career. Pharmacists should learn how to keep their knowledge and skills up to date^{6,7}.

- Teacher: The pharmacist has a responsibility to assist with the education and training of future generations of pharmacists and the public. Participating as a teacher not only imparts knowledge to others, it also offers an opportunity for the practitioner to gain new knowledge and to fine-tune existing skills.

- Leader: In multidisciplinary (e.g., team) caring situations or in areas where other health care providers are in short supply or non-existent the pharmacist is obligated to assume a leadership position in the overall welfare of the patient and the community. Leadership involves compassion and empathy as well as vision and the ability to make decisions, communicate, and manage effectively. A pharmacist whose leadership role is to be recognized must have vision and the ability to lead⁷.

- Researcher: The Pharmacist is at the front-line of the research and development activities involving drug discovery, formulation development, marketing and drug use surveillance. The entire scope of Pharmaceutical research, ranging from Target to Post-market, is within the reach of the Pharmaceutical scientist⁹. Moreover, the pharmacist must be able to use the evidence-based information (e.g., scientific, pharmacy practice, health system) effectively in order to advice on the rational use of medicines in the health care team. By sharing and documenting experiences, the pharmacist can also contribute to the evidence base with the goal of optimizing patient care and outcomes. As a researcher, the pharmacist is able to increase the accessibility of unbiased health and medicines-related information to the public and other health care professionals^{6,7,8}.



The Universal Principles of Needs-based Education

Healthcare demands are incredibly diverse and complex, often varying widely within and between regions. Therefore, a “one size fits all” educational model or system is neither practical nor desirable; it does not offer the authenticity for buy-in or sustainability at the local level¹⁰. Needs-based education is a development strategy that calls for any given system to assess the needs of its community and then develop or adopt the supporting educational system accordingly¹¹.

In essence, needs-based education asks the question: What does the community need pharmacists to do, and what do pharmacists need to learn to deliver those services to the community? Claire Anderson *et al.*¹⁰ propose that the development of optimal educational systems should progress through a Needs-Services-Competencies-Education cycle (Fig. 1).

First, local and national health-related needs must be assessed and understood. Second, the services required to meet those needs, such as research and development, production, distribution, patient care, and public health are defined. Third, the competencies of the workforce are identified to enable optimal quality in the delivery of these services. Finally, educational programs are designed to prepare a workforce that achieves, maintains, and enhances the desired competencies¹⁰.

Therefore, development of optimal educational systems should progress through a cycle that first seeks to assess and understand local needs. Upon determining local needs, the services required to meet those needs can be defined and the competencies of the workforce should be aligned to the delivery of these services¹².

There is often a lack of consensus in assessing the needs of communities as each stakeholder engaged in the process has a different perspective. Some stakeholders confuse and even subvert local needs with their own corporate interests^{10, 13}. For instance, in many countries, the focus is on curative care-oriented education with limited consideration given for preventive care and public health, which may be more greatly needed in the community¹³. Therefore it is all important to have a clear, shared vision of how pharmaceutical services can meet the health-related needs of each country and to extend this vision to all those involved in meeting these needs; from industry to hospital, from professionals to funders, from educators to politicians, and ultimately to patients and their caregivers. It also highlights the importance of adopting a vision and action plan for global pharmacy that is grounded in a hierarchy of healthcare needs, progressing from local to regional, to national, and then international needs^{10, 13}.

Many countries including Ethiopia are introducing, expanding, or undertaking major reforms in pharmacy education. Such developments must, however, be accompanied by robust systems to assure the quality of educational structures, processes, and outcomes.

The older “product-centered” Versus the newer “patient-centered” curricula of the Mekelle University

Mekelle University, one of the largest public-funded Universities in Ethiopia, is situated in the country's northern marginal area in Tigray Regional State where drought is common. In such an area, health related problems are also common and the university has established the College of Health Sciences in the summer of 2003/2004 considering the potential mutual benefit it will have¹⁴. The common health problems encountered in the region give ample opportunity for researchers, educators and students to have first hand encounter with the real environment when getting in-touch with the local community and to integrate it with the science as per the training philosophy of the university. The presence of a multi-disciplinary health professionals training institute plays a great role in the prevention and control of health problems as well as to bring a change in the attitude of the local community to take its share in implementing the country's health care policies^{14, 15}.

Accordingly, the Department of Pharmacy was established as one academic unit in the Mekelle University system in October 2004 following the draft curriculum set to help the implementation of the proposal for the establishment of B.Pharm Degree Program in pharmacy and other health sciences within Mekelle University; presented for comments on a workshop, submitted to and accepted by the Ministry of Education of Ethiopia during the same time. The Department accepted its first batch, in 2005, with the general objectives of training highly qualified pharmacists having the required knowledge, skill and attitude with standard pharmaceutical care service ethics to work in different pharmaceutical settings. In the ensuing years, the Department has focused mainly on developing its human capacity and has already started to see its fruits in this regard. Having attained a level of human resources that could sustain almost all of its functional academic units, the Department has now turned its focus towards improving the quality of its training and the diversity of its programs.

The Department launched advance-standing summer and evening B. Pharm programs in the 2007/2008 academic year to mainly upgrade pharmacy technicians in its catchment area. These programs were however halted in 2009/2010, leaving three batches in the pipeline, amidst the curricular revision aiming at gearing it towards more clinical or patient-oriented which can be run only as a



regular program if the quality of education is to be maintained. As part of the national initiative to revise the curricula of the Schools and Departments of Pharmacy in public Universities in Ethiopia, the Department has revised its curriculum in 2008 with a significant compositional changes introduced in to its new curricular document as a result ¹⁴.



Figure 1: The Needs-Services-Competencies-Education cycle

The apparent differences in the contents of the new and old curricula of the Mekelle University, Department of Pharmacy, start right on the general objectives and graduate profiles stipulated on the respective curricular documents. The newer curriculum seems to have diversified the graduate profiles (core competencies) with the general objective of the training extended to incorporate newer concepts in the contemporary pharmaceutical sciences and practices. As to the general objectives, there is one key term that differentiates the two curricula-Pharmaceutical care. Pharmaceutical care is a relatively newer concept that tries to make pharmacists get involved in the direct provision of care to the patient. It is formally defined as the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life.

These outcomes are

- (i) cure of a disease;
- (ii) elimination or reduction of a patient's symptomatology;
- (iii) arresting or slowing of a disease process or
- (iv) preventing a disease ¹⁶.

The new curriculum has therefore embraced this concept in line with the global developments in the Pharmaceutical education and practices. Moreover, the training duration has been clearly indicated in the new curriculum as five years and also teaching and research activities have been put as additional career areas of the graduates; which seems to have aimed at catching up the ideals of the WHO and IPF when it comes to roles of the eight-star pharmacist ⁷.

The core competencies or the graduate profiles as stipulated in the two curricular documents seem to have

some significant differences amid the variation in the number and depth of the professional courses listed in the documents. Among the core competencies listed in the new curriculum but lacking in the old one include that the graduate will be able provide drug information, clinical Pharmacy services, Identify, manage and report adverse drug reactions, involve in preparation of drug list, formulary and treatment guidelines and involve in academic and research activities. The tools for achieving these additional core competencies in the new curriculum which are absent in the older one haven't, however, been explicitly indicated. But, one can presume that such newly incorporated courses as Drug Informatics, a series of Integrated Therapeutic courses (I to IV), Communication Skills for Pharmacists, Biostatistics, Epidemiology and Research Methods are to be offered to students to achieve these competencies. Moreover, the newly introduced clerkship scheme can also be the key in enhancing the indicated competencies.

The Department of Pharmacy, Mekelle University has five functional academic units via which it offers all the professional Pharmacy courses. Other supportive and general education courses are offered by other faculties from Institute of Biomedical Sciences, Natural and Computational Sciences, Education as well as Business and Economics. Table 1 below depicts the details of the credit hours offered by these units.

Table 1: The load (in credit hours) of the major, supportive and general education courses offered by the various academic units at the Department of Pharmacy, Mekelle University

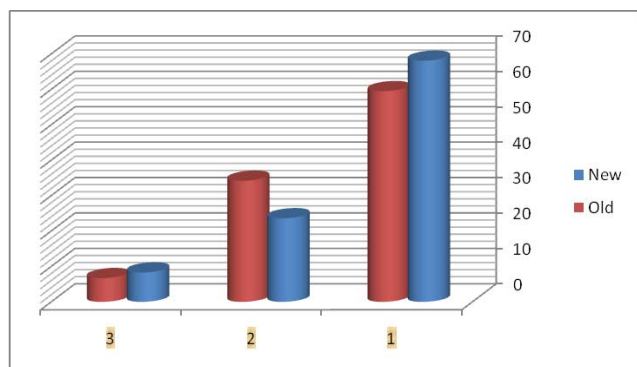
Course Offering Unit	% of the B.Pharm Degree program in Credit Hours	
	Old curriculum	New curriculum
Pharmaceutics	17.4	15.5
Pharmacology and Therapeutics	11.4	18.2
Pharmaceutical chemistry	12.8	12.8
Pharmacognosy	8.1	8.1
Social and Administrative Pharmacy	9.4	15.5
General Education	6.7	8.1
Supportive	34.2	22.0

This table shows that there have been significant changes with regards to the credit hours offered by the Pharmacology and Therapeutics Course and Research Unit as far as the two curricula are concerned. This is because of the introduction of three additional Pharmacotherapeutic courses (4 credit hours each) and the two credit course of Drug Informatics in the new curriculum to be offered by the unit. Moreover, supportive courses have been significantly reduced in the new curriculum as compared to the old one. This is because of the fact that almost all Chemistry courses, with the exception of Organic Chemistry have been knocked out in the new curriculum together with their practical laboratory parts. The courses delivered by the Pharmaceutical Chemistry Course and research unit remained proportionally unchanged in both curriculum



documents; while those in Pharmaceutics Course and research unit slightly reduced principally owing to the integration of the two Pharmaceutics courses with Physical Pharmacy courses to be offered at lower credits. The incorporation of such new courses as Pharmacy Ethics and Law, Pharmacoeconomics, Pharmacoepidemiology and two Practicum courses to be coordinated by the Social and Administrative Pharmacy Course and Research Unit significantly increased the percentage of credit hours to be offered by this unit in the new curriculum. The percentage proportions of the major courses offered by the academic units of the Department of Pharmacy, Mekelle University are all significantly different from those given by the same academic Departments of the College of Pharmacy, King Saud University under its 1993 curriculum in which both the Pharmaceutics and Pharmacology academic units offered 27.5% (in credit hours) of its 175 credit hours B.Sc.Pharm Degree¹⁷.

On the other hand, the proportions of the professional/major, supportive and general education courses that constitute the B.Pharm programs in the two curricula at the Department are very much different. Fig. 2 below shows the percentage proportions of these three course categories in the two curricula.



Key: 1=Major, 2=Supportive, 3=General Education

Figure 2: The percentage proportions of the Major, Supportive and General Education courses in the new and old curricula of the Department of Pharmacy, Mekelle University.

The general trend is that the major courses which constitute all those dedicated to the Pharmaceutical sciences and practices have increased to 68.1% in the new curriculum from 59.1% in the older one while the supportive courses decreased from 34.2% in the old to 23.6% in the new one. These apparent differences might be attributed to the recent push from the Ministries of Health and Education to focus only on the core competencies in all disciplines of study run by all public tertiary education systems in Ethiopia. The traditional curricula of most Health and Health related fields offered in most Ethiopian Universities had focused more on the basic sciences than the practical skills, knowledge and attitude needed by the graduates⁴.

Nevertheless, the loads in credit hours of the General education courses haven't shown a significant difference in the two curricular documents. The major changes on the contents of the two curricula, with respect to the major courses, haven't however brought about any change on the nomenclature of the Degree to be awarded which remains to be the Bachelor Degree in Pharmacy or B.Pharm^{14, 15} for short. However, other major components of these curricular documents do differ from each other as shown in Table 2 below.

Table 2: Comparison of the New and Old curricular documents of the Department of Pharmacy, Mekelle University with regards to some major components

Parameter	As stipulated in	
	Old curriculum	New curriculum
Degree Nomenclature	Bachelor Degree in Pharmacy (B.Pharm)	Bachelor Degree in Pharmacy (B.Pharm)
Degree Load (C.Hs)	144	148
Duration (Semesters)	8	10
Professional Elective courses	Not requirement	One course requirement in each academic unit
Internship	Not requirement	One year internship in major hospital wards a requirement

The load of the B.Pharm Degree in the two curricula remains to be more or less the same while the duration of the study has increased by two semesters in the new, i.e., a 25% increase in the duration of the study period, as compared to the old curriculum, hasn't brought about a significant change on the load of the Degree to be awarded. This is primarily due to the fact that the two semesters' internship program in the new curriculum hasn't been given any load (in credit hours) at all. The students are required to complete this part of their studies as a kind of compulsory scheme for graduation. But if the average per semester credit loads (18 credit hours) taken by students over the eight semesters preceding the two internship semesters are considered to hold true for the internship semesters, the total load of the B.Pharm degree in the new curriculum would be 180 credit hours.

This is very much closer to the 175 credit hours B.Sc.Pharm Degree offered by the College of Pharmacy, King Saud University¹⁷ implying the need for the Department to make a natural progression towards starting the Pharm.D program following the foot-steps of the Faculty of Pharmacy, King Saud University. Professional elective courses are requirements in the new curriculum unlike in the old one. Accordingly, students are required to take one professional elective course



stipulated by each of the five academic units of the Department as shown in Table 3 below.

Table 3: Professional Elective courses at the five academic units of the Department of Pharmacy, Mekelle University

Academic unit	Professional elective course	Course code	Credit hours
Pharmaceutics	Manufacturing	Phar 512	3
Pharmacology and Therapeutics	Pharmacogenetics	Phar 546	3
Pharmaceutical Chemistry	Pharmaceutical Quality Control and Quality Assurance	Phar 532	3
Pharmacognosy	Phytochemistry	Phar 522	3
Social Pharmacy	Pharmacoepedimiology		3

These professional elective courses are designed to streamline the interests of the graduates in their future careers thereby help them prioritize their employment opportunities in the various areas of the pharmaceutical sector.

Al most all of these courses are stipulated to be taken during any one of the semesters during the eleven or thirteen semesters, respectively, of the B.Sc.Pharm and Pharm.D Degree programs currently run by the Faculty of Pharmacy, King Saud University ¹⁷.

The prospects of launching the Pharm.D program at the Department of Pharmacy, Mekelle University

The Pharm.D Degree program is currently becoming the mainstay of most Pharmacy Schools in North America, Europe, Australasia and the Middle East regions with Africa lagging far behind in adopting it. Even countries like Egypt and South Africa are still running the traditional Bachelor of Pharmacy Degree programs in all of their Schools of Pharmacy and the authors of this article couldn't find any initiative by these countries to go ahead with this regard. There had, however, been some moves by the School of Pharmacy, Addis Ababa University in the year 2002/3 to consider launching the Pharm.D program. The School couldn't still realize this manoeuvring and the most commonly forwarded reasons for that failure have often been the lack of government commitment to support the initiative as the program is much more resource-intensive than the traditional B.Pharm program; and perhaps the lack of properly trained clinical mentors for the Pharm.D program, among others. Such problems had been in place in most other countries as well ¹⁸ at the very outset of the commencement of the Pharm.D program and hence the Ethiopian scenario shouldn't make us desperate prospectively.

The world is changing and tracking that change remains to be indisputably the rule of the game to cope by every country and community across the globe. Therefore,

whenever nations adopt the Pharm.D program and indeed transform the services delivered by their Pharmaceutical sector, Ethiopia in particular and the entire African continent in general should also contextually track the change. The Pharm.D program has already proven to be out-come based and hence worth adopting it in countries like Ethiopia where monitoring patient treatment outcomes has never been established. Moreover, though the traditional Pharmacy training has been very rigorous, even by the standards of most curricula for medical doctors, graduate pharmacists have often been underutilized ¹⁹; presumably due to the defects in the traditional curricula of pharmacy trainings.

This can thus be improved by adopting the Pharm.D program which already has proven to result in better utilization of Pharmacists. The need to internationalize the curriculum, perhaps by contextualizing the local scenario, can also stand as another viable reason for Ethiopia to consider launching the Pharm.D program.

The new curriculum of the Department of Pharmacy, Mekelle University has already been enriched by most of the courses that are incorporated in most Pharm.D programs and hence needs only slight modification to make it a full-fledged Pharm.D curriculum. For instance, it is very similar to the Pharm.D curriculum at the College of Pharmacy, King Saud University (CoP-KSU) that is proposed to get accreditation from the Canadian Council for Accreditation of Pharmaceutical Programs (CCAPP) and also from Accreditation Council for Pharmacy Education (ACPE) in the United States ¹⁷. Because the Pharm.D curriculum of the Faculty of Pharmacy, King Saud University has already been harmonized with most of the American and Canadian schools of pharmacy that offer Pharm.D ¹⁷, the B.Pharm program of the Department of Pharmacy, Mekelle University can also be said to have comparable contents with most of these US or Canadian schools of Pharmacy.

This indeed is an indication of the fact that only slight modifications on the curricular contents are needed to make it the curriculum of the internationally accredited Pharm.D Degree.

Conclusion

In addition to tracking the changes in the areas of Clinical Pharmacy and Pharmaceutical care, Ethiopia has to boost its manufacturing capacity in the pharmaceutical sector as most of the medicines for the health care settings of the nation are currently to be imported. Therefore, the country has to strike a delicate balance in redesigning its pharmacy curriculum so that the output graduates will be competent both in the manufacturing and service sectors of the pharmaceutical industry.



The commencement of the Pharm.D program can indeed help to maintain that delicate balance as even most pharmaceutical manufacturing companies currently prefer Pharm.D over the traditional B.Pharm. The Department of Pharmacy, Mekelle University can hence follow the pathway taken by the College of Pharmacy, King Saud University whereby both the Pharm.D and B.Pharm programs can be run in parallel. Such schemes, if successfully introduced, will definitely benefit the country but eventually lead to the freezing of the B.Pharm program as was the case in most North America and Canada.

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AUTHORS' CONTRIBUTIONS

Authors contributed equally to all aspects of the study.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests