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ASSESSING PHARMACY PRACTICES AND OUTCOMES USING CASE STUDY ANALYSIS: A COMPREHENSIVE REVIEW

Bhuvana Chandar Chikkala[1], Tarun Choudari[1], Vinay Kumar Kintali[2] and Sita Kumari Karanam[1]*

[1]Maharajah's College of Pharmacy, Phool Baugh, Vizianagaram, Andhra Pradesh.
[2]College of Pharmaceutical Sciences, Andhra University, Visakhapatnam, Andhra Pradesh.

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***Corresponding Author**
Dr. Sita Kumari Karanam
Maharajah's College of Pharmacy, Phool Baugh, Vizianagaram, Andhra Pradesh, India – 535002.

ABSTRACT

The training of pharmacy students through hospital-based programs is crucial for preparing them for professional practice. Integrating case studies into these training programs enhances practical learning by providing real-world situations that challenge students to apply their conceptual understanding. This review examines the effectiveness of hospital training programs and the use of case studies within B.Pharmacy curricula, exploring their impact on student learning and skill development. Hospital training offers students exposure to clinical environments, bridging the gap between classroom learning and professional practice. Case studies are invaluable tools in pharmacy education, fostering critical thinking and problem-solving skills. This paper also highlights the challenges of implementing hospital training and case studies, as well as the best practices and future directions for enhancing pharmacy education.

KEYWORDS: Pharmacy education, Hospital training, Case studies, Pharmacy practice.

INTRODUCTION

The training of pharmacy students through hospital-based programs plays a crucial role in preparing them for the demands of professional practice. Integrating case studies into these training programs enhances practical learning by providing real-world situations that challenge students to apply their conceptual understanding. This review article examines the effectiveness of hospital training programs and the use of case studies within Bachelor of Pharmacy curricula, exploring their impact on student learning and skill development.

Overview of hospital training in pharmacy education

Hospital training is an essential component of pharmacy education, offering students exposure to real clinical environments where they can develop practical skills. This training involves working alongside healthcare professionals, participating in patient care, and gaining a deep understanding of medication management and therapy. Hospital training connects the classroom learning and professional practice; ensuring that pharmacy graduates are well-equipped to meet the challenges of their future careers (Michael et al., 2018).

Queen's NRI Multispecialty Hospital, situated on Gurudwara Rd, Balayyasastri Layout, Seethammadara, boasts 280 beds, including emergency and private wards. Recognized as one of the best multispecialty hospitals in the town, it remains at the forefront of technological advancements to meet the growing demands of the health sector. The hospital provides a comprehensive overview of various medical equipment used across departments, including critical and intensive care units, neonatal units, pediatric units, etc. These departments are well-equipped with modern laboratory facilities, X-ray technology, and other advanced medical resources. The hospital's commitment is evident in its efforts to keep pace with the increasing demand for healthcare services, ensuring the fulfillment of the needs of the community it serves.

Training at the pharmacy unit of Queens NRI Multi speciality Hospital in Visakhapatnam is integral to maintaining the high standards of patient care and clinical excellence for which the hospital is renowned. This training encompasses a comprehensive program that includes hands-on experience in medication management, patient counseling, and the implementation of clinical pharmacy practices (Vinay Kumar et al., 2023; Divya et al., 2022). Trainees are exposed to real-world examples that enhance their knowledge of pharmacotherapeutics and the importance of interdisciplinary collaboration in a multispecialty environment. The emphasis on continuous education and practical exposure ensures that pharmacists are well-equipped to manage complex medication regimens, contribute to patient safety, and improve therapeutic outcomes (Nobuyuki et al., 2024).

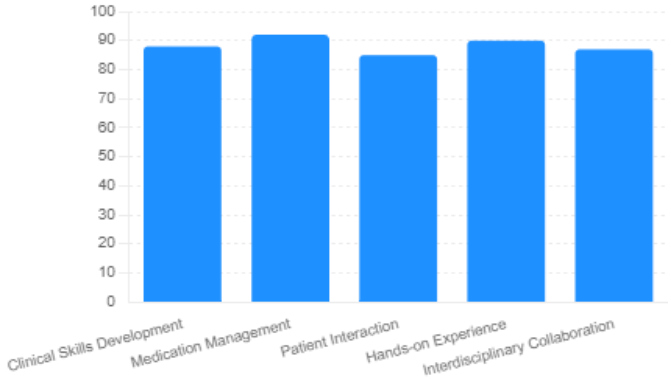

Figure 1: Importance of hospital training in pharmacy education.

Figure 1 representing the importance of practical learning in the pharmacy unit during the B.Pharmacy course. The chart illustrates the significant impact of practical training on various aspects of learning, including clinical skills development, medication management, patient interaction, hands-on experience, and interdisciplinary collaboration, with high percentages indicating their crucial role in pharmacy education.

By investing in rigorous pharmacy training, Queens NRI Multi speciality Hospital not only fosters professional growth but also enhances the overall quality of healthcare services provided, reinforcing its commitment to excellence and innovation in patient care.

Importance of case studies in practical learning

Case studies are invaluable tools in pharmacy education, providing detailed, real-life scenarios that require students to apply their knowledge and problem-solving skills. Through case studies, students learn to navigate complex clinical situations, make informed decisions, and understand the outcomes of their actions. This method of learning fosters critical thinking and enhances the ability to handle diverse and dynamic healthcare environments (Mohanraj et al., 2023).

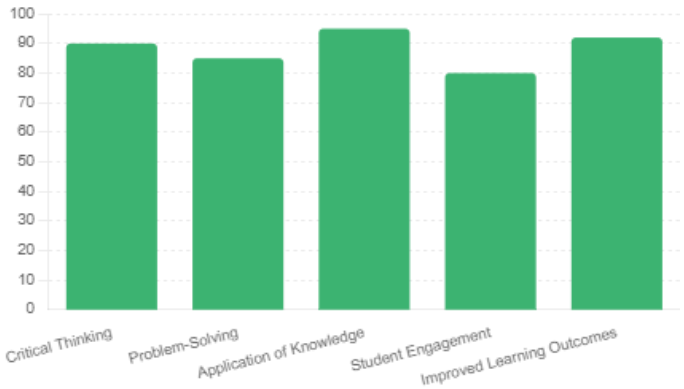

Figure 2: Importance of case studies in practical learning for pharmacy education.

Figure 2 is a bar chart representing the importance of case studies in practical learning for pharmacy education. The chart highlights how case studies enhance various aspects of learning, including critical thinking, problem-solving, application of knowledge, student engagement, and improved learning outcomes, with high percentages indicating their significant impact.

Theoretical background

Conceptual framework of practice schools

Practice schools serve as the interface between academic education and clinical practice, designed to provide pharmacy students with structured, hands-on training. These programs are based on experiential learning theory, which posits that knowledge is best acquired through direct experience. Practice schools aim to immerse students in real-world settings, facilitating the transition from theoretical understanding to practical applications (Emily O Flynn et al., 2021).

Role of hospital training in pharmacy curriculum

Hospital training is integrated into the pharmacy curriculum to ensure that students acquire the necessary clinical competencies. This training includes rotations in various departments, such as internal medicine, pediatrics, and oncology, allowing students to gain a broad perspective on patient care. By engaging in hospital training, students develop a comprehensive understanding of pharmaceutical practices, including drug therapy management and patient counselling (Vinay Kumar et al., 2023; Divya et al., 2022).

Methodology of case studies in hospital training

Selection and Design of case studies

The selection and design of case studies are critical to their effectiveness in pharmacy training. Case studies should be based on common and significant clinical scenarios that reflect the learning objectives of the program. Collaboration with clinical experts is essential to ensure that the cases are realistic, relevant, and challenging. Well-designed case studies stimulate critical thinking and help students apply their knowledge in practical contexts (Yaroslav Tsekhmister et al., 2015).

Integration methods in pharmacy training

Integrating case studies into hospital training can be achieved through various methods, such as role-playing, simulation-based learning, and problem-based discussions. These approaches

provide interactive and engaging ways for students to learn and practice their skills. The use of case studies in the curriculum can Several approaches, including problem-based talks, simulation-based learning, and role-playing, may be used to include case studies into hospital training. These methods provide pupils exciting and dynamic opportunities to study and hone their abilities. Including case studies in lesson plans enhance student understanding and retention by creating a dynamic and effective learning environment (Sireen Shilbayeh & H.J. Jarrai, 2023)

Impact of hospital training on student learning

Skills Development through practical exposure

Hospital training provides pharmacy students with invaluable practical exposure, allowing them to develop essential clinical skills. This exposure includes patient assessment, medication therapy management, and interprofessional collaboration. Practical training helps students build confidence and competence, preparing them for their future roles as healthcare providers (Celia Piquer-Martinez et al., 2021).

Case studies as learning tools: Efficacy and Outcomes

In the field of pharmacy education, case studies have consistently shown to be an excellent method of instruction (Celia Piquer-Martinez et al., 2023). To improve their analytical and problem-solving abilities, students might use case studies to apply what they've learned in the classroom to real-world scenarios. Studies have shown that students who engage in case-based learning exhibit improved clinical reasoning and better patient care outcomes (Clare Depasquale & Gwen Gray, 2024).

Case study analysis

Examples of successful case studies in b. pharmacy training

Case studies provide practical insights into patient care, helping students develop a holistic understanding of pharmaceutical practice.

Case study – 1 (Alzheimer's disease)

Alzheimer's disease is a progressive neurological condition that results in the degeneration of brain cells, causing cognitive decline and memory loss. In older adults, it is the most common cause of dementia, affecting their daily lives significantly. Symptoms typically develop slowly and worsen over time, ultimately becoming severe enough to interfere with basic tasks such as speaking, swallowing, and walking. Research has identified several risk factors,

including age, genetics, and lifestyle, but the exact cause remains unclear. Current treatments focus on managing symptoms, as there is no cure yet for Alzheimer's disease (Lane, C et al., 2018).

Mrs. K. Rajeswari, a 61-year-old female with a height of 155 cm and weight of 57 kg (BMI 23 kg/m²), presented with symptoms of forgetfulness, memory loss, lack of sleep, and an inability to recognize family members. Under the care of Neurologist and General Physician, Mrs. Rajeswari was diagnosed with Alzheimer's disease. Her medical history revealed a three-year progression of memory decline, generalized body aches, and reduced sleep and appetite over the past week. Diagnostic procedures included physical examination, brain imaging, MRI, CT scan, CSF examination, and FBS, all of which confirmed the Alzheimer's diagnosis through both subjective and objective evidence. Mrs. Rajeswari was treated with intravenous normal saline, lorazepam injection (1 mg, twice daily), and oral medications including Clonazepam (0.5 mg, once daily), Donepezil (5 mg, once daily), Amisulpride (50 mg, once daily), and Escitalopram (10 mg, once daily). Upon improvement, she was discharged in a hemodynamically stable condition. Her treatment plan included lifestyle modifications such as staying physically active, avoiding alcohol and smoking, engaging in regular exercise, maintaining optimal sleep, and following a healthy diet.

Case study- 2 (Bronchospasm, Hyperthyroidism & Hypertension)

Hyperthyroidism is a condition characterized by the overproduction of thyroid hormones, leading to symptoms such as weight loss, rapid heartbeat, and anxiety (Gudisa Bereda et al.,2023; Sun Y Lee & Elizabeth N. Pearce, 2023).

Mr. A. Appa Rao, a 53-year-old male with a height of 171 cm and weight of 65 kg (BMI 23 kg/m²), presented with symptoms of chest pain, shortness of breath, myalgia, cough, urinary urgency, and cold. Under the care of General Physician, Urologist and Pulmonologist, he was diagnosed with acute bronchospasm, hyperthyroidism, and hypertension. Diagnostic procedures included an X-ray, CT scan, TSH test, thyroid ultrasound, complete blood count, and pulmonary function test. His treatment regimen comprised antibiotics, antacids, antihypertensives, antithyroid agents, cough suppressants, nebulization, antiallergics, and vitamin supplements. Specific medications included INJ Pipzo (4.5 gm in 100 ml NS, TID), INJ Pantop (40 mg, OD), INJ Ondem (2 cc IV, SOS), INJ hydrocortisone (100 ml, OD), TAB Azee (500 mg, OD), TAB levocet M (OD), TAB Stamlo (5 mg, OD), TAB Levofloxacin (500 mg, OD), TAB Pulmoclear (BD), TAB Mirbeg S (BD), CAP Abflo (100 mg, BD), and

nebulization with iprasure/Doulin (BD). Referred to a urologist for urinary urgency, he underwent a CT-KUB and received further medication. The pulmonologist advised nebulization for respiratory management. Following the treatment, Mr. Rao's condition improved significantly, leading to his discharge in a hemodynamically stable condition. Lifestyle modifications recommended for him included a healthy diet, regular exercise, stress management, avoiding alcohol and smoking, avoiding stimulants, and maintaining optimal humidity to manage his conditions and promote overall health.

Fig. 3: Interaction with the patient.

Case study -3 (Coronary artery disease)

Coronary artery disease (CAD), which is caused by atherosclerosis, is characterized by narrowing or blockage of the coronary arteries, resulting in chest pain (angina) and heart attacks. Effective management includes lifestyle changes, medications, and potentially surgical interventions to restore and maintain adequate blood flow to the heart (Rushil Prajapati et al., 2022; Aryan s Bhosale1 et al., 2022).

Mrs. Ch. Satyavamma, a 60-year-old female with a height of 149 cm and weight of 66 kg (BMI 23 kg/m²), presented with symptoms of fever, loose stools, fluid retention, oedema, increased blood pressure, shortness of breath, and blurred vision. She has a known history of hypertension and Type-2 diabetes mellitus. Upon admission, she was evaluated by General Physician, Nephrologist, and Cardiologist. Diagnostic procedures included an echocardiogram, CBC, blood urea, sugar test, lipid profile, C-reactive protein test, and MRI. She was diagnosed with CAD-TVD with renal artery stenosis. Investigations revealed complications of Type-2 diabetes, hypertension, and coronary artery disease. The nephrologist managed her serum creatinine levels, while the cardiologist recommended medical management and coronary angiography (CAG). The angiogram confirmed CAD-TVD with renal artery stenosis, necessitating CABG. Mrs. Satyavamma's treatment included

antiplatelets, statins, antidiabetics, antihypertensives, and supportive management. Specific medications administered were INJ Metrogyl (100 ml, TID), INJ Pantop (40 mg, OD), INJ Optineuron (2 ml, OD), TAB Nicardia retard (10 mg, TID), and TAB MET-XL (50 mg, OD). Post-treatment, she was advised on lifestyle modifications including a healthy diet, regular exercise, limiting alcohol consumption, weight management, medication adherence, and regular medical check-ups. Following this comprehensive treatment plan, Mrs. Satyavamma showed significant improvement and stabilization of her condition.

Case study – 4 (Parkinson's Disease)

Parkinson's disease is a progressive neurological disorder caused by the degeneration of dopamine-producing neurons in the brain. Parkinson's disease primarily affects motor function. Tremors, rigidity, bradykinesia (slowness of movement), and postural instability are common symptoms (Radhakrishnan et al., 2018; Kalia et al., 2015; Janice M. Beitz, 2014). Cognitive impairment and mood disorders are also possible non-motor symptoms. The exact cause of Parkinson's disease is unknown, but it is believed to involve a combination of genetic and environmental factors. Treatment options, including medications like levodopa and dopamine agonists, aim to manage symptoms but do not cure the disease.

Mr. V. Subramanyam, a 56-year-old male with a height of 173 cm and weight of 65 kg (BMI 21.7 kg/m^2), presented with symptoms of slurred speech, constipation, tremors of the upper limbs and fingers, and difficulty in getting up from a sitting position. He has a past medical history of renal calculi. Under the care of Primary and Neurologist, diagnostic procedures including an MRI scan, CT scan, and CBC were performed. Clinical examination revealed pedal edema, slowness in activities, monotonous voice, and rigidity. Based on these findings, Mr. Subramanyam was diagnosed with Parkinson's disease, confirmed by the presence of tremors and rigidity. Differential diagnoses considered included vascular parkinsonism and multiple system atrophy. His treatment regimen included Tab sodium picosulfate (10 mg, HS), Tab levodopa (100 mg, TID), Tab carbidopa (25 mg, TID), and Tab selegiline (5 mg, TID). Lifestyle modifications recommended for him included regular exercise, a healthy diet, staying hydrated, and getting adequate sleep. Following the treatment plan, Mr. Subramanyam's condition improved significantly, and he was discharged in a hemodynamically stable state.

Case study – 5 (Cerbero Vascular Accident)

A cerebrovascular accident (CVA), commonly known as a stroke, occurs when the blood flow to a part of the brain is either blocked by a clot or ruptures, leading to brain damage. Prompt medical treatment is critical to reduce the risk of severe brain injury and improve recovery outcomes (Nazia Asad 2020; Liby et al., 2011).

Mrs. Ch. Nookalamma, a 55-year-old female with a height of 154 cm and weight of 60 kg (BMI 26 kg/m^2), presented with symptoms of inability to speak and weakness in her right upper and lower limbs. She was under the care of Neuro and Cardiologist. Diagnostic procedures included an MRI scan, CT scan, CBC, urine test, and echocardiogram. The clinical examination diagnosed her with an acute cerebrovascular accident (CVA), confirmed by right hemiparesis and her known history of diabetes and hypertension. The MRI scan revealed acute infarcts in the left ICA territory. She underwent intravenous thrombolysis, followed by mechanical thrombectomy and left ICA stenting. Her discharge medications included Tab Brevipil (50 mg, BID), Tab Strocit Plus (100 mg, BID), Tab Ecosporin (75 mg, OD), Tab Zoryl (5 mg, OD), Tab Nicardia (10 mg, BID), and Tab Brillinta (90 mg, BID). Lifestyle modifications recommended included regular exercise, a healthy diet, speech therapy, physiotherapy, and adequate sleep. Following this comprehensive treatment plan, Mrs. Nookalamma showed significant improvement and was discharged in a hemodynamically stable condition.

Fig. 4: Interaction with the patient.

Case study – 6 (Chronic stable angina)

The term chronic stable angina refers to chest pain or discomfort that occurs with exertion or stress because of reduced blood flow to the heart muscle. Lifestyle modifications and

medications such as nitrates, beta-blockers, and calcium channel blockers can alleviate symptoms and prevent complications (Johnson et al., 2016; Fihn et al., 2012).

Mr. B. Ajay, a 38-year-old male with a height of 165 cm and weight of 68 kg (BMI 24.9 kg/m²), presented with symptoms of retrosternal chest pain, expectoration, shortness of breath on exacerbation, and wheezing while breathing. Under the care of Cardiologist, diagnostic procedures including an MRI scan, CT scan, CBC, urine test, and ECG were performed. Clinical examination diagnosed him with chronic stable angina and hypertension. Differential diagnoses considered were acute myocardial infarction, unstable angina, acute pericarditis, pulmonary embolism, and pneumonia. The final assessment confirmed chronic stable angina. The treatment plan aimed to relieve chest pain, reduce exacerbation of shortness of breath and wheezing, increase the supply of blood and oxygen to the heart muscles, and reduce morbidity and mortality. Discharge medications included Tab Acitrom (2 mg, OD), Tab Pantop (40 mg, OD), Tab Fruselac (20 mg, 1/2 tab, OD), and Tab Sildenafil (20 mg, OD). Recommended lifestyle modifications included regular exercise, a healthy diet, minimizing caffeine intake, avoiding foods containing saturated and hydrogenated fats, and adhering to the complete drug regimen. Following this comprehensive treatment plan, Mr. Ajay's condition improved significantly, and he was discharged in a hemodynamically stable condition.

Evaluation of Results and Criticism from students

Case studies substantially improve the educational experience, according to analysis of learning outcomes and student comments. Students report increased engagement, improved understanding of complex concepts, and greater confidence in their clinical abilities. The positive feedback underscores the importance of incorporating case studies into pharmacy training programs (Beata Plewka et al., 2023).

Challenges in implementing Hospital Training and Case studies

Logistical and Educational hurdles

Implementing hospital training and case studies in pharmacy education poses several logistical and educational challenges. These include coordinating schedules between academic and clinical settings, ensuring access to diverse and relevant case studies, and providing adequate resources for high-fidelity simulations. Overcoming these hurdles requires careful planning and collaboration among educators, clinical partners, and institutions.

Addressing the gap between Theory and Practice

A major problem in pharmacy education is helping students make the transition from theoretical understanding to real-world application. Addressing this gap requires ongoing efforts to align academic curricula with the needs of clinical practice. This includes updating course content to reflect current healthcare trends and incorporating practical training elements that prepare students for real-world scenarios (Lisa Lebovitz et al., 2019).

Best practices in hospital training

Innovative approaches to enhance learning

Adopting innovative approaches in hospital training can significantly enhance the learning experience for pharmacy students (GouriPalsokar et al., 2018). These approaches include the use of virtual reality simulations, interdisciplinary training sessions, and patient-centered care models. By incorporating cutting-edge technologies and collaborative learning methods, educators can create more engaging and effective training programs.

Recommendations for practice school curricula

To improve the effectiveness of practice schools, several recommendations can be made. These include regular curriculum updates to include emerging trends in pharmacy practice, increased focus on soft skills such as communication and leadership, and greater integration of case studies and practical training elements. By continuously refining the curriculum, educators can better prepare students for the evolving demands of the healthcare sector.

Future directions

Trends and Innovations in practice-based pharmacy education

The way students are taught in pharmacy is always changing due to new trends and advancements in the sector. Emerging trends include the use of artificial intelligence for diagnostic support, personalized medicine, and the integration of telehealth services (Johnson et al., 2016). These innovations are set to redefine the scope and methods of pharmacy practice, necessitating updates to educational programs to keep pace with these changes.

Research Gaps and Opportunities for further study

Despite the advancements in pharmacy education, several research gaps remain. These include the need for more studies on the long-term impact of new technologies on learning outcomes and the effectiveness of various training methods (Claredepasquale & Gwen Gray

2024; Fihn et al., 2012). Further research is essential to identify best practices and develop evidence-based approaches to pharmacy education.

CONCLUSION

Hospital-based training and the integration of case studies are fundamental in preparing pharmacy students for the complexities of professional practice. These methods provide essential practical exposure and enhance critical thinking, problem-solving, and application of knowledge. The success of such training programs at institutions like Queens NRI Multispecialty Hospital underscores the importance of experiential learning in pharmacy education. Despite challenges in implementation, innovative approaches and continuous curriculum updates can significantly enhance the effectiveness of these programs. Future research should focus on the long-term impact of emerging technologies and training methods on learning outcomes. By addressing these areas, educators can better prepare students for the evolving demands of the healthcare sector, ensuring they are well-equipped to deliver high-quality patient care.

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