

Comparative Analysis of Pharmacy Education: Eenchmarking the Philippine Model Against Asian-Pacific Approaches

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Abstract: The Philippines is creating a roadmap for pharmacy education, however, there are no published comparative analyses to evaluate how global pharmacy education models can be adapted to the Philippines. This research seeks to address this gap by assessing the present context of pharmacy education in the Asia-Pacific region, specifically focusing on regulations, curriculum design, and quality assurance measures. The aim is to identify international models from June to October 2023, which will serve as the basis for developing a complete roadmap for pharmacy education in the Philippines. Methods used for the study include a thorough examination of existing literature and the gathering of information. Key informants from different countries were invited to validate the findings. Comparative analysis is used through thematic analysis and descriptive statistics to evaluate the possible adoption of global strategies within the distinct context of the Philippines. After examining the models of 24 countries in the region, the result yields comprehensive insights on pharmacy education in 6 thematic areas in the Asia Pacific region. An analysis of curricula, accrediting mechanisms, internship, and education framework uncovers subtle distinctions and parallels between the Philippines and other nations in the area. The analysis identifies areas where the Philippines either conforms to or diverges from regional patterns, guiding stakeholders in evaluating their pharmacy education system about broader regional norms. The obtained insights provide recommendations for making well-informed decisions and creating strategic plans, ultimately formulating a focused roadmap to enhance pharmacy education in the Philippines.

Keywords: Pharmacy Education, Comparative Analysis, Asia-Pacific Region, Roadmap Development, Education Models

INTRODUCTION

According to the World Health Organization (WHO), healthcare cannot exist without a workforce, and there cannot be a workforce without education. Education, therefore, has a crucial role in expanding health care, including sustainable pharmacy services, to address the health demands of populations (1). Based on the latest available data the estimated total number of Pharmacist as of 2023 is 53,498 which translates to a Ratio of Population to Pharmacist of 4.7 pharmacists per 10,000 population which is below the WHO recommendation (2)

To respond to the gap, the Philippines released a Human Resources for Health (HRH) Masterplan that is inspired by the passage of the Universal

Health Care (UHC) Act in 2019 to serve a long-term framework for management and development of HRH in the country, part of the strategy is the creation of education road map in each health-related discipline (3). To this end, the Commission of Higher Education (CHED) and the University of the Philippines (UP) College of Pharmacy endeavors to create a road map for the sustainable production of practice-ready pharmacy professionals through strategic training and education. Globally, pharmacy practice has experienced a significant shift, which has been driven by the growing complexities of patients' healthcare requirements, the rising expenses related to disease management, and the necessity to develop pharmacy leaders (4).

One strategy to ensure global competitiveness for the road map of pharmacist education is benchmarking. This is a systematic procedure that aims to identify optimal practices by comparing different pharmacy education models and trends internationally (5). However, to date there is a gap in published comparative analysis of pharmacy education models in the region and examine the adaptability of these models to the Philippines. This research, therefore, seeks to address this gap by describing the differences and similarities in the selected countries in the Asia-Pacific region, with a specific emphasis on answering the following research questions:

1. What are the trends of laws and legislation to regulate pharmacy education?
2. What are the top degree programs of pharmacist education in the region and their respective duration?
3. What is the composition, qualifications, and strategies of teaching in the different colleges or schools of pharmacy?
4. What are the current admission requirements to enter an academic program or educational degree in pharmacy?
5. What are the different internship sites, duration, and roles related to internships in pharmacy?
6. What are the trends for quality assurance and continuing pharmacy education?
7. What are the similarities and differences of these models to that of the Philippines?
8. What are the recommendations that can be adopted for the development of pharmacy education in the Philippines?

These research questions were developed by combining insights from literature review, stakeholder consultations, and alignment with key areas of interest to meaningfully to the roadmap program's objectives. The significance of the study lies in its potential to initiate substantial transformations in pharmaceutical education in the country. The results of this research will have significant implications for the development of evidence-based road maps, policies, fostering an environment where pharmacy education not only conforms to current standards but also anticipates and adapts to future advancements globally.

MATERIALS AND METHODS

The research timeline spans from June to October and comprises distinct phases aimed at ensuring a comprehensive and transparent research process. In the initial two months (June to July), activities focus on administrative tasks, document preparation, and engaging with stakeholders, including key informants such as FAPA Bureau members, Section Chairs, and the Secretariat. These engagements are pivotal in finalizing components and operational definitions.

Subsequently, spanning three months from August to October, the research delves into a thorough literature review to collect pertinent data about pharmacy education in selected countries. The study's methodology primarily involved a meticulous and manual search through secondary databases, focusing on publicly available existing literature and the systematic gathering of data through the internet.

This phase also entails validation, revision, and invaluable input from key informants, namely Focal persons, ensuring data accuracy and comprehensiveness. This study relied on focal persons to validate and contribute country-specific data. Professional Organizations nominated these informants, which the Federation of Asian Pharmaceutical Associations (FAPA) Bureau approved. This FAPA headquarters endorsement boosted data gathering legitimacy and study reliability. Afghanistan, Australia, Bangladesh, Cambodia, Hong Kong, India, Indonesia, Japan, Jordan, Korea, Macau, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, United Arab Emirates, and Vietnam had 1 or 2 focal persons each. Their competence and experience in pharmacy education or related sectors in their nations likely led to their selection. Which includes:

1. Professional experience: Focal personnel had pharmacy education or related experience, ensuring their knowledge.
2. They are linked with pharmacy education or healthcare systems groups in their country.
3. Language proficiency in the relevant national languages may have been a selection criterion.

Focal persons nominated by their organizations and endorsed by the FAPA Bureau gave legitimacy to the study's data gathering and findings due to their expertise and experience. Informed consent was obtained from all key informants before they participated in the study. This included providing clear information about the purpose of the study, the expected outcomes, and the rights of the informants regarding data confidentiality and anonymity. Consent forms were distributed and signed by the informants to confirm their voluntary participation and understanding of the research process.

The final three weeks in October witness data encoding for cleaning and standardization, aligning with key informant input. Statistical analysis, including frequency statistics and thematic analysis, is carried out while considering feedback and recommendations from key informants. The culmination involves the preparation of summary reports and visual presentations, meticulously crafted to highlight key findings per variable and country, all while ensuring accuracy and relevance through the integration of key informant input. The study team and focal persons worked together to resolve data discrepancies. This certainly involves several conversations, evaluations, and modifications to ensure data correctness and reliability during the FAPA Congress technical workshop.

Once the data from each selected country had been compiled, the data was encoded for data cleaning. It was analyzed both qualitatively using thematic analysis and quantitatively using descriptive statistics (frequency and percentage). The process of thematic analysis starts with data familiarization, classifying relevant text segments with descriptive codes leading to code collation and topic identification. To capture study topics'

patterns and concepts, codes were examined and adjusted to create themes. Themes were chosen based on study goals, frequency, dataset consistency, knowledge, and unique perspectives. Based on substance and relevance, themes were assessed, identified, and titled for correctness and meaning. The use of STATA/BE 17 statistical software was used for the quantitative data. The key findings and insights were summarized and reported.

RESULTS

Legally recognized laws and legislation that regulate pharmacy education.

The regulatory framework governing pharmacy education in the Philippines is characterized by a comprehensive structure that includes important legislative acts and regulatory standards. These pillars have a crucial role in maintaining the quality, standards, and relevance of pharmacy education, consequently influencing the growth of professionals in the sector.

First is the Republic Act 5921 (RA 5921), known as the Pharmacy Law of 1969, is a significant statute that serves as the foundation for the regulation of pharmacy education in the Philippines (6). This legislation outlines the fundamental concepts and criteria that form the basis of the pharmacy profession, encompassing the educational and training prerequisites essential for obtaining a pharmacist's license. The document delineates the curriculum, accreditation criteria, and licensure examination procedures, guaranteeing that educational establishments effectively transmit the necessary knowledge, skills, and competencies to individuals seeking to become pharmacists (6).

Table 1. Trends of Laws Regulating Pharmacy Education.

Laws Regulating Pharmacy Education in Asian Countries	Frequency of themes from 24 countries	Percentage (%)
Detailed regulations	19	79.20%
Higher education legislation	15	62.50%
Education frameworks	13	54.20%
Professional licensing	13	54.20%
Practice standards	10	41.70%
Program accreditation	8	33.30%

Building upon the foundation laid by RA 5921, The Republic Act 10918 (RA 10918) also known as the Philippine Pharmacy Act is a legislative measure that amended the law to modernize and improve the regulatory environment for pharmacy practice and education (7). This legislation encompasses a wide range of issues, including new trends, technological progress, and changing healthcare requirements. As a result, it is necessary to update and improve the current educational standards. RA 10918 implements novel strategies for curriculum development, fosters ongoing professional growth, and enhances regulatory supervision to ensure the protection of public health and safety (7).

The regulatory framework governing pharmacy education in the Philippines was examined in comparison to 23 other countries, revealing both similarities and areas for improvement. The summary of the findings is available in Table 1. The thematic analysis reveals that a significant majority (79.2%) of the nations examined have well-defined legislation that specifies the standards for pharmacy education like the Philippines. These regulations encompass many aspects such as curriculum requirements and the qualifications expected of the professionals.

The majority (62.5%) of nations have implemented laws pertaining to higher education, which establishes the legal framework for the provision of pharmacy degrees. More than half (54.2%) of the countries have established national education frameworks that outline the organization and criteria for higher education, frequently incorporating regulations tailored to pharmacy programs.

Likewise, in 54.2% of nations, there is a requirement for pharmacy graduates to meet licensing criteria in the form of qualification examination. This requirement is put in place to guarantee their proficiency and competency as professionals. Practice standards are present in 41.7% of nations, outlining the expected performance and range of responsibilities for pharmacists. Pharmacy programs are accredited in 33.3% of nations, assuring that they meet established requirements for quality and competency.

Degrees of pharmacist education and their duration

The Philippines has a diverse selection of academic programs and degrees in pharmacy, presenting students with numerous educational and career prospects. At the undergraduate level, students can choose between two programs provided at the University of the Philippines: a 5-year Bachelor of Science (BS) in Pharmacy Program or a 5-year BS in Pharmaceutical Sciences. Alternatively, students may choose to enroll in a 4-year Bachelor of Science (BS) in Pharmacy program, offered at pharmacy schools that follow the curriculum established by the Commission on Higher Education (CHED) (8). This curriculum offers students a thorough education in pharmacy, encompassing vital theoretical knowledge and practical skills important for the needs of the health system (8). The differences in program durations can be attributed to variations in the curricula provided by different pharmacy schools. Institutions regulated by the Commission on Higher Education (CHED) generally follow a 4-year curriculum, while those with autonomous status often offer a 5-year version (8).

At the postgraduate level, students can pursue master's programs like the Master of Science (MS) in Pharmacy, which provide specialized knowledge in track such as Hospital Pharmacy, Industrial Pharmacy, Pharmaceutical Chemistry, and Social and Administrative Pharmacy (8). These programs enable students to enhance their expertise in specific domains of pharmacy practice and research. A Doctor of Philosophy (PhD) in Pharmacy is also available but in a limited number of universities locally. The program duration is between 2 to 4 years depending on the phase of the students (9).

Individuals interested in pursuing additional education and specialization have the option to enroll in doctoral programs. These programs include the Doctor of Pharmacy (PharmD), which can be completed in either a 6-year program or a 2-year post-baccalaureate program after completing the 4-year bachelor's degree, in a 4 plus 2 years format. Notably, there are no existing laws to regulate this academic program locally because it is primarily offered by universities with autonomous status in the country.

Pharmacy education in the Philippine Qualifications Framework (PQF) as seen in Figure 1 are classified into the following categories. Level 6 pertains to the bachelor's degree in pharmacy, which is the necessary undergraduate degree for entering the field. Upon completion of this degree, graduates should possess fundamental knowledge and expertise in pharmaceutical sciences, pharmacotherapy, and pharmacy practice (10).

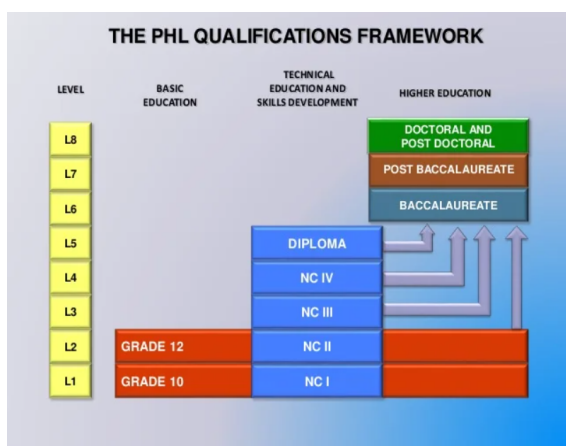


Figure 1. Philippine Qualifications Framework

The master's degree in pharmacy is positioned at level 7, providing pharmacy professionals with additional study and specialty prospects. The degree allows pharmacists to enhance their knowledge and skills in specific areas such as clinical pharmacy, pharmaceutical sciences, or pharmacy administration, hence improving their ability to take on leadership positions and engage in specialized practice (10).

The highest academic achievement in the discipline of pharmacy is the PhD in Pharmacy, which is classified at Level 8 of the Philippine Qualifications Framework (PQF). The doctoral degree demonstrates the highest level of academic accomplishment and expertise in research methodology, critical analysis, and intellectual contributions to the progress of pharmaceutical knowledge and practice (10).

It should be noted, however, that the positioning of the Doctor of Pharmacy (PharmD) program within the PQF hierarchy is still unclear between level 6 and level 7. The PharmD program, with its emphasis on clinical pharmacy practice and patient-centered care, offers a distinctive educational track that may justify its separate classification within the requirements of Level 6 framework or an incentive in the form of a professional track pathway to progress to Level 7.

Table 2 compiles the most common academic programs and degrees offered in the 24 countries included in the review, offering insights into the diverse educational choices available to pharmacy students in the region. A bachelor's in pharmacy degree is a fundamental component of pharmaceutical education, present in 22 out of the 24 countries examined, accounting for 92% of the countries studied. The Master of Pharmacy degree, which is offered in 13 countries (54% of all nations), provides specialized education in pharmaceutical sciences and clinical practice at an advanced level. Pharmacy doctoral degrees are offered in 50% of the total 24 nations, allowing pharmacists to participate in advanced research and contribute to scientific knowledge and innovation in the area.

Table 2. Trends of Laws Regulating Pharmacy Education.

Top Degree Programs offered in the 24 countries	Frequency of theme from 24 countries	Percentage (%)
Bachelor's degree in pharmacy	22	92.00%
Master of Pharmacy	13	54.00%
PhD in Pharmacy	12	50.00%
PharmD	10	42.00%
Master of Clinical pharmacy	9	38.00%
Diploma in Pharmacy	8	33.00%
Master of Pharmaceutical Medicine/Science	6	25.00%

The PharmD program, available in 10 countries (42%), is an advanced professional degree that integrates clinical training with pharmaceutical knowledge. Master of Clinical Pharmacy programs, conducted in 9 countries (38%), emphasize specialized clinical training to provide pharmacists with the necessary skills to enhance patient care and deliver improved pharmaceutical services. Moreover, there are diploma programs in several pharmacy-related disciplines offered in 8 countries, accounting for 33%.

Table 3 shows the duration of pharmacy education programs across 24 countries. A notable diversity in program lengths emerges. Certificate programs, lasting 3-6 months and observed in 17% of countries, provide focused training in specific areas of pharmacy practice, for example competencies to be a pharmacist assistant or pharmacist technician. Similarly, training

programs for registration, spanning 1 year and present in 13% of countries, aim to prepare students for a bachelor's in pharmacy. Diploma programs, lasting 2-3 years and observed in 38% of countries, offer comprehensive training and expertise in various aspects of pharmacy. Which shows a trend for a ladder program for pharmacy. Like the Philippines' pharmacy education, bachelor's programs in the region spans between 4-6 years. The Philippines belong to the majority that offers shorter-duration programs.

For the master's programs lasting 1.5-4 years, graduate certificate and diploma programs spanning 2 years, and PharmD programs varying from 2-6 years. Additionally, PhD programs, observed in varying durations of 2-4 years and greater than 5 years, provide opportunities for advanced research and innovation within the field.

Table 3. Length of degree programs

Length of Degree Programs	Frequency of theme from 24 countries	Percentage (%)
Certificate and diploma programs		
Certificate 3-6 months	4	17.00%
Training for registration 1 year	3	13.00%
Diploma 2-3 years	9	38.00%
Bachelor's degree		
4 years	16	67.00%
5 years	9	38.00%
6 years	2	8.00%
Master's degree		
2 years	9	38.00%
3 years	7	29.00%
4 years	1	4.00%
1.5 years	1	4.00%
Graduate Certificate/Diploma		
Graduate Certificate 2 years	4	17.00%
Graduate Diploma Certificate 2 years	1	4.00%
Professional program 1 year	1	4.00%
PharmD/D.Pharm		
PharmD 6 years	7	29.00%
Additional 2-3 years	6	25.00%
PhD (Doctor of Philosophy)		
3-4 years	3	13.00%
>5 years	2	8.00%
2 years	1	4.00%

Overall, the Philippines is at par with the majority duration of each program with the exemption of a formalized ladder degree from the diploma or pharmacy assistant to PhD and formalized diploma, like that of the models in Afghanistan, Bangladesh, India, Indonesia, Korea, Mongolia, and Vietnam. For example, in Vietnam, they will undergo elementary diploma in pharmacy (EDPharm) for 1 year, a secondary diploma in pharmacy (SDPharm) for additional 2 years, a college diploma in pharmacy (CDPharm): 1, 1.5–2, or 3 years then a Bachelor of pharmacy (BPharm): 1.5–2, 3, 4 or 5 years. Where, students holding a bachelor's degree in biology, chemistry, or medicine can apply for the 3-year BPharm program. A Master of pharmacy (MPharm) has a duration of 1–1.5 or 2 years, Doctor of philosophy in pharmacy (PhDPharm) of 2–3, 3–4, or 4 years. A formalized specialization diploma program in the form of First-level diploma of specialization in pharmacy (FDSPPharm) of 1 or 2–5 years and a second-level diploma of specialization in pharmacy (SDSPPharm) of 1 or 2–4 years.

Teaching staff and strategies of colleges or schools of pharmacy

The conventional academic hierarchy is adopted in most countries that consists of professors, associate professors, and assistant professors. Lecturers are prevalent in most countries, occupying different degrees of seniority such as senior lecturers and transient lecturers. Some countries have specific positions, such as researchers, clinical instructors, and preceptors, which highlight a focus on instruction that is driven by research and practice. Some countries offer specific teaching roles, such as teaching associates, teaching fellows, university professors, and visiting faculty, which may imply diverse instructional approaches. Instructors and demonstrators have a significant impact in several nations, especially those with emerging pharmacy education institutes. As is in the Philippines, there are specific roles reserved for those holding master's and doctoral degrees, underscoring the importance of advanced education in teaching. Fellow and emeritus positions are available in a select few nations, indicating acknowledgment for exceptional contributions to the field of pharmacy education.

The thematic analysis uncovers a wide range of instructional approaches utilized in pharmacy education across various countries. Out of the 24 nations evaluated, traditional lecture-based

learning is still the most common mode, observed in 16 countries, making up 66.7% of the total. Nevertheless, numerous institutions have implemented innovative strategies to improve student involvement and educational achievements, by extensively employing active learning techniques such as problem-based learning (PBL), small group discussions (SGD), and case studies. These active learning strategies were seen in 15 nations, accounting for 62.5% of the total.

Additionally, students often engage in practical, skill-oriented laboratory sessions, simulated patient interviews, and role-playing activities (n=7, 23.3%). These activities aim to foster the development of clinical proficiencies and effective communication abilities. Technology has a substantial impact on contemporary pharmacy education through the incorporation of online platforms (n=4, 13.3%), multimedia teaching methods (n=4, 13.3%), and e-learning technologies (n=6, 20%). Blended learning methods (n=3, 10%), which integrate in-person teaching with digital resources, have gained significant popularity due to their ability to provide students with flexibility and easy access to educational materials.

Requirements for admission, or admission criteria

A comparison of the entrance requirements for pharmacy programs in 24 countries reveals numerous significant patterns and trends. The admission requirements in the Philippines nearly adhere to global standards. The criteria cover a range of factors, such as academic requirements, proficiency in English, entrance examinations, high school records, paths, supplementary assessments, interviews, equivalency, specific prerequisites, educational level, and support services as summarized in Table 4.

Most countries place significant importance on Academic Requirements, with 87.5% stressing the completion of secondary education that focuses on science-related disciplines such as biology, chemistry, physics, and mathematics. Applicants are frequently required to meet specified grade point average criteria or attain predetermined percentages in their high school curriculum. Furthermore, it is worth noting that English Language Proficiency plays a crucial role, as 41.7% of nations mandate students to exhibit their proficiency by means of standardized assessments such as IELTS, TOEFL, or similar exams.

Table 4. Requirements for Admission in Pharmacy Schools/Colleges in Asian Countries

Most common requirements	Frequency of theme from 24 countries	Percentage (%)
General Academic Requirements:	21	87.50%
Entrance Exams	11	45.80%
English Language Proficiency:	10	41.70%
High School Transcript	7	29.20%

It should be noted that in the Philippines, the approach to English proficiency exams in the context of university entrance differs slightly from some other countries. In the country, English proficiency remains a crucial need for university and college admissions, it is typically evaluated as part of a comprehensive entrance exam that assesses a range of academic abilities and topic knowledge, rather than being a standardized test on its own.

Entrance Exams are a common requirement, with 45.8% of countries requiring students to take these assessments to evaluate their academic knowledge and preparedness for pharmacy education. Furthermore, High School Transcripts are of utmost significance in the admission requirements of 29.2% of countries, highlighting the essentiality of a robust academic history, especially in the fields of science and mathematics.

Pharmacy Internship

The countries have implemented student internship programs to offer hands-on experience, such as in the Philippines. The durations of pharmacy internships vary significantly across countries, ranging from a minimum of 336 hours in Mongolia to a maximum of 67,200 hours in Singapore. This wide range indicates that there is no global standard for the duration of pharmacy internships. Some countries, such as Singapore and Malaysia, stand out with exceptionally long internship durations, likely reflecting comprehensive pharmacy education programs.

These countries aim to provide extensive hands-on experience to their pharmacy students.

Most countries (10 out of 24) require internships lasting between 1,000 and 5,000 hours. This range includes countries like Australia, India, Japan, and Korea, as seen on Table 5. It reflects a common duration bracket in many regions. Which is the same as the required internship hours in the Philippines of a total of 1,200 hours that is divided to community pharmacy (300 hours), hospital pharmacy (300 hours), manufacturing pharmacy (300 hours), institutional pharmacy (120 hours), and regulatory pharmacy and public health (180 hours). These are specified in accordance with CMO No. 104 s. 22 and CHED No. 25 s. 2021 (11).

Pharmacy education internship sites span sectors. Hospital pharmacies, clinical settings, and specialized medical departments are the most common training places at 21 (25.3%). Following closely, community pharmacies account for 13 (15.7%). Pharmaceutical firms and manufacturing plants offer internships in 11 (13.3%) situations. Government agencies like the Ministry of Public Health and Pharmaceutical Regulatory Affairs offer internships in 3 cases (3.6%). University labs and research institutions offer internships in 10 cases (12.0%). Compounding and retail pharmacies account for 6 cases (7.2%). Other unspecified internship venues account for 16 (19.3%). Pharmacy students can train in clinical, industry, and regulatory contexts, as shown by this distribution.

Table 5. Duration of Pharmacy Internship in Asian Countries

Duration of Internship	Frequency of theme from 24 countries	Percentage (%)
1,000 - 5,000 hours	10	41.67%
More than 5,000 hours	6	25.00%
Less than 1,000 hours	3	12.50%

Several countries mention the importance of reputable or nationally recognized training sites, ensuring that students receive high-quality education. Some countries, like Malaysia and Sri Lanka, emphasize the importance of standards and quality assurance in the selection of training sites, ensuring that students receive the best possible education. While efforts are done in the Philippines to ensure quality internship experience through Preceptors Guild of the Philippines and internship manuals designed by Philippine Association of colleges of Pharmacy (PACOP), to date there are no formalized system for training site accreditation like that of the medical program degrees in the country and that of the models in other benchmark countries.

Quality assurance measures and continuing education of pharmacy

An analysis of quality assurance methods in pharmacy education across 24 countries finds a wide range of measures designed to uphold and improve educational standards. The mechanisms include accreditation organizations, regulatory control, self-assessment procedures, continuing education efforts, regional and worldwide cooperation, and the participation of professional associations.

Accreditation of pharmacy schools is a fundamental aspect of ensuring quality in numerous countries, where specialized organizations are responsible for assessing pharmacy education programs based on established criteria. Out of the nations that were evaluated, over 58.3% had certification agencies. Examples of these entities are the Australian Pharmacy Council and the Pharmacy Council of India. Accreditation offers a systematic framework for universities to comply with criteria and consistently enhance their educational offerings. In the Philippines, the Commission on higher education (CHED) fulfills this function of accrediting pharmacy schools.

Regulatory organizations such as CHED, play a crucial part in guaranteeing the excellence of pharmacy education, encompassing tasks such as accrediting programs and overseeing institutions. As an example, the Ministry of Higher Education in Afghanistan is responsible for supervising the accreditation procedures, but the Ministry of Health in Cambodia regulates the higher education establishments. In the same vein, the National Qualifications Authority and

the Commission for Academic Accreditation in the UAE maintain and enforce high-quality benchmarks.

Self-assessment and evaluation procedures enhance quality assurance endeavors, promoting a culture of ongoing enhancement within pharmacy education institutions. Countries such as Japan engage in internal self-evaluations in addition to external assessments conducted by organizations like the Institute for Pharmacy Education and Evaluation. These techniques promote the monitoring of institutional performance and the implementation of essential improvements. The counterpart in the Philippines are the voluntary additional qualifications that increases the status of the pharmacy school. For example, accreditations with professional groups, such as Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU) in the Philippines, that enhances quality control by conducting regular assessments of pharmacy programs.

In addition to the accreditation of institutions, Pharmacy graduates in the Philippines must undergo a pharmacist license examination conducted by the Board of Pharmacy, which is under the oversight of the Professional Regulations Commission. The implementation of quality assurance at both the pharmacy school and among professionals follows a dual strategy, which is like the techniques observed in benchmark countries.

On top of the licensure exam, in the Philippines, continuing professional development (CPD) units is required for renewal of professional license. Pharmacist continuing education is a worldwide endeavor, with countries employing different methods to guarantee continuous professional growth. The types of continuing education activities often align with local healthcare needs and regulatory requirements. Specific CPD requirements vary by country based on healthcare practices and government regulations. The CPD trends are summarized in Table 6.

Continuing Professional Development (CPD) initiatives, exemplified by programs in Hong Kong, ensure that practicing pharmacists remain updated with the latest knowledge and skills, contributing to ongoing professional development. Many countries provide

Table 6. Trends on CPD in Asian countries

CPD trends	Frequency of theme from 24 countries	Percentage (%)
Local Needs and Regulations	24	100.00
Variety of Learning Formats	21	87.50
National Recognition and Accreditation	11	45.80
Compliance and Quality Assurance	10	41.70
CPD Credit Points System	6	25.00
Research and Specialization	6	25.00

continuing education opportunities for pharmacy professionals. These opportunities include a wide range of activities, such as courses, webinars, symposiums, lectures, workshops, conferences, internet discussion groups, clinical case studies, journal clubs, presentations, training, and publication of journal articles.

Regulatory authorities in countries such as Bangladesh create avenues for pharmacists to consistently enhance their knowledge and abilities, underscoring the significance of upholding rigorous educational criteria. Countries like Indonesia, Malaysia, Taiwan, Thailand, and UAE utilize a credit points system to monitor and evaluate ongoing education endeavors. Pharmacists are obligated to gather points within specific time periods. Specialized training programs, such as Singapore's National Pharmacy Residency Program, provide focused education, which is a gap in the Philippines.

DISCUSSION

Legally recognized laws and other legislation that regulate pharmacy education

The analysis of laws and other legislation in the region, demonstrates inclination towards organized pharmacy education systems, which are shaped by diverse regulatory strategies impacted by cultural, educational, and healthcare considerations in the region. Gaining insight into these distinctions helps guide global cooperation, the creation of educational programs, and the enhancement of standards in pharmaceutical education. Currently, the regulatory landscape concerning legislation related to pharmacy education in the Philippines is comparable to that of other countries, yet

there are several areas identified for potential improvement. While the existing regulations provide a framework for pharmacy education, there is room for enhancement by aligning them more closely with internationally recognized standards and best practices specifically on the clinical side of the practice.

Degrees of pharmacist education and its duration

When comparing pharmacy school programs in different nations to those in the Philippines, some common themes and noticeable variances become apparent. Commonalities encompass undergraduate programs that culminate in a bachelor's degree. Similarly, there is a wide availability of master's degrees in pharmacy, which offer chances for higher education and expertise in fields such as clinical pharmacy and pharmaceutical sciences. Furthermore, doctoral programs, such as the PharmD and PhD in Pharmacy are also available. Nevertheless, it is important to acknowledge that there is a wider range of universities and diverse graduate programs offered outside the Philippines.

Moreover, the presence of a post-baccalaureate PharmD program, as shown in the Philippines, may not be prevalent in other regions, indicating variations in pharmacy education routes. It is crucial to clarify the correct level designation for the PharmD program in the PQF to ensure it is in line with global standards and to promote a clear understanding of its educational status and recognition. Assigning a clear position for the PharmD program within the PQF hierarchy will improve the transparency, comparability, and legitimacy of pharmacy education qualifications in the Philippines.

In addition, it is worth mentioning that there is a distinct lack of a structured ladder education system for pharmacy education, like the ones observed in Vietnam. The Philippines can improve its approach by using a well-organized pathway inspired by successful models in countries such as Vietnam. An integrated program would offer students the chance to enter the pharmacy field at different levels, starting with pharmacy assistant positions and leading up to PhD studies.

This method would not only improve the flexibility and adaptability of the workforce, but also eliminate the possible inefficiency of resources that might occur with a rigid 4-year bachelor's degree approach. Furthermore, the implementation of structured diploma programs could function as advantageous milestones for students wishing to pursue advanced studies in pharmacy, guaranteeing a broader and more accessible educational route for prospective pharmacists.

Unlike a well-defined residency program for pharmacists, the Philippines does not have a regulated route for pharmacists to improve their professional practice beyond academic environments. This underscores the necessity of establishing structured career paths and specialized training initiatives to meet the changing demands of the pharmaceutical field in the nation and guarantee that pharmacists have avenues for professional advancement and specialization.

Teaching staff and strategies of colleges or schools of pharmacy

In terms of academic structure, the Philippines adhere to that of the majority. However, there are variations in the instructional approaches utilized in various geographical areas. While several nations prioritize conventional teaching techniques enhanced by contemporary resources, others have embraced more innovative methodologies, such as team-based learning (TBL), flipped classrooms, and community-based learning activities. Notwithstanding these variances, the primary objective remains consistent: to provide pharmacy students with the requisite information, skills, and competences necessary to flourish in their forthcoming positions as pharmacists.

Technology has a substantial impact on contemporary pharmacy education through the incorporation of online platforms, multimedia teaching methods, and e-learning technologies. Blended learning methods, which integrate in-person teaching with digital resources, have gained significant popularity due to their ability to provide students with flexibility and easy access to educational materials.

The COVID-19 pandemic has forced universities in the Philippines to adopt active, problem-based, and technology-based learning. This adaptation has increased post-COVID teaching and technology use opportunities and changed perspectives about the future of teaching and technology integration (11). Technology has improved teaching efficacy and helped educators obtain advanced technology skills, according to research. As such, the Philippines has the potential to implement a more organized and systematic approach to pharmacy education by integrating active learning, problem-based learning, and technology-enhanced instruction can foster a more dynamic and engaging learning environment for pharmacy students in the Philippines. The faculty in the Philippines should therefore have increased competency in these modalities to future-proof the programs.

The researchers also suggest a ladder curriculum, like those in other countries, to give students clear career paths and expertise. For instance, Vietnam's five-year pharmacy degree program has a ladder structure that allows students to improve annually and graduate. After a Higher Secondary Certificate, students can pursue an Elementary Diploma in Pharmacy, a Secondary Diploma, a College Diploma, or a Bachelor of Pharmacy degree. Different levels have different durations and progression criteria. Tech high schools can offer Elementary Diploma (1 year) and Secondary Diploma (2 years) in Pharmacy, whereas universities can offer College Diploma (3 years), Bachelor of Pharmacy (5 years) and postgraduate degrees are usually awarded by universities (8). After one year, students can work or continue their studies, demonstrating its potential to utilize limited human resources and satisfy evolving pharmacy sector demands in the Philippines.

Requirements and admission criteria

In general, the Philippines' adherence to these worldwide admission requirements demonstrates its dedication to assuring the quality and proficiency of future pharmacy professionals. The difference lies in the method of conducting English proficiency exams. Typically, in the country, English proficiency exams are merely one part of the larger entrance exam, rather than being an independent standardized test. This distinctive methodology arises from the widespread recognition of English as a national language and its prevalent use for educational purposes in academic institutions throughout the country. The approach mirrors the linguistic environment and educational methods in the Philippines, where the ability to speak English fluently is highly regarded in addition to other academic skills.

Internship requirements

Although the Philippines has made efforts to improve the quality of internship experiences, such as establishing the Preceptors Guild of the Philippines and creating internship manuals by the Philippine Association of Colleges of Pharmacy (PACOP), there is still a significant gap in the absence of a formalized system for accrediting internship and training sites. In contrast to the medical program degrees in the country and the patterns followed by benchmark countries, the pharmacy education sector in the Philippines does not have a standardized method for accrediting internship sites. Introducing a structured accrediting procedure could guarantee uniformity in the quality of educational opportunities offered by various institutions and enhance the overall level of pharmacy education in the nation.

Quality assurance and continuing professional development.

In general, the global state of quality assurance in pharmacy education demonstrates a deliberate endeavor to maintain strict criteria and train pharmacists to provide exceptional healthcare services. The continued improvement of pharmacy education worldwide is achieved through the combined efforts of accreditation, regulatory control, self-assessment, continuing education, international collaboration, and professional association involvement.

While CPD programs exist in the Philippines, there exists a significant disparity in the accessibility of structured career paths outside of the conventional academic setting. Specialized training programs, like the National Pharmacy Residency Program in Singapore, provide targeted study and practical experience to pharmacy practitioners, enabling them to specialize in specific aspects of pharmaceutical care.

CONCLUSION AND RECOMMENDATIONS

The comparative review of the laws, regulations, and educational standards governing pharmacy education in 24 countries reveals a diverse regulatory environment influenced by cultural, educational, and healthcare factors. This analysis examines the similarities and differences between the Philippines and nearby nations, offering valuable information for stakeholders to evaluate and enhance pharmacy education systems. While the regulatory framework in the Philippines adheres to international standards, there is a need for improvement to enhance the quality and efficacy of pharmacy education in the country.

A crucial suggestion arising from this research is the adoption of a meticulously structured ladder curriculum in pharmacy education in the Philippines. This concept, inspired by exemplary models observed in countries like Vietnam, would offer students clearly defined pathways for career progression. The objective of this plan is to enhance the versatility and adjustability of the pharmaceutical workforce and optimize the allocation of resources by integrating diploma programs and creating well-defined pathways for career advancement that align with the student's requirements and competencies.

One area that requires improvement is the creation of formal career paths and specialized training programs that extend beyond traditional academic environments. The Philippines should contemplate adopting measures to establish structured career advancement and specialized educational initiatives for pharmacists outside of the conventional academic setting or university. Specialized training programs, such as the National Pharmacy Residency Program in Singapore and PharmD specializations in Thailand, offer focused education and hands-on training to pharmacy professionals, allowing

them to specialize in particular areas of pharmaceutical treatment. This would address the existing disparity in access to higher levels of professional practice and ensure that pharmacists have possibilities for career advancement to level 7 and level 8 even without a master's or PhD degree.

Moreover, it is imperative to develop the proficiency of faculty members in active learning, problem-based learning, and technology-enhanced instruction. This will enhance the learning process and better prepare students for the constantly evolving pharmaceutical sector. Another suggestion is to establish and execute a methodical accreditation procedure for internship sites, which can ensure uniformity in the quality of educational experiences and elevate the general standard of pharmacy education in the Philippines. Professionals should prioritize quality assurance and continuous professional development to ensure that pharmacists remain up-to-date with the latest knowledge and skills.

In summary, by implementing these recommendations and conforming to international benchmarks, the Philippines has the potential to enhance the quality, effectiveness, and relevance of pharmacy education. This would ultimately result in improved healthcare outcomes and a more efficient response to the population's needs.

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