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Clinical pharmacy education and practice evolvement in Malta

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Abstract

Introduction: Malta, a member state in the European Union, provides an education in line with the requirements for professional registration in Europe including a unique pharmacy education program with patient-focused practice and synergism between practice, research, and education. A postgraduate Doctorate in Pharmacy program, which runs in collaboration with the College of Pharmacy at the University of Illinois at Chicago provides an opportunity for advanced clinical pharmacy practice and innovative practice research.

Objective: This paper discusses how outcomes of pharmacy education developments have impacted pharmacy practice in Malta.

Methods: Pharmacy education at the University of Malta is examined through an analysis of the facilitators of change, the positiveness of this transformation in pharmacy education, and a critical description of the evolving pharmacy course changes. Objectives and strengths of the changes and how practice research influenced the development of collaborative clinical pharmacy services are described. The uniqueness of clinical pharmacy aspects in community pharmacy, as prompted through educational models, is highlighted. Inspirational aspects through international collaborations, including the establishment of a postgraduate doctorate in pharmacy, are described.

Results: The leveraging of education, practice, and research provided synergism for advancing pharmacy practice which puts the patient in the center. Transformative education models focusing on empowering graduates were developed and practice research was used to advance practice within health systems. Facilitators included particular settings such as the closeness of the family doctors in community pharmacies, the participation of academics in regulatory sciences leadership, and in international collaborations. The postgraduate professional doctorate in pharmacy program that was developed contributes to the advancement of clinical pharmacy both locally and internationally.

Conclusion: The characteristics of pharmacy education in Malta involve the absorption of change in a transformative process that produced positive pharmacy education outcomes and an impact on clinical pharmacy evolvements in both hospital and community practice.

KEYWORDS

leadership, pharmacy, pharmacy education, graduate education

1 | INTRODUCTION

Pharmacy education was established in Malta in 1676 with a School of Pharmacy inaugurated at the Holy Infirmary during medieval times when Malta hosted the Knights of St John who were crusaders, Hospitallers, and a religious order. At the Holy Infirmary, the chief pharmacist was required to accompany the physician during ward rounds, which is an analogy to today's clinical pharmacy practice.[1] Later, the School formed part of the Faculty of Medicine and Surgery within the University of Malta, and the current scenario to-date provides opportunities for collaborative education and research between pharmacists and doctors.

Malta is a member state in the European Union and follows the European requirements for mutual recognition and registration of professionals, including pharmacists. One of the requirements for pharmacy education in Europe through the 1985/432 European Union Directive[2] is that pharmacy students must complete at least 6 months of practice in a pharmacy open to the public, a reflection of the times of pharmacy education at the Holy Infirmary.[3] By 1948, pharmacy education in Malta developed into a 4-year course with a practice component leading to a Bachelor of Pharmacy degree.[4] Given this background of practice and education, our paper analyzes how clinical pharmacy practice has evolved in Malta and identifies the driving forces behind the changes in this evolvement.

2 | FACILITATORS OF CHANGE

The practice of clinical pharmacy in Malta can be attributed to many local and international factors, such as the professional standing of pharmacists, the increase in the number of pharmacists, and development of clinical pharmacy in hospitals in the United States.

The socioeconomic scenario, as a consequence of the Second World War, was a determining factor in bringing people to seek the services of the community pharmacist, who was easily accessible in village and town cores, with the unique feature of having family doctors holding clinics within the community pharmacies. The community pharmacy at the town and village center provided advice on health issues and on the use of medicines without substantial financial burden. The significant patient-focused intervention of the community pharmacist was brought to the forefront following the decreased function of the community pharmacist as a compounder of medicines, due to the industrialization of the production of medicines.[5]

The forces of change in the United States taking place in the late 1960s, focusing on the emerging role of the hospital pharmacist as a direct contributor to patient care, were experienced first-hand by a pharmacist from Malta, Anthony Serracino-Inglott, during his studies at the University of Cincinnati. Upon his return to Malta, Serracino-Inglott initiated a mechanism of change that spread through the profession and embraced the philosophy of clinical pharmacy as an innovative model for both hospital and community pharmacy practice.[6] From an educational perspective, the number of students attracted to follow a course leading to a degree in pharmacy increased exponentially and led Malta to having a comparatively high density of pharmacists with a ratio of 24 per 10 000 population.[7]

3 | TRANSFORMATIVE PHARMACY EDUCATION

A vision for practice development was driven by championing "transformative" pharmacy education models. Concepts of biopharmaceutics and clinical pharmacokinetics in the pharmacy undergraduate course, offered by the University of Malta, were introduced as early as the 1980s. Textbooks by leaders in the field, including Fundamentals of Clinical Pharmacokinetics by John Wagner,[8] the Handbook of Basic Pharmacokinetics by Wolfgang Ritschel,[9] Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi,[10] and Clinical Pharmacokinetics by Malcolm Rowland and Thomas N. Tozer,[11] were introduced. The dynamic on-going process within pharmacy education in Malta was a distinguishing factor of the transformative education model supporting practice-oriented competences in pharmacy students based on a sound scientific foundation (Figure 1).

The introduction of "Pharmacy Practice" in 1990, an unconventional subject for science-oriented pharmacy curricula in continental Europe, exposed students to the concepts of clinical sciences in pharmacy education. These innovative areas, sometimes, wrongly referred to as "soft options," included medication dispensing, distribution, and administration, health informatics, public health, self-care pharmacotherapeutics, patient assessment, patient care and patient monitoring, optimization in medicine use, needs of specific patient populations, and interprofessional practice.[12] Pharmacy Practice has evolved as one of the pillars of the pharmacy curriculum adding to the robustness of the program that included pharmaceutics, medicinal chemistry, and pharmacology. Pharmacy Practice consisted of didactic and experiential components and was covered starting from the first year of the curriculum.[13]The introduction of Pharmacy Practice in the curriculum and its elaboration over the years has enhanced the development of competences for pharmacy students to be able to perform clinical interventions in hospital and community practice. The Department of Pharmacy maximized on its affiliation with the Medical School at the University of Malta in achieving interprofessional teaching settings at the patients' bedside.

The pharmacy course at the University of Malta expanded into a 5-year program aligning with the 1985/432 Directive of the European Union,[2] as a requisite for Malta to join as a full member of the European Union in 2004. This 5-year program allowed for an additional 24 weeks of rotations and permitted an increase in the width and breadth of the Pharmacy Practice Research component encouraging the dissemination of results through presentations in local and international conferences. Experiential learning and rotations in community and hospital pharmacy settings undertaken throughout the 5-year program were entrenched on a solid basis. Structured tutor-practitioner led academic experiences enhanced the development of attitudes, professional behaviors, communication, and professional decision-making skills within a collaborative practice and a patient-

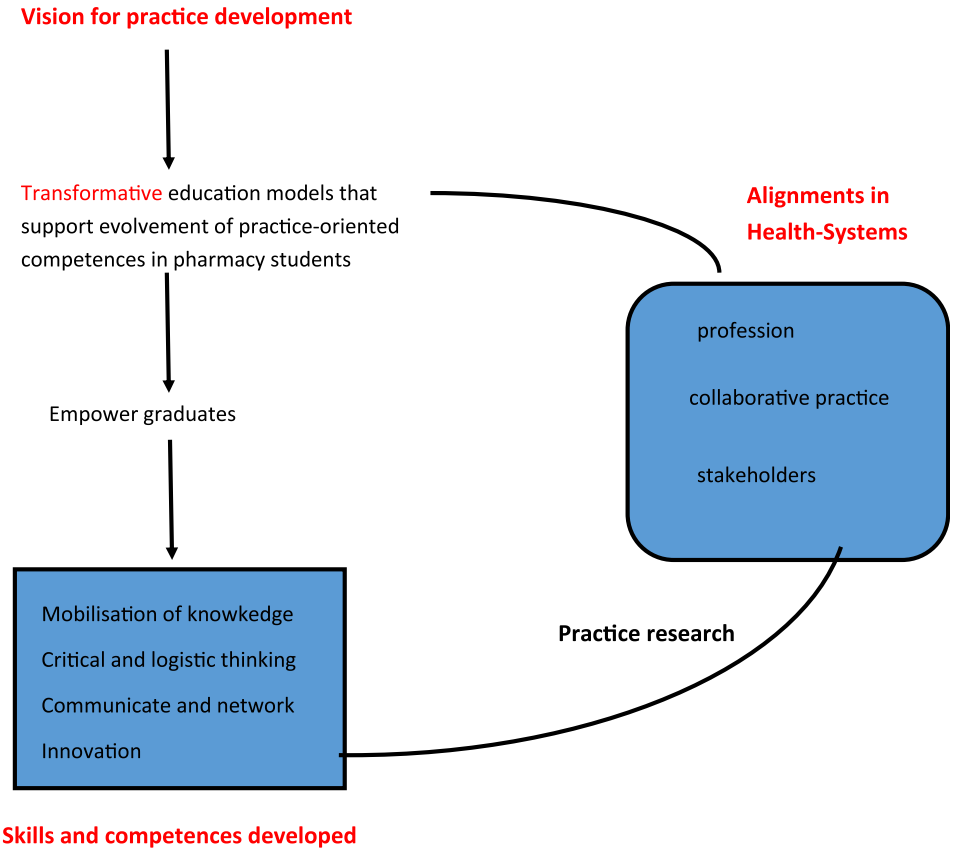

FIGURE 1 Transforming pharmacy

focused scenario. The tutor-practitioners are experienced pharmacists trained by faculty from the Pharmacy Practice group who participated in "train-the-trainer" sessions intended to build on the tutoring experience and the sharing of ideas. Teaching activities and assessments, including multiple-choice questions in different formats, used to evaluate the development of student competences in providing clinical pharmacy services within a collaborative team, were based on real scenario case studies documented from community and hospital practice. Examples of these examinations were compiled and published by the Pharmaceutical Press of the Royal Pharmaceutical Society in the United Kingdom to serve as textbooks for pharmacy students in Europe preparing for the pharmacist registration examination.[14-17]

The strengthening of the clinical sciences component within the pharmacy curriculum was a transformative feature, contrasting with continental European pharmacy programs, which was influenced by the pattern of development of clinical pharmacy education in the United States. The evolvement of clinical pharmacy initiatives within the health systems in Malta, both the hospital and community settings, was a positive consequence of these educational achievements (Figure 1). Academic capacity building increased the recruitment of full-time faculty, faculty with joint positions in practice settings, tutor-practitioners, and preceptors. Capacity building was approached through different aspects including faculty reading for doctoral research degrees in areas relevant to practice and outcomes research, supporting tutor-practitioners, and preceptors to undertake training programs and doctorate studies, as well as mobilizing the academic group to participate in pharmacy and academic European and international fora.

The educational model adopted in Malta that put forward clinical (medical) sciences as a major component (12.3% compared with 16.7% in the United States) of the pharmacy curriculum contrasted with other European pharmacy courses where chemistry comprised up to 46% of the program.[6,18,19] A European harmonization system was adopted in 1989 to allow free movement of students between European Universities through the European Credit Transfer System (ECTS), where 1 ECTS is equal to 25 study hours.[20] Table 1 shows the distribution of the courses, within the pharmacy program in Malta, and demonstrates that 44% of the total 5-year pharmacy program is dedicated to clinical sciences, rotations, and pharmacy practice research.

4 | PRACTICE RESEARCH DRIVING INNOVATION

Student Pharmacy Practice Research Projects were started as a compulsory component of the pharmacy education program at the University of Malta in 1977. The concept of having pharmacy students undertake a component of their studies in practice research was considered a progressive educational idea. The Pharmacy Practice Research Projects were structured to shift from traditional didactic teaching to active learning and drawing on student-focused learning

TABLE 1 Study units allocation for pharmacy practice, experiential, and practice research in the pharmacy program at the University of Malta

Component	ECTS credits
Pharmacy practice	54
Advanced experiential	40
Pharmacy practice research	50
Total practice components	144 (44%)
Pharmaceutical chemistry	38
Pharmacology and therapeutics	30
Pharmaceutical technology and regulatory sciences	28
Basic sciences	28
Socioeconomic sciences	18
Other experientials	18
Calculations and computing	14
Other projects	12
Total ECTS for the pharmacy program	330 (100%)

Abbreviation: ECTS, European Credit Transfer and Accumulation System.

opportunities emphasizing critical thinking, communication, and innovation. The tasks developed within the Projects included literature retrieval and interpretation, field analysis within a health system scenario, data handling, and analysis, extrapolation of findings, and dissemination of results. The Projects are organized within research groups that focus on: (a) Establishing pharmaceutical services within the hospital, community, and domiciliary settings, (b) Optimization of pharmacotherapy, (c) Standardized pharmaceutical patient care, and (d) Patient safety, mitigation of risk, and regulatory sciences. The Projects support professional practice in hospitals. Standardization and documentation of pharmacist interventions in inpatient and outpatient clinical settings are key. Hospital systems involve the setting of formularies and unit-dose system distribution of medicines, including the introduction of robotics. The Projects highlighted patient perspectives and met their expectations by giving due practical consideration to pharmacoeconomic and sustainability of the patient-centered practice. The pharmacist clinical activities often associated with interventions in hospital practice have, in the Maltese model, been fully transposed to the community pharmacy setting. Student projects in community pharmacy have included such topics as the interpretation and actioning through point-of-care patient monitoring and adjustment of dosage in diabetic and hypertensive patients. Medication reviews focused on coordination of prescribing between different specialties avoiding clinically significant drug interactions.

5 | CLINICAL PHARMACY SERVICES DEVELOPMENT

Clinical pharmacy services within the hospital settings in Malta started in the early 1970s within Malta's 800-bed General Hospital. The inauguration of a state-of-the-art hospital, dedicated specifically to the acute care of the elderly in 1991, saw the establishment of a strong interprofessional practice where the pharmacist had a leading role in coordinating the therapeutic aspects of patient care. Pharmacists participated in all steps of a patient's journey during hospitalization: admission, inpatient care, and discharge. The impact and outcomes of having pharmacists participate in these processes was audited through the Pharmacy Practice Research Projects, and the results of the Projects were used to optimize this service. To date, this hospital pharmacy service still serves as a flagship for teaching and research in pharmacy education.

With the medical literature demonstrating the cost-effectiveness of pharmacists' clinical services starting as of the mid-1990s, the need to elaborate clinical pharmacy services in Malta that would contribute to positive patient outcomes and cost-effectiveness of health systems was identified.[21] The establishment of clinical pharmacy services in different local hospitals was enabled through the dissemination of the findings from the Pharmacy Practice Research Projects.[22-29] Examples of services developed include: ambulatory care settings for patients suffering from rheumatoid arthritis, systemic lupus erythematosus, and juvenile rheumatoid arthritis; development of a pharmacist hospital patient discharge service and standardization of pharmacists' care processes; development of pharmaceutical care processes specific to patient populations such as older persons, patients receiving psychiatric treatment including lithium, patients receiving methotrexate, and biological agents; audited protocols for interactive wound management; human papillomavirus (HPV) vaccinations for adolescents; antiemetic care in cancer chemotherapy; direct-acting oral anticoagulants; and first-line use of high-intensity statins.[30-37]

6 | UNIQUE CLINICAL PHARMACY ASPECTS IN COMMUNITY PRACTICE

Community pharmacy practice in Malta has a number of unique characteristics that promote streamlined collaboration between the family doctor and the community pharmacist who spend time together to discuss patient profiles including social factors that could influence health outcomes. It is often the pharmacist, after this discussion with the doctor, who communicates with the social worker, the psychologist, the physiotherapist, and the clinical pharmacist at the hospital, acting as an advocate on behalf of the patient. This historical approach to teamwork is now being expanded through the use of technology and telematics, which are presenting a challenging avenue for coordinated patient care.

Community pharmacies function as a primary care health setting, thereby serving as a physical setting for physicians and medical specialists to provide private-run clinics. Community pharmacists have access to patients' chronic medication lists and records through Malta's public national health system that supports free medicines for chronic use. Chronic medications on the public national health system are dispensed from the private community pharmacy of the patient's choice. The service was elaborated following the Pharmacy Practice Research Projects that identified the feasibility of having community

pharmacists provide chronic medication therapy management. Community pharmacists provide clinical pharmacy services related to acute and chronic patient management including self-care pharmacotherapy, point-of-care testing, and medication therapy management services. The Pharmacy Practice Research Projects supported the feasibility, practicality, and standardization of innovative community pharmacy-based clinical services such as point-of-care testing of international normalized ratios (INRs) and monitoring of patients on warfarin, patient follow-up for management of hypertension, diabetes, and hyperlipidemia, and medication reviews.[38-46]

Pharmacists from the practice settings participated in short intensive courses led by the Department of Pharmacy at the University of Malta focusing on bedside clinical pharmacy teaching in a "teach-the-teacher" format. The short intensive courses had the objective to support pharmacists in embracing evolving concepts of clinical pharmacy practice and to develop their contribution as preceptors and tutor-practitioners. Hands-on courses were organized with the participation of international collaborators renowned in the field including Charles D. Hepler from the University of Florida, Steve Hudson from the University of Strathclyde, and colleagues from the European Society of Clinical Pharmacy. The Department of Pharmacy international network includes eminent pharmacists from the United States, such as Gloria N. Francke, Henri Manasse, Lucinda Maine, Mike Rouse, Peter Vlasses, Mike Maddux, and Alan Lau.

7 | ADVANCING PRACTICE INTERNATIONALLY

The acquisition of professional and academic credentials as part of career development for pharmacists may inspire them to become proactive in innovating and elaborating clinical pharmacy services. A pathway for developing practitioners and leaders in pharmacy is for pharmacists to follow doctoral studies within pharmacy practice research groups, an opportunity started in Malta in 1996. A postgraduate course leading to a Doctorate in Pharmacy degree commenced in 2014, with the aim of expanding opportunities at the doctoral level for pharmacists with an aptitude toward the professional focus and to enhance innovative thinking and leadership. The Doctorate in Pharmacy degree in Malta is a 3-year full-time post-graduate doctoral study that provides a professional doctorate at a level equivalent to the Doctor of Philosophy degree. The Doctorate in Pharmacy program offered in collaboration with the College of Pharmacy at the University of Illinois at Chicago (UIC), focuses on providing advanced clinical pharmacy skills, competences in optimizing patient medication use, and empowers graduates to lead professional advancement for safe, rational, and quality interventions.[47] The Doctorate in Pharmacy program is a specialized postgraduate course for pharmacists interested in developing further skills in applying clinical sciences to safe, effective, and rationale use of medications. The course consists of three parts: didactic (recitations and case-based sessions), interprofessional rotations (teamwork), and a research dissertation (evidence-based practice). The course has attracted 76 pharmacists of whom 32 hail from 17 countries in Europe, Asia, and Africa. The 40 graduates who have completed the Doctorate in Pharmacy program as of 2019 are now active in pharmaceutical fields including community pharmacy, hospitals, and pharmaceutical regulatory processes in different parts of the world. A common factor is that they lead innovation in their practice. The merge between the strengths of the two institutions involved, namely, UIC and the University of Malta, provide for distinguished attributes in these pharmacists with doctoral-level studies who are well positioned to lead evolvements in the practice of pharmacy in different countries and serve as an example of how international collaboration is the key to excellence in education, practice, and research.

Academic staff at the University of Malta benefit from visits to other educational institutions in different locations including Chicago, Greece, Florida, Italy, and the United Kingdom, and through active participation at international pharmacy conferences. Students are motivated to participate in student exchanges, and around 90% of students in the Department of Pharmacy follow a 3-month mobility in partner universities in Europe through the Erasmus+ Mobility Program available in the European Union (https://ec.europa.eu/programmes/erasmus-plus/). Postgraduate students participate in rotations carried out in the United States in Chicago and Florida. The Department of Pharmacy hosts visiting students from Europe and the United States who opt to either follow studies or participate in a rotation or in practice research. Visiting students represent 10% of the student population every academic year. As an institution, the Department of Pharmacy maintains internationalization at the forefront of its activities. The current head of the Department of Pharmacy (Lilian M. Azzopardi) is involved in the international pharmacy education platform as the President of the European Association of Faculties of Pharmacy and as an elected member representing Europe at the International Pharmaceutical Federation Global Academic Leaders Advisory Group.

8 | OVERCOMING CHALLENGES AND FUTURE DEVELOPMENT

The intertwining of education, practice, and research activities present challenges in tertiary education. The developments in the early 1970s in clinical pharmacy education and practice in the United States were inspirational to Malta in overcoming the challenges of shifting from an emphasis on didactic teaching of the basic sciences to application of the sciences in a practice-focused curriculum and extension to clinical practice. The introduction of pharmacist prescribing in the United Kingdom at a later stage served as a stimulus for the direct intervention of pharmacists in achieving rational use of medicines. The inspirations, stimuli, and circumstantial requirements were used to prompt the academic institution and the pharmacy profession to influence the national health system to trigger changes in models of practice. In current times, responding to the coronavirus disease 2019 (COVID-19) pandemic served as a good occasion to introduce pharmacist prescribing for repeat prescriptions and to spearhead other developments,

such as e-prescribing and electronic communication between health professionals. An important outcome is that prescription and patient safety may have increased.

Challenging future developments of the pharmacy profession that have been identified in the health sector include areas of advanced therapies, vaccination, and preventive medicine, all of which require personnel with acceptable basic knowledge of pharmaceuticals and preparedness in digital health care through the application of information technology and artificial intelligence. The Department of Pharmacy, envisaging to meet these professional needs, initiated a 3-year course leading to a Bachelor of Pharmaceutical Technology degree. Graduates from this course are proving to be an invaluable asset to the continuous expansion of services offered by pharmacists. More intensive participation of pharmacists in the design and timely execution of clinical trials is an example of exploiting opportunities provided through the on-going evolvement of pharmacy education in Malta.

9 | CONCLUSION

The historical trail tracing the development of pharmacy education at the University of Malta could be compared to that of a mirror in a car, where the past serves to guide the future. The process over the years could be described as positively transformative. Key instruments adopted for achieving positive change included patient-focused innovation, collaborative international diverse leadership, attitudes, and processes reaching the optimal position of acquiring knowledge and skills, a lateral thinking mode, transformative will, and intellect. The scientific areas along the years that have influenced educational development include biopharmaceutics and pharmacokinetics, which may be cited as a comparative discovery revolutionizing the views on pharmacy practice as much as the discovery of penicillin and its impact on drug therapy. The evolvement of clinical pharmacy into pharmaceutical care with the underlying emphasis on interprofessional and intraprofessional skills and leadership, to the transition to the "-omics" era such as pharmacoeconomics and pharmacogenomics, has impacted the application of the basic sciences to daily evidence-based practice. The influence of innovative clinical pharmacy services on societal perception and the response for patient and stakeholder participation point the way forward in the coming years. Pharmacist collaborative prescribing and rational, educated, self-care with the injection of the benefits of advanced therapies, such as biologicals, stem cell therapy, and advancements in oncology treatment and personalized care present future opportunities for pharmacy practice which will be spearheaded by advancements in pharmacy education.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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