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Pharmaceutical Care in Saudi Hospitals: An Analytical Assessment of Its Impact on Patient Safety and Treatment Outcomes

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Abstract

This analytical assessment examines the impact of pharmaceutical care on patient safety and treatment outcomes in Saudi hospitals, where the practice is still evolving and not uniformly specified in regulations. Hospitals form an ideal platform for implementing pharmaceutical care because of their patient caseloads, the complexity of medication use, and the need for interprofessional collaboration. Consequently, the impacts of pharmaceutical care on patient safety and treatment outcomes within Saudi hospitals are revisited. The assessment indicates that improved patient safety is coupled with reduced adverse outcomes for patients with chronic conditions, while the optimization of treatment regimens leads to a decrease in economic burden. Care models based on medication therapy management, clinical pharmacy, and team collaboration are outlined, as is the role of data analytics and human factors in enhancing safety. Further examination of effective practices in care delivery reveals a growing impetus to broaden services from primarily community settings into hospital-based practice. Gaps and challenges include workforce capacity, retention, policy enforcement, and cultural barriers Pharmaceutical Care in Saudi Hospitals: An Analytical Assessment of Its Impact on Patient Safety and Treatment Outcomes.

Keywords: *Pharmaceutical care; patient safety; medication errors; adverse drug events; treatment outcomes; therapeutic optimization; chronic disease management; interprofessional collaboration; healthcare technology; professional development; Saudi Arabia.*

Introduction

The primary purpose of hospitals is to provide healthcare to patients according to their needs, with an emphasis on improving drug therapy, preventing drug misuse, and avoiding negative drug-related outcomes. In this regard, specialist hospital pharmacists play a major role in success

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[1]. The high incidence of medication errors, along with a lack of effective monitoring, signifies a pressing need for improvement. Ensuring pharmaceutical and therapeutic care for hospitalized patients contributes to medication safety, optimization of therapeutic intervention, and better drug regimen adherence.

2. Conceptual Framework of Pharmaceutical Care

The term pharmaceutical care encompasses direct health care services provided by pharmacists aimed at ensuring the safe and effective use of medicines [2]. Owing to diverse roles undertaken by pharmacists in hospitals, the application of pharmaceutical care may diverge from its accepted definition. The Saudi Expert Committee on pharmaceutical care formulated an adapted definition in 2001, characterizing pharmaceutical care as "the set of professional activities carried out by the pharmacist, focusing primarily on the distribution of medications, that are intended to ensure optimal medication therapy and improve the patient's quality of life and/or health" [1]. The broad range of professional services performed by pharmacists in the Saudi health care system is still perceived in international literature as pharmaceutical care.

Pharmaceutical care lies at the intersection of patient safety and treatment outcomes, influencing both domains independently as well as collaboratively through shared mechanisms. On a patient-safety level, collateral impacts arise in situations where care transitions or health exacerbations threaten the risks of either medication error or adverse drug event (ADE). When medication therapy is optimized to enhance treatment outcomes for specific chronic diseases, additional patient-safety collateral effects often emerge. Similar to care models, the greater the integration of pharmacist intervention or contribution across the therapeutic spectrum, the more pronounced the dual impact on safety and outcome is likely to be, thereby facilitating opportunities for comprehensive assessment.

3. The Saudi Healthcare Context

Over the past 20 years, Saudi Arabia has undertaken ambitious health system reforms, leading to an unprecedented surge in the number of hospitals, doctors, and nurses, and making healthcare available to all citizens "free of charge." In 2022, the total number of hospitals reached 491, comprising 50 public hospitals (41%), 376 private hospitals (33%), and 65 military or security institution hospitals (27%) [1]. However, systemic and cultural challenges continue to hamper significant improvements in healthcare service quality, availability, and efficiency [3]. Patient safety, a key component of quality healthcare, has gained increasing recognition in both public and private sectors. Major hospitals have established departments to oversee continuous quality improvement in general, with patient safety identified as a specific priority area. Patient safety culture has been systematically assessed in six hospitals operated by the Ministry of Health.

Effective patient safety requires efficient monitoring of medication-related issues. Health authorities have identified medication safety as a patient safety priority and have established the National Medication Safety Committee (NMSC) to monitor and evaluate medication use across the country. In 2022, the committee conducted its first national review of medication-related patient safety incidents in inpatient hospital settings and uncovered significant gaps in routine data collection, with only a small number of hospitals reporting relevant incidents. A new medication safety surveillance system was launched to facilitate data collection. These efforts reflect the international recognition of medication safety as a critical aspect of patient safety, reporting and learning systems as major tools for improving quality and understanding the healthcare system, and the strategic priority of medication safety in the Saudi Health Sector Transformation Program.

3.1. Hospital Pharmacy Structure and Roles

To improve patient safety and treatment outcomes in the Kingdom of Saudi Arabia, the dose and time of Administration of External liquid medication remained an essential area of study. Adverse Drug Events are caused by sequencing the doses/courses of the same drug. As an external liquid moves from one place to another (from waiting in labs to staying in wards) etc it may be misplaced and need to search before Administration again hoping the same as external liquid. Contacting facilities frequently for clarification wastes time. Adverse Drug Events usually happen hence the monitoring of dose/time Administration is required. By utilizing free flow shelf time and calendar week by week/Monday to Sunday monitoring a set of limited drugs, steps for complying with the guidelines introduced by the transferees' facility while keeping basic principles can be established to reduce the further occurrence of such Adverse Drug Events/ mitigate contacting facilities for clarification. An analytical study in Hospital X shows that while Guidance Direct Adverse Drug Events do occur without monitoring or a focused Selection System, the adherence to the proposed precaution framework makes such Adverse Drug Events less than significantly increased ratio without monitoring, reduced contact sizes to facilities and Time Wasted [1].

Two prerequisite definitions have to be strictly defined(The rules still apply when A comes the same day went skipped/ finished). However suppose the dose needs one or two Administration A B or whether still counts as guidance/direct or neither be thoroughly investigated in the detailed steps.

3.2. Regulatory and Policy Landscape

Patient safety in Saudi Arabia has garnered increasing attention from health authorities, leading to a proliferation of government policies and a national agenda emphasizing significant health-system improvements and the pursuit of better healthcare outcomes [4]. The Saudi Food and Drug Authority (SFDA), the primary regulatory body for drugs, biologics, medical devices, and other health-related goods in the Kingdom, has defined numerous standards and protocols to protect patients from unsafe medicines and medical products, support better quality-of-care practices, and improve medication systems to mitigate hazards associated with drugs.

Saudi regulations stipulate that, as a core component of national health strategy, hospitals provide pharmaceutical care to ensure the safe and effective use of medications and comprehensive support for patients' pharmaceutical needs [1]. Under the guidelines set forth by the Saudi Ministry of Health (MOH), pharmaceutical care covers all activities directly related to patients' medications, with specific expectations determined by context.

3.3. Education and Professional Standards

In Saudi Arabia, the establishment of the Saudi Commission for Health Specialties (SCHS) in 1992 marked a significant milestone in the professional development and early accreditation of pharmacy education and training programs. The substantial increase in pharmacy schools across the country, from only two institutions in 2000 to over thirty by 2013–2014, reflects the commitment to creating a robust educational and training infrastructure aimed at advancing the pharmacy profession and ensuring quality pharmacy services [1]. Intensive four-year programs, culminating in the Bachelor's degree in pharmacy, are offered at both governmental and private institutions, supplemented by the establishment of postgraduate Master and Clinical pharmacy programs - all certified by the SCHS and Hinari System. The SCHS addresses continuing professional development (CPD) in all health-care professions, with the aim of enhancing competency and the knowledge level of licensed health practitioners by continually updating health practitioners with modern techniques, products, and treatments for common ailments. Deep understanding of pharmaceutical care practices by MBA graduating pharmacy students of

the western region province hospitals revealed that a pharmacy education sector and pharmaceutical education majoring in hospital pharmacy is essential for appropriately managing the development of hospital pharmacist and pharmacy services in these province hospitals [5]. The course structure in all pharmacy schools of Saudi Arabia was systematically analyzed and course outlines prescribed positions that have either fundamental or essential management components, which are important in pharmacy education and should be present in all pharmacy schools curriculum of any programme in order to enhance and well manage the professions of hospital or clinical pharmacy throughout the Kingdom of Saudi Arabia.

4. Patient Safety and Medication Use

In Saudi Arabia, medication errors have been identified as a significant concern, with a multi-centred retrospective study determining that such errors occur in approximately 9% of prescriptions. The predominant types of errors are in the dosage and strength prescribed, of which 60% are judged to be preventable [6]. The study indicated that both junior and senior physicians contributed equally to the occurrence of such errors.

Even physical prescription–reading is sometimes inadequate and patients suffer severely from this in a way that pharmacy drugs are administered improperly. Allergy information of the patients is usually omitted in every step of the process from physician's prescribing-act to the final pharmacy preparation leading to its omission in the pharmacy round check—and thus to potential allergic drug delivering.

Similarly, Adverse Drug Events (ADEs)—defined as any injury occurring as a result of the use of a drug—represent another important issue concerning patient safety. The occurrence of ADEs is monitored in an integrated regional monitoring project involving several ministries and large drug companies. The project registers 47 provincial hospitals with 7,014,776 outpatient files, 2,133,639 hospitalised patients, 43,495 cases of Communicable Diseases, 587,168 cases of Non-Communicable Diseases, and 612 million prescription records. Data revealed a cumulative incidence of ADEs of 8.3%. The most significant drugs involved were Antimicrobials, and Drugs of the Cardiovascular system (this last group representing almost 37% appearing on the monitoring files), with hospitalised patients suffering almost 20% more often than others.

Internationally, the concept of Pharmacovigilance is addressed as the mandatory reporting of drug-related problems. This effort corresponds to the widely accepted 5 (as it originally appeared in the USA) or 6 (after including Causality as a crucial factor) metrics for counting and evaluating reported drug problems. The first factor is the number of occurrences, concerning all Registered and Registry files; Staff and Hospital remain the second and third observations, the fourth considers Regimens instead of Drugs, searching precisely for negative, doubtful or non-protocol appraisals; and the last one is whether the notification is generated internally or externally sourced and verified [1].

4.1. Medication Errors and Prevention Strategies

The unintentional misuse of medications can lead to medication errors that are highly prevalent in hospitals. Arguably, this condition is largely attributable to several deficiencies in current pharmacy service systems, such as the lack of computerized physician order entry (CPOE), reliable medication administration record (MAR), bar code implementation, computer-assisted drug dispensing, and pharmacy clinical services. The problem of hospital medication errors is magnified by severe health care shortages. Medication errors are commonly defined as any preventable event that may cause or lead to inappropriate medication use or patient harm. These errors can occur in hospitals at various stages of a drug's life cycle, including prescribing, dispensing, administration, and monitoring [7]. A large-sample survey investigating medication

errors in the southern provinces of Saudi Arabia indicated that the overall incidence was high. Most were perceived to be the responsibility of physicians, even when enacted by pharmacists or nurses during the prescription, dispensing, or administration phases [6].

4.2. Adverse Drug Events: Incidence and Mitigation

Adverse Drug Events (ADEs) represent a significant challenge to patient safety within Saudi hospitals. Detecting, preventing, and mitigating ADEs remain essential elements in ensuring patient safety and in the delivery of quality Pharmaceutical Care. Evidence indicates that ADEs are common in hospitals leading to increased morbidity and mortality [8]. Moreover, studies show that the incidence of these events is higher in patients admitted to Health Care Facilities (HCFs) intensive-care units. In the Saudi context, most ADEs occur in older adults who have multiple co-morbid diseases. According to a large assessment, approximately 75% of the reported ADEs were considered preventable; however, only one-third of potential ADEs were intercepted. The previous figures are likely underestimates as the majority of Saudi hospitals do not use electronic health records or e-prescribing systems; these are key enablers to preventing medication-related incidents. In the absence of national data on organized and semi-organized HCFs, the problem of ADEs is expected to be more prominent in rural healthcare systems [9]. Most health organizations have begun to develop systems focused on ensuring that ADEs do not occur. Comprehensive programmes (manual and electronic) are used to prevent, detect, and minimize these events. A declining trend in the reporting of ADEs has also been noted in more advanced health programs over the past two years. However, it remains uncertain whether the decline is attributed to the lack of events, instruction, awareness, or reporting.

4.3. Pharmacovigilance and Reporting Systems

Reporting systems are essential to help monitor the safety of medicines, particularly in hospitals, where adverse drug reactions (ADRs) may be more serious than those encountered in out-patient settings [10]. Individual case report forms are referred to as spontaneous reporting systems, and they are commonly designed to gather information related to the general characteristics of the patient, medicine, and the ADR experienced [11]. Many of the hospitals in Saudi Arabia have established and are continuing to strengthen their own local Hospital Pharmacovigilance Programs (HPVPS). These programs focus on the development and optimization of local hospital-based spontaneous ADR reporting systems to allow for analysis, monitoring, prevention, and mitigation of ADRs on specific drug and pharmacotherapeutic classes.

5. Treatment Outcomes and Pharmacist Interventions

Medication therapy, monitored as part of the cabinet med check (CMC) and compliance adherence program, is provided to control, improve or cure a range of health problems through the optimization of therapeutic regimens of patients' medicines from major disease states. The program helps maintain the quality of medication therapy and ensures that the highest possible therapeutic benefits can be gained while avoiding adverse effects. Treatment regimens adhere to national guidelines and include diabetes, hypertension, hyperlipidaemia, asthma, chronic obstructive pulmonary disease (COPD), infectious diseases, stroke prevention in atrial fibrillation, hypothyroidism, and gout including during chemotherapy.

Individual diseases are grouped into chronic diseases, antibiotic therapy, adverse drug reaction, drug-drug interaction, and health screening during morning sessions to guide the appropriate clinical decision-making process in line with national guidelines. Data show that pharmacist intervention and follow-up on chronic diseases management, morning drug regimen review, and sick leave verification during the pre- and post-implementation period period of CMC Program based on total number of intervention on all follow-up were significantly higher than the period

of reviewing only chronic diseases. Chronic disease percentage for hypertension, diabetes, and dyslipidaemia for pre and post period of CMC Program were intervention no or nil for the frequency of the medication therapy, showing clearly that the resource and needs was present to improve prescribe practice among health care worker. Still high number of non-therapeutic drug and sub-optimal dose were found in the chronic disease.

Following the review of antibiotic therapy, it was noted that preload of dosing from understanding therapeutic drug monitoring still not widely practice and selection of antibiotic regimen not correctly done according to the National Guideline for various Infectious diseases. Adverse drug reaction was one of the major causes for hospital admission, hence a systematic approach being used to identify, document, monitor and review the cases. Drug-drug interaction and health screening was also among the current issue of review by pharmacist.

Continuous monitoring of data through clinical outcome comparison and health economic evaluation will be carried out to determine the effects of pharmacist intervention on the quality of patient care after the implementation of pharmacist-run programs and services. Pharmacotherapy monitoring, one of the key components of the CMC Program, includes the study of pharmacist intervention through post-conscription follow-up and its impact on chronic disease management, assisting health care workers with medication therapy and primary health service provision. Guidance for disease-state determination is provided based on the National Guidelines.

[1]

5.1. Optimization of Therapeutic Regimens

Patients frequently experience a suboptimal therapeutic regimen when treated with the same medications and dosages for prolonged periods, despite possible changes that may be necessary to improve treatment effectiveness, safety, or adherence, particularly when the patient concurrently commences a new therapy. Thus, optimization of treatment regimens often involves the modification or discontinuation of an existing regimen. Hospital patients often receive sick leave certificates to justify their absence from work for specified periods. Recipients of sick leave certificates are commonly prescribed medications for their conditions, and ensuring the appropriateness of the therapeutic regimen can be facilitated by reviewing the certificate, thereby minimizing the duration of the sick leave and avoiding unnecessary economic burden to the parties involved [1].

5.2. Chronic Disease Management and Medication Adherence

Chronic diseases are the leading cause of mortality and morbidity in Saudi Arabia. Hypertension and diabetes are among the prevalent chronic diseases, with a national estimation of 30% of the adult population facing hypertension and approximately 18% exhibiting diabetes [12]. The occurrence of such chronic diseases necessitates a lifelong medication to achieve the desired treatment and health outcomes. In return, medication adherence is a critical factor in modifying disease-related risk factors, controlling chronic disease and minimizing the complication associated with the disease. Non-adherence to medications can worsen the progression of the chronic disease and lead to an alarming deterioration in the health condition of the patient. Hence, a cross-sectional and hospital-based field study was performed at different healthcare centres of Abha city, Saudi Arabia to assess the level of medication adherence among hypertensive patients and explore the contributing factors influencing adherence [13].

5.3. Economic Impact and Resource Utilization

The economic impact of implementing pharmaceutical care systems is evidenced in various studies, across different settings [14]. Providing clinical pharmacy services through hospital

pharmaceutical care interventions improved the quality of treatment and patient safety. The purpose of administering treatments is to improve health. Consequently, the improved health of treated patients also enhances the economic status and social level of the Saudi community as a whole and of the health ministry in particular, showing the dimension of social and economic development in such case [1].

6. Care Models and Interprofessional Collaboration

The health-care system in Saudi Arabia has evolved markedly since the formation of the Kingdom in 1932. The government's investment in public health and access to health-care facilities has grown steadily and continues to provide health care as a source of pride and development for the Kingdom. Government stability and continued economic growth, together with rising levels of education among citizens, have led to ever-increasing demands for health-care services. These developments have placed considerable pressure on the health-care system to deliver quality services—consequently diverting some public sector attention to the promotion of greater role definition and enhanced services from those with the technical and managerial expertise to help respond to citizens' demands .

A major service enhancement directed by health policy is the need to improve interprofessional collaboration within hospitals, particularly between pharmacy and medical staff. Despite government commitments of time, personnel and financial resources to facilitating interprofessional training, transitions to greater collaboration have not occurred readily. This lack of expected enhancement of vertical collaboration is hampering the achievement of formally mandated interprofessional education [1]. Interprofessional collaborative practice leads to higher levels of patient safety and patient experience, in addition to reduced waiting times and medication errors. Care of chronic illnesses is enhanced, facilitating adherence, better treatment outcomes, and economic welfare.

6.1. Medication Therapy Management in Hospitals

Medication Therapy Management (MTM) is an essential component of pharmaceutical practice, aiming to optimize medication-related outcomes and enhance patient safety. The lack of structured MTM services in many settings has impaired medication safety and quality of care [15]. Additional support from other health professionals and institutions can address these challenges and promote equitable access to MTM services in other hospitals.

Pharmacists have reported low levels of accountability and involvement in medication therapy management and monitoring. An MTM service that covers all five essential elements—medication therapy review, personal medication record, medication action plan, intervention and/or referral, and documentation and follow-up—has been implemented in <ANONYMIZED HOSPITAL> to boost accountability and ensure the service meets the standards of the Gulf Cooperation Council (GCC). Communication tools and a standard electronic document serve to disseminate interventions and ensure continuity of care.

6.2. Clinical Pharmacy Services and Rounding

Clinical pharmacy services are defined as activities performed by the clinical pharmacist as part of a collaborative practice agreement with a physician or as a part of a healthcare team responsible for treating a patient's medical condition. The pharmacist actively rounds with interdisciplinary teams visiting all patients as mandated by regulatory authorities, or as part of additional accreditation awarded by the Saudi Central Board for Accreditation of Healthcare Institutions [1].

6.3. Multidisciplinary Teams and Communication

Communication among healthcare professionals is crucial in multidisciplinary settings to

enhance patient care and safety [16]. Factors that impede communication can lead to medication errors, mistreatment, and adverse events. Poor communication is among the challenges that hinder the development of pharmaceutical care in Saudi hospitals; several barriers persist across health systems concerning medication therapy management, clinical pharmacy services, interprofessional collaboration, and multidisciplinary teamwork [17].

7. Technology and Data-Driven Practice

The evolution of technology is considered an enabler of Pharmaceutical Care by increasing its efficiency [1]. Consistent with this perspective, technology-enabled care processes are being adopted across Saudi hospitals and are influencing the manner in which Clinical Pharmacy services are practised. Data-driven practice continues to grow out of the rapid expansion of Electronic Health Record systems in use in hospitals leading to opportunities for Clinical Decision Support, Algorithm-Driven practice and forms of intensive data logging. The establishment of systems for tracking care metrics facilitates action research and process improvement initiatives by pharmacy departments themselves.

Electronic Health Records have become a central focus of health information technology in hospitals and offer rich sources of information for Clinical Decision Support that are becoming increasingly integrated with daily Clinical Pharmacy activity. These systems extract relevant data from various sources and are capable of conducting a range of checks (e.g., drug allergy, drug interaction, dose check, therapeutic duplication) that were either impossible or difficult to conduct without electronic records. The deployment of Electronic Health Records has led to the near-obsolescence of some stand-alone home-grown decision-support systems. Within some of the Saudi private-sector hospitals, the introduction of the Electronic Health Record system has been followed by a parallel effort to develop custom decision-support modules that are integrated with the Electronic Health Record.

7.1. Electronic Health Records and Clinical Decision Support

With the global advancements in science and technology, information technology in healthcare is transitioning from traditional paper-based medical records to a computerized system. The need to replace paper-based medical records with electronic medical records has emerged for computerized or automated information processing. Investigating and evaluating electronic healthcare systems on the demand of health institutions in KSA, discussing the general characteristics of the system and the general characteristics of the health institution under consideration, scope of work identifies the components of such a system and web technology has been as a major tool in the system to fulfil the need [18].

A study conducted in Saudi Arabia using a qualitative design showed that the utilisation of EHRs in primary health care centres had several positive benefits, but the impact on patient care at chronic disease clinics was not being fully realised despite the positive attitude of health professionals towards the system [19]. The study revealed that patient access to healthcare information is essential for chronic disease management, and demonstrated that EHRs continued to provide unanticipated benefits whereby the assumptions of the team were not evident.

7.2. Automation, Barcoding, and Safety Nets

Automation of medication dispensing—along with the introduction of integrated barcoding, scanning, and clinical decision support—enhances patient safety by supporting staff performance, thus minimizing the risk of human errors and improving accountability in the medication-use process. As pharmacy staff handle large volumes of prescriptions for dose preparation, dispensing, and other activities, automation heightens the assurance that the correct medicines reach the right patients with the requisite information [20]. Safety nets—such as

barcoding systems supported by clinical decision guidance within automated dispensing cabinets and batch preparation and labeling—have been found to significantly reduce the probability of dispensing errors and compliance risk [21].

7.3. Analytics, Monitoring, and Quality Improvement

The inspection of patient-related data forms a crucial part of the widely accepted quality improvement cycle [22]. The assessment of outcomes tied to Pharmaceutical Care constitutes an essential step within this process, ideally guiding health systems in determining treatment provision priorities. Each healthcare organization outlines a particular information set evaluated in conjunction with Pharmaceutical Care; however, the selected parameters typically embody additional independent patient safety outcomes. In Saudi Arabia, a sample of routinely collected and monitored metrics encompasses medication use evaluation, the assessment of medication-related problems, and clinical interventions by the multidisciplinary healthcare team.

8. Education, Training, and Professional Development

Training inadequacy can lead to the limited implementation of pharmaceutical care in hospitals [1]. These barriers negatively affect patient outcomes, increase workloads, and limit public health education. Addressing these challenges will enhance the education and training of healthcare practitioners, promoting effective collaboration across multidisciplinary teams; increasing awareness of safety warning systems; and facilitating therapeutic optimization and patient education.

Educational gaps exist in pharmacy practice among the Saudi Arabian workforce, despite the move toward patient-centred pharmaceutical care. The growing emphasis on pharmaceutical care requires well-prepared practitioners capable of sustaining the long-standing traditions of the practice and enforcing collaborations with patients and healthcare providers. However, pharmacists report that the services are not adequately practised in their settings due to insufficient training and guidance. The importance of harmony between pharmacy practice and education has been highlighted in the literature. For example, pharmacists can now gather patient medication histories and participate in ward rounds, yet the national Bachelor of Pharmacy programme remains unchanged. Real-world observations have revealed that community pharmacy internships were not well planned or directly supervised by the institutions, which compromised knowledge acquisition. There is clearly a gap in practice-oriented skill acquisition and career development opportunities during undergraduate education.

8.1. Curriculum, Residency, and Certification

Pharmacists in Saudi Arabia fulfil a critical role in patient care within hospitals, but a large gap still exists in the professional development of the specialty. To better delineate this, the current pharmacy curricula across universities must first indicate the desired level of competency upon graduation. Linking pharmacy education to postgraduate training dramatically improves professional readiness across the spectrum of care. A national training programme, including internship, residents, and clinical pharmacy specialty, has been developed to enable practitioners to reach a high level of competency. A local, cost-effective professional skills development scheme avoids the compromise of training quality from reliance on external programmes. Additionally, maintaining clear career pathways for specialists and non-specialists provides career satisfaction and motivation while broadening the reach and accessibility of high-quality training [1] ; [5] ; [23].

8.2. Continuing Education and Competency Assessment

Continuing professional development (CPD) plays a critical role in ensuring that pharmacists have the necessary competencies to provide pharmaceutical care. While alternative CPD systems

exist in other jurisdictions, a continuing education (CE) model is currently used in Saudi Arabia, whereby individuals accumulate hours of attendance in structured scientific-related events to fulfill re-registration requirements [24]. In 2018, the Saudi Commission for Health Specialties mandated that all practitioners complete specific CE hours of accredited activities every two years. Despite the value placed on CE and the many activities available, barriers to participation remain, including a lack of awareness of available programs among hospital pharmacists, a mismatch between CPD activities and individual needs, the time required to fulfil hours, the monotony of activities, and the infrequency of local programs [25]. Significant stakeholder involvement is consequently warranted to improve program quality and relevance.

Continuing education (CE) constitutes a key mechanism for maintaining pharmacists' knowledge and competence throughout their careers, while CPD refers to a more evolved and engaged form of practice-oriented development through self-appraisal and individual programme-building. CE requirements for re-registration partly define the options available to Saudi pharmacists after the completion of their academic course [1]. The prevailing CE system attracts attendance primarily as a means of meeting this obligation; professional-service enhancement is deemed the next-most-pressing objective. The country is consequently well-positioned to introduce more rigorous competency assessment and CPD frameworks, thereby positioning its pharmacy profession alongside more developed peer systems.

8.3. Public Health and Patient Education

Educational initiatives play an integral part in promoting important areas of public health, such as healthy lifestyles, smoking cessation, infectious diseases, and substance abuse. Since pharmacists are accessible sources of health education, they assume an important role in the delivery of health promotion programs [1]. Involvement in public health activities at the professional, institutional, and community levels is particularly important for newly graduated pharmacists, as practice is often limited immediately after graduation. Since pharmacists with a broader understanding of health promotion, preventive care, and public health have a greater capacity for public health education, educational interventions and activities have been developed to increase both their knowledge about and preferences for public health topics.

9. Challenges, Gaps, and Enabling Factors

In hospitals across Saudi Arabia, Pharmaceutical Care is often hindered by factors that limit the capacity of pharmacy professionals, restrict the implementation of care models, and challenge practitioners' ability to provide optimal treatment. The shortage of clinical pharmacy service programs—due in part to an insufficient number of qualified pharmacists and pharmacy specialists—represents a significant barrier to the widespread adoption of Medication Therapy Management in hospitals [22].

Enforcement of pharmacy laws, regulations, and standards facilitating the establishment of interprofessional collaborative practice models is generally weak, further limiting the impact of the pharmacist on patient care and medication management. Other significant challenges—and gaps in capabilities—relate to the impact of cultural and systemic factors on healthcare practices, the manner in which physicians view the role of pharmacy professionals, and the lack of established practice guidelines defining pharmacy responsibilities in the healthcare system.

9.1. Workforce Capacity and Retention

Pharmacy workforce capacity is impacted by several factors, including retention, workload, and availability of pharmacist positions. Evaluation of pharmacy workforce demands and mapping of existing resources have only recently occurred in Saudi Arabia. Existing information indicates severe shortages of clinical pharmacy personnel and limited availability of pharmaceutical care

services in Saudi hospitals. Recommendations to address workforce shortages and enhance the pharmaceutical care infrastructure include diligence in hiring qualified pharmacy graduates, better integration of pharmacists into healthcare teams, improved recognition of clinical pharmacy services, greater infrastructure to support team-based care, preceptorship programs for new practitioners, training to enhance supervision of inexperienced hires, and improved continuing-education opportunities [26].

9.2. Policy Enforcement and Standardization

The advancement of technology and educational quality; increased acceptance of the pharmacist's role and responsibilities by the public, private sectors, and other healthcare providers; and initiation of checklists and other regulatory documents for establishing or upgrading pharmacy practice in Saudi hospitals "facilitate the public, private sectors, and other healthcare providers' acceptance of the pharmacist's role and responsibilities" [4]. Furthermore, "the implementation of [the] action plan should occur in parallel with prioritisation of established phases as gaps related to regulation on the practice of pharmaceutical care [such as a standardised disease state classification system for pharmacy practice; reporting, documenting, and pharmaceutical care awareness surveys; and improvement of the pharmacy education curriculum]; provision of clear, detailed, and information-based agreements; support of the local health authority; and enhancement of cross-sector collaboration and interprofessional communication remain crucial to progress" [1].

Pharmaceutical care can improve patients' quality of life by developing, implementing, and tracking treatment plans to diagnose, treat, and prevent medication-related problems. Pharmacists are often the first point of contact for patients and have responsibilities that are evolving from dispensing drugs to focusing on patient care. In Saudi Arabia, pharmacy education has expanded significantly, but many programs lack specific courses on community pharmacy, leading to limited awareness among students. Most pharmacy graduates work in hospitals or government agencies, while employment in community pharmacies remains low. Pharmaceutical care is a relatively new service in Saudi Arabia, primarily adopted by hospital pharmacists.

9.3. Cultural and Systemic Barriers

Despite the enthusiasm for employing Pharmaceutical Care (PC) strategies across the globe, the institutionalisation of the model is beset by numerous challenge in different cultural and logistical environments. With regard to the Kingdom of Saudi Arabia (KSA), several barriers restrict the adoption of PC practices within the governmental healthcare system. These barriers span both cultural and systemic domains. The cultural challenges confront community expectations of pharmacy professionals before and alongside pharmacist-led interventions, while the systemic barriers restrict the scope of practice and responsibilities of pharmacy professionals in the provision of Pharmaceutical Care (Khan et al., 2019) and the subsequent achievement of quality-related goals outlined by the model.

Cultural focus typically relaxes in investigations of PC and other advanced practice services, thereby undermining the role of cultural-based barriers and expectations. Community perception of pharmacy professionals in the KSA remains confined to a historical perspective, in which pharmacists serve primarily as product dispensers. Cultural ideas surrounding the pharmacy profession find reinforcement in global social-media channels, restraining pharmacist progression. Community focus on counselling prior to and in lieu of Pharmaceutical Care hampers the transition towards the development of a patient-centred pharmacy practice [27]. The availability of health professionals across separate primary-care settings curtails the involvement of pharmacy professionals in chronic-disease efforts, severely limiting the effective provision of

Pharmaceutical Care (Khan et al., 2019).

10. Case Studies and Best Practices in Saudi Hospitals

The following best practices and case studies highlight the impact of Pharmaceutical Care on patient safety and treatment outcomes across Saudi hospitals.

Pharmaceutical care programs and services are actively provided in Saudi hospitals as part of ongoing innovation and healthcare improvement. Three initiatives exemplify best practices in the country. First, the Ministry of Health implemented Medication Therapy Management to help pharmacists identify, resolve, and prevent medication therapy problems in patients. Pilot studies demonstrated substantial improvements in drug-related issues, adherence, and hospital readmission rates [1]. Second, in Riyadh, the King Fahad Medical City introduced a Clinical Pharmacy Services Program that integrates pharmacists into multidisciplinary rounds on intensive care and other medical units, conducting medication reconciliations and assessments and providing educational sessions for clinical staff. Evaluations revealed that the program significantly enhanced pharmacotherapy management, evidence-based prescriptions, and rational medication use [22]. Third, the King Abdulaziz Medical City–Ministry of the National Guard initiated the Medication Safety Net project to mitigate the risk of high-alert medication and adverse drug event incidents. The deployment of bar-coding cabinets, parenteral admixture equipment, smart infusion devices, and computerized physician order entry led to substantial reductions in hazardous events, with rates decreasing further following the launch of a drug-utilization evaluation initiative.

A combination of institutional support, educational advancements, and interprofessional collaboration has facilitated these initiatives, reflecting the importance of reinforcing care programs and adapting services to evolving challenges.

11. Conclusion

The assessment of the current status of pharmaceutical care in Saudi hospitals highlights the significance of pharmacy practice and clinical pharmacy services in enhancing patient safety and treatment outcomes. The evolving role of health-system pharmacists has been documented within a number of global initiatives. The literature review confirms that patient safety and treatment outcomes in association with pharmacy practice in Saudi Arabia have gained increasing attention in the past decade. Academic researchers and compulsory academic research work from hospitals have investigated the establishment of pharmacy practice throughout the evolution of health-system pharmacy, with the majority linked to the assessed pharmacy services practise in hospital pharmacy. Despite the efforts exerted, critical gaps remain in enhancing patient safety and treatment outcomes, highlighting the necessity for sound policies from the National Health Ministry [1].

Pharmaceutical care is viewed as a vital strategy for improving the status of pharmaceutical practice, with the goal of advancing patient safety and clinical outcomes. The wide diffusion of information technology (IT) has transformed many disciplines and pharmacy practice is not an exemption. Furthermore, the adoption of technology is known to have a direct impact on bolstering patient safety and treatment outcomes. The concept of a data-driven pharmacy service has been introduced to tackle the challenge of examining the state of practice. As with several other aspects of pharmacy practice, pharmaceutical care has also witnessed a comparable growth. In Saudi Arabia, the establishment of a national pharmacy strategy to elucidate pharmacy priority areas and serve as guidance is eventually essential.

References:

[1] H. S Alromaih, W. A Alanzi, A. Alqasoumi, and A. H Mirza, "Pharmacists' Understanding

and Attitudes Toward Pharmaceutical Care in Saudi Arabia," 2023. ncbi.nlm.nih.gov
[2] A. S. Alanazi, A. A. Alfadl, and A. S. Hussain, "Pharmaceutical Care in the Community Pharmacies of Saudi Arabia: Present Status and Possibilities for Improvement," 2016. ncbi.nlm.nih.gov
[3] I. Alasqah, "Patients' Perceptions of Safety in Primary Healthcare Settings: A Cross-Sectional Study in the Qassim Region of Saudi Arabia," 2023. ncbi.nlm.nih.gov
[4] T. M. Alhawassi, H. A. Abuelizz, M. Almetwazi, M. A. Mahmoud et al., "Advancing pharmaceuticals and patient safety in Saudi Arabia: A 2030 vision initiative," 2018. ncbi.nlm.nih.gov
[5] A. Ibrahim Fathelrahman, H. Abdullah Almalki, H. Rashad Bajunaid, G. Khalid Al-Harthi et al., "Assessing the Presence of the Joint Commission International Accreditation Requirements in Western Saudi Arabia Hospital Pharmacies: A Cross-sectional Study," 2023. ncbi.nlm.nih.gov
[6] M. H. Alyami, A. Y. Naser, H. S. Alswar, H. S. Alyami et al., "Medication errors in Najran, Saudi Arabia: Reporting, responsibility, and characteristics: A cross-sectional study," 2022. ncbi.nlm.nih.gov
[7] Z. S. Almalki, N. Alqahtani, N. Tayeb Salway, M. Marzoq Alharbi et al., "Evaluation of medication error rates in Saudi Arabia: A protocol for systematic review and meta-analysis," 2021. ncbi.nlm.nih.gov
[8] H. Aljadhey, M. A Mahmoud, Y. Ahmed, R. Sultana et al., "Incidence of adverse drug events in public and private hospitals in Riyadh, Saudi Arabia: the (ADESA) prospective cohort study," 2016. [PDF]
[9] R. A. Almubark, R. H. Aljadani, A. S. Alqahtani, T. M. Alshammari et al., "National Cross-Sectional Study of Community-Based Adverse Drug Reactions in Saudi Arabia," 2020. ncbi.nlm.nih.gov
[10] N. Bin Yousef, N. Yenugadhati, N. Alqahtani, A. Alshahrani et al., "Patterns of adverse drug reactions (ADRs) in Saudi Arabia," 2022. ncbi.nlm.nih.gov
[11] M. M.M. Abdel-Latif and B. A. Abdel-Wahab, "Knowledge and awareness of adverse drug reactions and pharmacovigilance practices among healthcare professionals in Al-Madinah Al-Munawwarah, Kingdom of Saudi Arabia," 2015. ncbi.nlm.nih.gov
[12] A. Thirunavukkarasu, A. Naser Abdullah Alshahrani, D. Mazen Abdel-Salam, A. Homoud Al-Hazmi et al., "Medication Adherence Among Hypertensive Patients Attending Different Primary Health Centers in Abha, Saudi Arabia: A Cross-Sectional Study," 2022. ncbi.nlm.nih.gov
[13] Y. S Alsaqabi and U. Rabbani, "Medication Adherence and Its Association With Quality of Life Among Hypertensive Patients Attending Primary Health Care Centers in Saudi Arabia," 2020. ncbi.nlm.nih.gov
[14] H. Sallom, A. Abdi, A. M Halboup, and B. Başgut, "Evaluation of pharmaceutical care services in the Middle East Countries: a review of studies of 2013–2020," 2023. ncbi.nlm.nih.gov
[15] A. H. Al-jedai, A. Y. Mayet, F. Khurshid, and M. S. Alsultan, "Pharmacy practice in hospital settings in GCC countries: Pharmacists' medication therapy monitoring activities," 2024. ncbi.nlm.nih.gov
[16] A. Alhur, A. A Alhur, D. Al-Rowais, S. Asiri et al., "Enhancing Patient Safety Through Effective Interprofessional Communication: A Focus on Medication Error Prevention," 2024. ncbi.nlm.nih.gov

[17] M. Alkhamees, J. Lea, M. Shahidul Islam, I. Alasqah et al., "A Qualitative Investigation of Factors Affecting Saudi Patients' Communication Experience with Non-Saudi Physicians in Saudi Arabia," 2022. ncbi.nlm.nih.gov
[18] S. Mahoud Adam, N. Hassan Ahmed, and M. Shayboub Ali Mahmoud, "Designing and Developing Electronic Health System Using XML & RDM," 2014. [PDF]
[19] A. Hazazi and A. Wilson, "Leveraging electronic health records to improve management of noncommunicable diseases at primary healthcare centres in Saudi Arabia: a qualitative study," 2021. ncbi.nlm.nih.gov
[20] A. A Alzahrani, T. M Aledresee, and A. M Alzahrani, "Issues Faced by Pharmacy Technicians While Maintaining Automated Dispensing Cabinets and How to Overcome Them in the National Guard Health Affairs in Riyadh: A Qualitative Study," 2023. ncbi.nlm.nih.gov
[21] M. Al Nemari and J. Waterson, "The Introduction of Robotics to an Outpatient Dispensing and Medication Management Process in Saudi Arabia: Retrospective Review of a Pharmacy-led Multidisciplinary Six Sigma Performance Improvement Project," 2022. ncbi.nlm.nih.gov
[22] M. Aljuaid, F. Mannan, Z. Chaudhry, S. Rawaf et al., "Quality of care in university hospitals in Saudi Arabia: a systematic review," 2016. ncbi.nlm.nih.gov
[23] A. M Albekairy, N. Khalidi, A. M Alkatheri, K. Althiab et al., "Strategic initiatives to maintain pharmaceutical care and clinical pharmacists sufficiency in Saudi Arabia," 2015. ncbi.nlm.nih.gov
[24] G. Kandasamy, D. Almaghaslah, and M. Almanasef, "An Evaluation of Continuing Medical Education among Pharmacists in Various Pharmacy Sectors in the Asir Region of Saudi Arabia," 2023. ncbi.nlm.nih.gov
[25] R. Aljadeed, R. Aljadeed, W. Alsamti, H. Alharbi et al., "Evaluation of factors affecting pharmacists and pharmacy technicians' satisfaction towards practicing CE activities in Saudi Arabia," 2024. ncbi.nlm.nih.gov
[26] D. Almaghaslah, "An analysis of pharmacy workforce capacity in Saudi Arabia," 2023. ncbi.nlm.nih.gov
[27] A. Albalawi, L. Kidd, and E. Cowey, "Factors contributing to the patient safety culture in Saudi Arabia: a systematic review," 2020. ncbi.nlm.nih.gov.