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The Current Situation of Facilities and Human Resources for College Level Pharmacy Training at Dak Lak Medical College in 2024

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Abstract
Introduction: In addition to a scientific and modern curriculum, the quality of college-level pharmacy education depends mainly on teaching staff and training facilities. Assessing these two core factors provides a foundation for improving the quality of human resource training in pharmacy. This study aims to evaluate the current status of lecturers and facilities serving the pharmacy technician training program at Dak Lak Medical College in 2024, to identify strengths and areas for improvement that enhance training quality.
Materials and methods: A cross-sectional descriptive study was conducted at Dak Lak Medical College in 2024. Secondary data were retrospectively collected from records on human resources and training facilities. The study covered all lecturers and facilities involved in the pharmacy technician program. Data were analyzed using descriptive statistics and compared with national standards issued by the Ministry of Labor, Invalids, and Social Affairs.
Result: A total of 68 lecturers participated in teaching, including 7 specialized in pharmacy (10.3%). Among them, 87.0% held university degrees or higher, with 34.1% having postgraduate qualifications. The student-to-lecturer ratio was 17:1. Most lecturers possessed certificates in foreign languages (75.0%) and informatics (77.9%). The college had a total area of 12,919.46 m², with 62.85% allocated to classrooms and practice areas. The Faculty of Pharmacy included 7 specialized laboratories covering 413 m², equipped mainly with basic instruments. However, advanced devices such as HPLC and UV-Vis spectrophotometers were lacking. The library contained 4,889 titles, 81.8% being pharmacy references, and all resources were digitized.

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1. Introduction

Pharmacy technicians play an essential role in the healthcare system by assisting pharmacists in ensuring the safe, effective, and rational use of medicines. In Vietnam, the Ministry of Health and the Ministry of Labor, Invalids and Social Affairs have issued several regulations emphasizing the development of qualified pharmacy human resources to meet increasing demands in medical care, production, and pharmaceutical distribution. The quality of pharmacy technician training depends not only on a scientific and up-to-date curriculum but also on two core elements: competent teaching staff and adequate training facilities [1, 2, 3]. These components directly affect students' ability to integrate theory with practical skills and to meet professional competency standards upon graduation.

However, many medical and pharmacy colleges, especially in local regions such as the Central Highlands, still face challenges in ensuring sufficient qualified lecturers and modern laboratory equipment. Limited postgraduate specialization in pharmacy,

outdated teaching tools, and insufficient investment in practice facilities have hindered the improvement of training quality. Dak Lak Medical College, as a key institution providing healthcare training in the region, needs a comprehensive assessment of these aspects to identify current strengths and weaknesses. Therefore, this study was conducted to evaluate the current situation of teaching staff and facilities serving the pharmacy technician training program at Dak Lak Medical College in 2024, providing evidence-based recommendations to enhance training quality and meet the evolving needs of the healthcare sector.

2. Objectives

Given the crucial role of pharmacy technicians in the healthcare system and the growing demand for high-quality human resources in the pharmaceutical field, it is essential to assess the current status of training conditions to ensure educational effectiveness. Based on this rationale, this study was conducted with the following objectives: (1) To describe the current status of the teaching staff participating in the pharmacy technician training program at Dak Lak Medical College in 2024; (2) To analyze the existing conditions of facilities and equipment serving pharmacy training at the college; (3) To propose recommendations for improving the quality of human resources and infrastructure to enhance the effectiveness of pharmacy education and meet professional standards.

3. Materials and methods

3.1. Study Design and Setting

A cross-sectional descriptive study was conducted at Dak Lak Medical College (DLMC) from January to December 2024. The study focused on assessing human resources and facilities involved in the training of college-level pharmacy technicians.

3.2. Sample Size

The study included the entire population related to the pharmacy technician training program at DLMC in 2024. Specifically, all 68 lecturers participating in teaching and all training facilities including classrooms, laboratories, and the library were selected for assessment. This comprehensive sampling approach ensured that the collected data accurately reflected the overall situation of the college's human and physical resources.

3.3. Data collection and analysis

A structured assessment tool was developed to evaluate the current status of teaching staff and training facilities in the pharmacy technician program. The instrument was adapted from national standards for vocational education and relevant studies on educational quality assessment in pharmacy training. It was reviewed by three academic experts for content validity, and necessary revisions were made before implementation. The tool consisted of three parts: Part 1 collected general information about lecturers (age, gender, qualification, teaching experience, and specialization); Part 2 assessed the availability and adequacy of facilities, including classrooms, laboratories, equipment, and learning resources; Part 3 included open-ended questions to identify existing limitations and proposed improvements.

Data were collected retrospectively from the 2024 records of Dak Lak Medical College and verified through direct interviews with key administrative staff. All responses and figures were entered, processed, and analyzed using SPSS version 26.0. Descriptive statistics such as frequency, percentage, and mean were applied to summarize the data. Comparative analyses were performed to identify differences between specialized and non-specialized lecturers, and between existing facilities and national benchmarks. Statistical significance was determined at $p \leq 0.05$.

3.4. Approval

This study was reviewed and approved by the Institutional Review Board (IRB) of Dak Lak Medical College. All procedures involving human participants were conducted in accordance with the ethical standards of the institution and the national guidelines for research involving human subjects.

4. Results and discussion

4.1. Characteristics of Academic and Administrative Staff

The results from Table 1 show that Dak Lak Medical College had a total of 68 staff members, including both academic and administrative personnel. Among them, 44 individuals (64.7%) were classified as lecturers or equivalent, while 13 (19.1%) were assistant lecturers or equivalent, and 11 (16.2%) held other professional positions. Notably, there were no senior lecturers or equivalent positions, indicating a lack of high-level academic titles within the institution. This finding is consistent with similar studies conducted in local medical and pharmaceutical colleges, which have reported a shortage of senior or specialized lecturers in pharmacy education. The absence of this group suggests limitations in academic leadership and professional mentorship, which are critical for advancing the quality of training and research [4].

The distribution of lecturers among faculties and departments also reflects the college's training priorities. The Faculty of Nursing and Medical Technology had the largest number of lecturers (12 staff, accounting for 17.6%), followed by the Faculty of Medicine (10 staff) and the Faculty of Pharmacy (7 staff). This pattern aligns with the institution's core focus on health sciences education but also highlights the need to strengthen human resources in the pharmacy field, where the number of qualified postgraduate lecturers remains limited. Administrative departments, such as the Department of Organization and Administration and the Department of Training, Scientific Research and International Cooperation, had relatively larger staff sizes, reflecting the increasing demands of institutional management and educational quality assurance. Overall, while Dak Lak Medical College maintains an adequate total workforce, the structure shows an imbalance between teaching and administrative personnel and a shortage of senior specialists, which may affect long-term academic development and training quality.

Table 1: Characteristics of the Participants (n=68)

No.	Unit	Number of staff and employees by rank				
		Total	Distribution			
			Senior Lecturer / Equivalent	Lecturer / Equivalent	Assistant Lecturer / Equivalent	Others
Total		**68**	**0**	**44**	**13**	**11**
1	Board of Rectors	2	0	2	0	0
2	Department of Training, Scientific Research and International Cooperation	08	0	05	01	02
3	Department of Organization and Administration	12	0	04	02	06
4	Department of Testing and Quality Assurance	04	0	02	02	0
5	Department of Testing and Quality Assurance	04	0	04	0	0
6	Department of Student Affairs	05	0	03	02	0
7	Faculty of Pharmacy	07	0	06	01	0
8	Faculty of Nursing and Medical Technology	12	0	09	03	0
9	Faculty of Medicine	10	0	05	02	03
10	Faculty of Basic Sciences	04	0	04	0	0

4.2. Quality of Teaching Staff

The data in Table 2 provide an overview of the lecturers' qualification structure. Regarding foreign language and informatics proficiency, the proportions of staff holding valid certificates were relatively high (75.0% and 77.9%, respectively), meeting essential professional and integration requirements. Notably, 7.4% of lecturers possessed ethnic language certificates an advantage particularly relevant to the Central Highlands context, where multilingual communication supports better health education and community service. However, 76.5% of lecturers had not received formal training in political theory, and 22.1% lacked informatics certificates, indicating a need for continuous training and professional standardization to enhance overall staff quality.

Table 2: Political Theory, Foreign Language, and Informatics Qualifications of Lecturers

No.	Qualification	Number	Percentage (%)
I.	**Political Theory Qualification**		
1.	Advanced or Bachelor Level	07	10.3
2.	Intermediate Level	09	13.2
3.	Not Trained	52	76.5
	Total	68	100
II.	**Foreign Language Qualification**		
1.	With Foreign Language Certificate	51	75.0
2.	With Ethnic Language Certificate	05	7.4
	Total	56	82.4
III.	**Informatics Qualification**		
1.	With Informatics Certificate	53	77.9
2.	Without Informatics Certificate	15	22.1
	Total	68	100

As shown in Table 3, the academic qualification structure of the teaching staff was well established and reflected a solid professional foundation. A total of 87.0% of lecturers held a university degree or higher, including 34.1% with postgraduate qualifications (Master's, Level I/II Specialist, or Doctorate). This composition demonstrates a strong capacity for academic teaching and research activities at Dak Lak Medical College. However, the proportion of lecturers with Master's degrees in Pharmacy (10.3%) remains limited compared to those in Medicine, suggesting that the college should prioritize postgraduate training in the pharmaceutical field to meet professional and accreditation standards in the future [5].

Table 3: Academic Qualifications of Lecturers

No.	Academic Qualification	Number	Percentage (%)
1.	Doctor / Level II Specialist	01	1.5
2.	- Master's Degree	17	25.0
	- Master of Medicine	10	14.7
	- Master of Pharmacy	7	10.3
3.	Level I Specialist	05	7.6
4.	University / Bachelor of Medicine	36	52.9
5.	College	03	4.4
6.	Others	06	8.6
Total		68	100

4.3. Current Status of Facilities

4.3.1. General Training Infrastructure

The data in Table 4 show that the college has a well-balanced and comprehensive infrastructure supporting its training and management activities. The two core components for education theoretical classrooms and practice areas occupy 62.85% of the total campus area, indicating a strong focus on teaching and learning. Additionally, dormitory (10.2%) and sports facilities (15.48%) create a conducive environment for both academic and personal development. Other functional areas, including the administrative building, library, canteen, and medical station, are proportionally allocated to ensure the smooth operation of the college.

Table 4: Area Distribution of Functional Units at Dak Lak Medical College

No.	Category	Usable Area (m^2)	Percentage (%)
1.	Administrative Building	628.7	4.87
2.	Theoretical Classrooms	4,335.5	33.56
3.	Practice Area	3,784.3	29.29
4.	Library	727	5.63
5.	Dormitory	1,318	10.20
6.	Canteen	100	0.77
7.	Medical Station	25.96	0.20
8.	Sports Area	2,000	15.48
Total		12,919.46	100

4.3.2. Specialized Pharmacy Practice Rooms

Table 5 indicates that the Faculty of Pharmacy is equipped with seven functional rooms, covering the essential areas of pharmaceutical education. The Pharmaceutics Industrial Pharmacy Laboratory accounts for the largest portion (38.2%), reflecting strategic investment in pharmaceutical manufacturing and technology training. Other laboratories

such as Analytical Quality Control, Clinical Pharmacy, and Pharmacognosy Traditional Medicine meet standard size requirements (60 m² each), ensuring sufficient practice space. The presence of a Model Pharmacy and dedicated storage room demonstrates attention to practical application and professional management in training.

Table 5: List of Pharmacy Faculty Practice Rooms

No.	Room Type	Quantity	Area (m^2)	Percentage (%)
1.	Faculty Office	01	25	6.1
2.	Pharmaceutics – Pharmaceutical Industry Lab	03	158	38.2
3.	Analytical Chemistry – Quality Control Lab	01	60	14.5
4.	Pharmacology – Clinical Pharmacy Lab	01	60	14.5
5.	Botany – Pharmacognosy – Traditional Medicine Lab	01	60	14.5
6.	Model Pharmacy	01	25	6.1
7.	Chemical and Material Storage	01	25	6.1
Total		09	413	100

4.3.3. Equipment for Pharmacy Technician Training

As shown in Table 6, most of the faculty's equipment consists of basic and essential laboratory tools. Glassware represents the largest proportion (59.2%), forming the foundation for basic chemical and analytical experiments. "Other equipment and tools" (35.2%) also contribute significantly to the diversity of teaching materials. However, specialized laboratory machines account for only 5.6%, indicating a limitation in access to advanced analytical technologies. The absence of laboratory fabrics and safety gear is another shortcoming that needs to be addressed to ensure professionalism and laboratory safety.

Table 6: Current Specialized Equipment Inventory

No.	Equipment Category	Unit	Quantity	Percentage (%)
1.	Glassware	Item	872	59.2
2.	Laboratory Machines	Item	82	5.6
3.	Laboratory Fabrics	Set	0	0
4.	Other Equipment and Tools	Item/Set	520	35.2

Table 7 reveals a shortage of 26 essential laboratory instruments, ranging from basic tools (melting point apparatus, incubator, magnetic stirrer) to advanced systems (HPLC, RO water system, tablet hardness tester). The lack of these instruments significantly limits students' ability to perform comprehensive experiments and independent research. Consequently, the current training environment does not yet fully meet the professional competency standards required for pharmacy technician education. Investment in modern laboratory equipment is therefore urgent and essential to ensure educational quality and accreditation compliance.

Table 7: List of Specialized Laboratory Machines Not Yet Available

STT	Items	Unit	Required Quantity
1	Melting Point Apparatus	Item	1
2	Polarimeter	Item	1
3	Potentiometric Titrator	Item	1
4	Magnetic Stirrer with Heating	Item	1
5	Autoclave (Sterilizer)	Item	1
6	Biological Safety Cabinet	Item	1
7	Incubator	Item	1
8	Refrigerator	Item	1
9	Deep Freezer	Item	1
10	Tablet Hardness Tester	Item	1
11	Tablet Friability Tester	Item	1
12	Orbital Shaker	Item	1
13	Vacuum Oven	Item	1
14	Vibrating Sieve Shaker	Item	1
15	Magnetic Stirrer with Heating (additional unit)	Item	1
16	Pressure Filtration Device	Item	1
17	Clarity Tester / Transparency Tester	Item	1
18	Aluminum Cap Sealing Machine	Item	1
19	Reverse Osmosis (RO) Water Purification System	Set	1
20	Moisture Analyzer	Item	1
21	High-Performance Liquid Chromatography (HPLC) System	Set	1
22	Powder Plasticity Tester	Item	1
23	Granule Sizing Machine / Particle Size Adjuster	Item	1
24	Tablet Hardness Tester	Item	1
25	Extrusion–Spheronization System	Item	1
26	Capsule Shell Opener	Item	1
Total			26

Table 8 highlights 59 types of missing laboratory tools, indicating a considerable gap in essential experimental facilities. Two key areas remain under-equipped: (1) Pharmacology training with laboratory animals, where the absence of dissection tools, animal cages, and injection kits limits hands-on learning; and (2) Pharmacognosy and Traditional Medicine, where basic extraction and concentration equipment are still lacking. These shortages directly affect the development of practical skills and hinder the connection between theory and real-world application.

Table 8: List of Specialized Laboratory Tools Not Yet Available

STT	Items	Unit	Required Quantity
1	Complete Vacuum Filtration Set (Vacuum Flask, Vacuum Pump, and Filter Funnel)	Set	1
2	Round-Bottom Flask with Reflux Condenser	Item	1
3	Animal Dissection Kit (Scissors, Forceps, Dissection Table, and Scalpel)	Set	6
4	Stethoscope	Item	6
5	Stopwatch	Item	6
6	Glass Basin / Glass Tray	Item	6
7	Mouse Restraining Box for Injection	Item	6
8	Mouse Cage	Item	2
9	Blunt Needle	Item	18
10	Rabbit Restraining Box for Injection	Item	3
11	Rabbit Cage	Item	2
12	Percolation Extraction Apparatus	Set	1
13	Herbal Concentration Apparatus	Set	1
14	Porcelain Evaporating Dish / Mortar Boat	Item	2
Tổng cộng			59

4.3.4. Learning Resources

The library provides an abundant learning resource system with nearly 5,000 titles, of which 81.8% are pharmacy-related reference materials. This ensures a strong foundation for both teaching and self-study. A remarkable strength is that 100% of resources have been digitized, reflecting the college's commitment to digital transformation and facilitating students' access to materials anytime and anywhere. This structure supports both curriculum-based learning and the promotion of self-directed and research-oriented study among students.

Table 9: Types of Learning Materials for Pharmacy Technician Training

No.	Type of Material	Hard Copy	Percentage (%)	Digital Copy	Percentage (%)
1	Core Textbooks	89	18.2	89	18.2
2	Reference Materials in Pharmacy	4800	81.8	4800	81.8
Total		4889	100	4889	100

5. Conclusion

The study results showed that, besides a scientifically designed and up-to-date training program, the quality of pharmacy technician education at Dak Lak Medical College is directly influenced by two key factors: the teaching staff and the training facilities. The findings revealed that the number of pharmacy lecturers remains limited, and the proportion of those with postgraduate qualifications, especially in the field of pharmacy, is still low. In terms of facilities, the college currently meets the basic requirements for training; however, the availability of modern laboratory equipment, such as HPLC and UV-Vis spectrophotometers, remains insufficient. Additionally, the learning resources are still modest in both quantity and diversity. Therefore, the college should focus on improving lecturer qualifications, supplementing specialized laboratory equipment, and expanding digital and reference learning materials to enhance the overall quality of pharmacy technician training and better meet the evolving demands of the healthcare sector.

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