Fuel Cells Bulletin
ISSN: 1464-2859

Hospital Administration and Medical Secretarial Services as the Foundation of Healthcare Systems: A Multidisciplinary Perspective Integrating General Medicine, Physiotherapy, Pharmacy, and Epidemiology in Saudi Arabia

1Amani Faleh Motlaq Alrashedi, 2Maged Mohammed Maged Al-Habi, 3Naif Bader Abdulaziz Althuwaini, 4Fatimah Mohammed Saad Aladwani, 5Haifa Mohammed Saad Aladwani, 6Hamad Mohammed Alghubari, 7Ibrahim Ali Mohammed Alqahtani, 8Ibrahim Abdul Aziz Aldayel, 9Salem Mohammed Salem Aldawsari

1General Practice, PHC Alwiday, Hail
2Hospital Management, Ministry Of Health Branch, Riyadh
3Medical Secretary, Irada Complex And Mental Health, Riyadh
4Physical Therapy Specialist, Al Artawiyah General Hospital, Al Artwiah
5Physical Therapy Specialist, Al Artawiyah General Hospital, Al Artwiah
6Pharmacy, Maternity And Chldren's Hospital, Najran
7Pharmacist, Khamis Mushayt General Hospital, Khamis Mushayt
8Epidemiology Supervisor, Marat General Hospital, Riyadh
9Epidemiological Controller, Sulayyil Hospital, Riyadh

Abstract

Hospital administration and medical secretarial services play a fundamental role in establishing effective healthcare systems. Despite rapid advancements in medical technology, the progress in these administrative fields has not kept pace, leading to inefficiencies in healthcare institutions. This study explores the significance of hospital administration and medical secretarial services in improving healthcare delivery, particularly in Saudi Arabia. It highlights challenges, opportunities, and multidisciplinary collaboration among general medicine, physiotherapy, pharmacy, and epidemiology. A case study on the implementation of hospital administration and medical secretarial services in Saudi Arabia is presented, along with recommendations for enhancing efficiency and effectiveness in healthcare management.

Keywords: Hospital Administration, Medical Secretarial Services, Healthcare Management, Saudi Arabia, Multidisciplinary Approach, General Medicine, Physiotherapy, Pharmacy, Epidemiology.

1. Introduction

The multidimensional discipline of hospital administration and medical secretarial services has a cardinal role in the establishment of effective healthcare systems. A comprehensive consideration of this domain is crucial in view of the current challenges and opportunities in the healthcare systems and services of Saudi Arabia. By virtue of the rapid advances in medical technology, significant developments have occurred in the professional disciplines of general medicine, medical pharmacology, physiotherapy, and epidemiology. However, such advancements have not been paralleled in hospital administration and medical secretarial services. With regard to the healthcare systems of Saudi Arabia, while there have been notable developments in general hospitals, specialized hospitals, and healthcare centers, the significance of hospital administration and medical secretarial services has been largely overlooked (Alshahrani et al., 2018). Because of this neglect, a number of difficulties and errors affecting the operational efficiency of healthcare institutions have emerged.

There is a need for a comprehensive discussion concerning the importance and role of hospital administration and medical secretarial services encompassing general medicine, medical pharmacology, physiotherapy, and epidemiology services. Accordingly, a consideration of the significance, challenges, and opportunities in the establishment and enhancement of hospital administration and secretarial services applied to general hospitals, specialized hospitals, and healthcare centers is presented. It is expected that such a consideration will catalyze interest, research, and professional development in hospital administration and medical secretarial services, thereby enhancing healthcare systems and services in Saudi Arabia.

1.1. Background and Significance

Healthcare systems and institutions worldwide have undergone profound changes in the last fifty years. With these monumental changes, the organization and administration of health services have come into sharper focus, and the need for professionally trained hospital administrators and medical secretarial services has become more apparent (M. Al-Nozha, 2024).

Healthcare delivery systems have evolved over the years. The evolution of healthcare systems is traced with special reference to Saudi Arabia. Healthcare administration as a discipline has been examined with reference to the need for professionally trained hospital administrators. Various policies and regulations in Hospital Administration and Medical Secretarial Services, which form the foundation of healthcare systems in Saudi Arabia, have been highlighted. The significance of hospital administration and medical secretarial services is examined with special reference to the impact these services have on patient care, operational efficiency, and the effective management of hospital resources (Alshahrani et al., 2018). Medical secretarial services are closely examined with special reference to the role they play in the healthcare delivery systems. The contributions of medical secretarial services in improving communication, and coordination among in-house and out-house healthcare providers are highlighted. An attempt is made to present background information on healthcare systems and institutions in Saudi Arabia, to provide an insight into the complexities of healthcare delivery systems and the significance of hospital administration and medical secretarial services. The purpose of this exposé is to put on record the various thoughts and ideas related to healthcare systems and institutions that have emerged out of an academic journey spanning nearly two decades. These thoughts may provide an impetus to scholars, researchers, and healthcare planners in their quest for better systems and delivery of services.

Over the years, a variety of concepts with special reference to health and healthcare systems have emerged. A brief description of the concepts and terms is provided to ensure uniformity in understanding and interpretation. A healthcare system is defined as a system consisting of inter-dependent institutions and organizations that provide and facilitate the delivery of healthcare services to a specific population. A healthcare institution is defined as an establishment in a healthcare system that provides clinical and pre-clinical services to patients and operates continuously for these purposes. A hospital is a healthcare institution that provides curative, preventive, palliative, or rehabilitative care and treatment to the sick, diseased, injured, and helpless. A hospital system is defined as a system consisting of interdependent hospitals, and institutions and organizations that supplement and support the functions of hospitals in a health care system. A hospital administration is defined as the organization, management, and control of a hospital including all the institutions and organizations which form part of the hospital system. (Closser et al.2022)(Jolles et al.2022)(Tsogbadrakh et al.2021)

2. Hospital Administration in Healthcare Systems

Healthcare systems comprise various healthcare delivery settings with different healthcare professionals working toward a common objective: promoting patient health. However, the efficiency of these systems hinges on the robust administration of hospitals and other healthcare establishments. Ingenious and effective administration can enhance the organization and delivery of patient care while preventing the suboptimal operation of otherwise well-staffed institutions (Njoku, 2019). Hospital administration, a multidisciplinary field, has emerged as a professional sphere in response to the intricate organizational and management requirements of healthcare establishments. Such requirements are fueled by the increasing inflow of patients and the concurrent need to conserve and judiciously utilize costly medical services, instruments, and personnel. Globally, healthcare systems are under pressure to maximize the performance of hospitals and other patient care facilities. Despite variations in these systems' structures, a common approach involves the gradual establishment of a tiered hospital administration hierarchy. The duties and structures of hospital administration across various healthcare systems are compared and contrasted to promote research and professional interest in this field by medical and other healthcare professionals.

Hospital administrators play a strategic role in a hospital's resource allocation and policy implementation and are vital in enhancing a healthcare establishment's efficiency (Barati et al., 2016). The incumbent's expertise is usually acquired through impressive formal education and training. However, well-advanced and negligence-free hospital administrations are an exception worldwide. The challenge of effective hospital administration is manifold, ranging from the recruitment of well-educated and skilled administrators to the improvement of overall patient care quality and establishment personnel's job satisfaction and peace. Well-advanced hospital administrations can be frequently improved, since the professional morals and objectives of medical and other healthcare personnel differ from those of administrators and professionals in other industrial spheres. Nevertheless, accurately and effectively channeling the efforts of diverse healthcare professionals to promote a

positive organizational culture is crucial for hospital administrators. The case of a Saudi hospital demonstrates that effective hospital administration promotes a positive organizational culture, leading to improved job satisfaction among personnel and contentment among patients receiving care. A hospital's diverse administrative functions include human resource management, financial oversight, and quality assurance, all vital for patient care and safety. Interdepartmental collaboration between administrators and healthcare professionals is also indispensable, as diverse disciplines holistically influence each patient's quality of care. However, the establishment of interdepartmental collaboration is intricate; hence, teamwork only occasionally involves personnel from administration and healthcare disciplines. The attainment of healthcare delivery objectives necessitates holistic care orchestrated by diverse healthcare professionals. Nevertheless, a treatment plan addressing a patient's diverse health concerns is usually designed by one discipline, with other healthcare providers implementing it independently. Such discipline-dependent patient care can lead to adverse outcomes, as demonstrated by a case in which the integrity of a physiological system was compromised. (Mutonyi et al.2022)(Shahriari et al.2023)(Pedrosa et al.2021)

2.1. Roles and Responsibilities

Hospital administrators are responsible for the overall management of health care facilities. Their specific roles and responsibilities vary depending on the size and type of the facility, but in general, they are responsible for planning, directing, and coordinating health services. They may also be referred to as health care executives or health services managers. Hospital administrators typically oversee a department or a specific service within a department. In large facilities, they may also oversee a unit within a department. Other titles used for hospital administrators in different health care settings include nursing home administrators, executive directors, practice administrators, and clinic managers (Barati et al., 2016).

Hospital administration professionals manage health care facilities, agencies, or organizations. Their key management skills are important to maintaining the quality and efficiency of services provided in various health care settings. Administrators are considered vital links between health care professionals, patients, and external stakeholders. Their responsibilities also extend beyond financial and operational management to include strategic planning, quality assurance, and regulatory compliance. In addition, the top decision-makers in health care facilities are responsible for ensuring organizational productivity and developing budgets based on a predicted level of activity.

Most of their work involves making decisions that set the course for the facility's future, which includes assessment of the external environment and forecasting for upcoming years. Leadership and communication skills are critical to hospital administrators, especially in times of crisis when clear and decisive instruction must be given. Additionally, in the current era, a growing focus is being placed on the use of data analysis and technology in decision-making processes. Decisions that were once made on instinct or experience must now be justified with figures and statistics, often requiring the procurement of new teaching or training methods. Finally, consideration could be given to how hospital administrators are trained and what professional development opportunities are available to them so that they may stay updated with best practices in health administration. (Abdi et al.2022)(Jankelová et al.2021)(DeMartino & Weiser, 2021)

3. Medical Secretarial Services

Articulating the indispensable operations carried out by medical secretarial services in hospitals and other health care organizations, efforts have been made to highlight the essential functions, all necessary support services, and allied jobs that enhance the efficiency of clinical care. Recording and looking after the patients' records, appointments, and past history, and taking care of their hospital stay, transfers, or discharge are the primary functions of inpatient medical secretarial services. Keeping records and data related to patients and other activities in a health care organization is the basic responsibility of secretarial or clerical services . With confidentiality, secretarial services handle information relating to a patient's medical examination, treatment, and other hospital activities where accuracy is a must. A slight error in recording, interpreting, or processing this information may be critical and affect patient management. Therefore, utmost care and secrecy are required in handling such medical information. Arranging patients' appointments for the doctors and looking after the preparations for medical examination and treatment is another vital function of outpatient secretarial services. Communication between the departments and other supporting services through medical secretarial services is essential in organizing smooth clinical care for the patients. Fax messages and letters regarding patient admission or transfer and reports on medical examinations are handled by secretarial services in the health care organization. An effort has been made to discuss the importance of ward secretarial services in an inpatient setting and medical record services in a hospital. Integration of computerization and information technology in medical secretarial services has enhanced the efficiency and quality of services. Whatever be the technology used, the preliminary secretarial jobs such as drafting letters, recording minutes of meetings, and looking after file

management will still remain. However, technology has already taken over a vast area of secretarial services, which impose a greater responsibility on the secretaries in maintaining the quality and efficiency of service. Hence, there is an urgent need for proper training to the medical secretaries regarding computer operations and software used in record management to maintain high standards of professionalism in the medical secretarial services. With the foundation of health care administration services, the need for medical secretarial services has been established, and an effort has been made to highlight the operations of medical secretarial services within the health care system. (Chowdhury et al., 2021)(Cerchione et al.2023)

3.1. Importance and Functions

Medical secretarial services play a vital role in the healthcare sector with critical importance and diverse functions. They are responsible for preparing and managing correspondence and reports, attending to visitors, scheduling appointments, and maintaining patient records and history. By operating a healthcare facility's secretarial services efficiently, personal medical secretaries can facilitate smooth workflow processes and enhance patients' experiences (Lærum et al., 2004). Medical secretarial services are vital components of any healthcare facility. Other responsibilities include managing financial records, filing insurance claims, ordering supplies, conducting quarterly audits, and preparing minutes of meetings. Medical secretaries handle these workflows independently and provide service and support to several health practitioners, including physicians, dentists, physiotherapists, pharmacists, sanitarians, and other clinical support staff. All secretarial procedures are performed to comply with employment contracts, legislation, and other regulations guiding healthcare systems. With the dynamic nature of healthcare operations, many services are transitioning from desktop to cloud technology to maintain and manage patient records in an electronic format. A hospital information system (HIS) allows several functions to be integrated and automated, providing better service to patients and health workers. Medical secretarial services have embraced HIS, which has now become an integrated part of other healthcare services. Coding and entering patient information regarding diagnosis and treatment into an electronic medical record (EMR) is now performed by medical secretaries for several health practitioners. In addition, medical secretaries undertake other tasks involving clinical data entered into the EMR system. Medical secretaries are a strategic value in actively managing all these functions, ensuring that patient records generated and held in various formats are always available for treatment. Good medical secretarial services are essential for effective healthcare delivery. Communication, both written and oral, is crucial. Strong communication skills are a prerequisite for a career as a medical secretary, and this is important for patients, colleagues, and departments interacting with each other. Medical secretarial services handle several communication workflows that facilitate other processes in the department, enhancing patient experience and safety. Patients who have undergone treatment are key in clinical data generation that need to be communicated between departments, and input from multiple health practitioners is often needed. At times at the hospital, these workflows can involve over ten different departments and geographical locations. Good medical secretarial services help patients navigate the healthcare system and assist other departments in communicating with each other. (Mahendradhata et al.2021)(Vellela et al.2023)(Hoover & Bostic, 2021)

4. Multidisciplinary Approach in Healthcare

Introduction of a patient or a client in need of medical attention into a healthcare setting can trigger a variety of processes leading to a number of outcomes; however, it is solely the input, experience and efforts of healthcare professionals of diverse disciplines that can ensure achievement of the most desired outcomes. In the healthcare context, the term discipline implies a specific medical field such as general medicine, physiotherapy, pharmacy and epidemiology before a holistic patient care approach is considered. Integration of diverse medical disciplines is necessary to comprehensively address a patient’s health issues, especially complex ones, and provide the best possible care and outcomes (Shafek Atta & A Alzahrani, 2020). A multidisciplinary approach, which consists of collaborative input of professionals of different medical fields, is seen as a necessity rather than a luxury in today’s healthcare settings.

While the focus of each healthcare professional’s practice is a certain patient or a group of patients, their collaboration creates an environment in which attention of diverse specialists can be directed to a single patient. This greatly enhances efficiency and effectiveness of the provided healthcare. Multidisciplinary efforts of general medicine, physiotherapy, pharmacy and epidemiology professionals will be presented in the context of the design, development and implementation of a multidisciplinary approach within Hospital Administration and Medical Secretarial Services Research Centre, King Saud University, Riyadh, Saudi Arabia. Models of collaboration that have resulted from this endeavour will be demonstrated and possible barriers to effective collaboration will be discussed with a view to finding ways to overcome them (Meguid et al., 2015). It is believed that by addressing the shortcomings of the present model, multidisciplinary practice will thrive in the Research Centre and become a cornerstone of its development.

4.1. Integration of General Medicine, Physiotherapy, Pharmacy, and Epidemiology

The health systems in Saudi Arabia are an integrated network of health services provided by varied levels and types of health service providers. A health service provider could be a single individual or a group of individuals from varied health service disciplines working as a team to provide a definite health service or a set of health services to patients. General Medicine, Physiotherapy, Pharmacy, and Epidemiology are four different health service disciplines that could be managed as a team working under a single health service provider unit to provide professional health services to patients, particularly in hospitals. General Medicine is the discipline that provides the foundation of health services comprising the diagnosis disease or health disorder and planning treatment actions. Physiotherapy is the discipline that provides rehabilitation service post-treatment towards the restoration of normal health. Pharmacy is the discipline that restrictively deals with medications and provides the health services of planning a pharmaceutical treatment for the patient comprising medication selection, dosage schedule, and education on medication use. Epidemiology is the discipline that studies diseases in a population and provides health services regarding the control of diseases in the community. Thus, Epidemiology is the health service discipline that plays an important role in public health (Unger et al., 2020).

The above four health service disciplines are considered professional health service disciplines that require a university degree in the respective discipline to practice as a health service provider. Integration of these health service disciplines provides a comprehensive approach to managing a hospital health service. General medicine makes the foundation of health service comprising the diagnosis and treatment of disease or health disorder. Physiotherapy focuses on health service post-treatment that deals with rehabilitation service towards recovery. Pharmacy focuses on health service regarding medications and plays critical roles on medication selection and education on medication use. Epidemiology provides health service regarding diseases in a population and control of the diseases in the community. Thus, Epidemiology is the discipline on public health. Integration of these health service disciplines provides a comprehensive approach to planning and managing a hospital health service. (Leaver et al., 2022)(Vela et al.2022)(Alavudeen et al.2021)

5. Case Study: Implementation in Saudi Arabia

An in-depth case study on the implementation of hospital administration and medical secretarial services as foundations of healthcare systems is presented, focusing on its application in Saudi Arabia. Specific strategies and initiatives undertaken to enhance healthcare delivery within the country are discussed, covering the establishment of hospital administration training programs in collaboration with local universities and the Ministry of Health, as well as the provision of medical secretarial services training for healthcare professionals. Consideration is given to the unique healthcare context of Saudi Arabia, characterized by a relatively young population and a growing burden of chronic diseases. The challenges faced during the implementation of these services, including cultural barriers, a conservative approach to change, and limited resources of the Ministry of Health, are addressed. Success stories, positive outcomes, and effective practices in the region are highlighted, such as streamlined appointment scheduling and the development of standardized correspondence templates. This case study serves as a practical example of how theoretical concepts have been applied in real-world settings and illustrates the importance of continuous evaluation and adaptability in administrative practices. It is hoped that the lessons learned from this case study will provide valuable insights for the consideration and implementation of similar services in other healthcare systems worldwide (Alnowibet et al., 2021). The health sector in Saudi Arabia is crucial for ensuring the wellbeing of the nation and has a significant share of government expenditure. Recent developments and changes in the domestic economy and global environment have emphasized the need to focus on sectors other than oil, necessitating improvements in the healthcare system. This case study discusses the current state and future needs of healthcare in Saudi Arabia, with an emphasis on hospital administration and medical secretarial services as foundations of healthcare systems. Steps taken to implement these services in the context of Saudi Arabia, as well as its unique challenges and success stories, are explored. (Wager et al., 2021)(Marchildon et al., 2021)(Grinspan et al.2021)

5.1. Challenges and Successes

Implementation of healthcare initiatives aimed at improving hospital administration and medical secretarial services in the Kingdom of Saudi Arabia necessitated an examination of specific challenges and successes. Initially, steps taken for the effective administration and delivery of services encountered obstacles. Key among these was a lack of awareness of the importance of hospital administration and medical secretarial services. Although efforts were made to conduct needs assessment surveys prior to implementation, many stakeholders had little understanding of these disciplines. Consequently, sensitization became essential. Resistance to change from healthcare professionals already in service presented another hurdle. Many felt that the proposed change would undermine their expertise. A greater challenge was the absence of funded positions

for medical secretarial services in the Ministry of Health's organizational structure and a lack of understanding of the role of medical secretaries in clinical departments (Aljuaid et al., 2016). Nonetheless, noteworthy successes emerged. For instance, departments of general medicine, physiotherapy, pharmacy, and epidemiology achieved the goals set out in their project proposals within the two-year timeframe. Patient outcomes improved substantially, as evidenced by a reduction in the average length of hospital stay and a decrease in readmission rates for patients with chronic illnesses. Furthermore, the percentage of physiotherapy patients requiring repeat consultation decreased, reflecting satisfaction with the quality of care (M. Al-Nozha, 2024). In addition, the establishment of medical secretarial services contributed significantly to the operational efficiency of clinical departments. Achieving success required effective problem-solving and leadership, especially in the early stages. It was also essential to maintain stakeholder involvement throughout implementation. Winning the support of key individuals, particularly in the Ministry of Health and other champion clinical departments, was crucial for overcoming initial hurdles. Furthermore, addressing concerns about the impacts of change on existing healthcare services proved important for maintaining stakeholder confidence. The detailed examination of these aspects aims not only to provide a framework for similar initiatives in other developing countries but also to document success stories that can serve as models. Both internal and external relationships built between the disciplines of general medicine, physiotherapy, pharmacy, and epidemiology were critical in navigating these challenges. Viewing challenges and possible solutions from different perspectives strengthened the approach taken. Finally, the paper considers how government policy and regulations enabled positive changes and highlights the importance of clearly defined institutional roles.

Conclusion :

Hospital administration and medical secretarial services are indispensable to the efficient functioning of healthcare systems. This study has highlighted the critical role these administrative functions play in ensuring streamlined operations, reducing inefficiencies, and enhancing overall healthcare delivery. By integrating multidisciplinary perspectives from general medicine, physiotherapy, pharmacy, and epidemiology, healthcare institutions can optimize their administrative functions and improve patient outcomes.

The case study of Saudi Arabia underscores the need for strategic investments in training and policy reforms to strengthen hospital administration and medical secretarial services. Implementing standardized administrative practices, adopting technological advancements, and fostering interdepartmental collaboration are key to enhancing efficiency. The findings of this research emphasize that a well-structured hospital administration leads to better resource allocation, improved staff satisfaction, and increased patient safety.

Future research should explore innovative approaches to integrating artificial intelligence, electronic health records, and automation into hospital administration and secretarial services. Additionally, policymakers and healthcare leaders must recognize the importance of administrative excellence and invest in continuous education and professional development. By addressing these areas, healthcare systems worldwide, including in Saudi Arabia, can achieve higher standards of efficiency, service delivery, and patient care.

References:

1. Alshahrani, A., Stewart, D., & MacLure, K. (2018). Factors influencing health managers' acceptance of eHealth services in Saudi Arabia.. [PDF]
2. M. Al-Nozha, O. (2024). Key aspects of the Saudi healthcare system reform and the potential impact on the main stakeholders: A qualitative study. ncbi.nlm.nih.gov
3. Closser, S., Mendenhall, E., Brown, P., Neill, R., & Justice, J. (2022). The anthropology of health systems: a history and review. Social science & medicine, 300, 114314. [HTML]
4. Jolles, M. P., McBeath, B., Collins-Camargo, C., & Chuang, E. (2022). Organizational complexity within private child welfare agencies in the United States and impact on agency performance outlook. Children and Youth Services Review, 143, 106670. [HTML]
5. Tsogbadrakh, B., Kunaviktikul, W., Akkadechanunt, T., Wichaikhum, O. A., Gaalan, K., Badamdorj, O., & Stark, A. (2021). Development and psychometric testing of quality nursing care scale in Mongolia. BMC nursing, 20(1), 68. springer.com
6. Njoku, V. (2019). Strategies Hospital Administrators Utilize to Optimize Patient Services. [PDF]

7. Barati, O., Sadeghi, A., Khammarnia, M., Siavashi, E., & Oskrochi, G. (2016). A Qualitative Study to Identify Skills and Competency Required for Hospital Managers. [PDF]
8. Mutonyi, B. R., Slåtten, T., Lien, G., & González-Piñero, M. (2022). The impact of organizational culture and leadership climate on organizational attractiveness and innovative behavior: a study of Norwegian hospital employees. BMC health services research, 22(1), 637. springer.com
9. Shahriari, M., Tajmir Riahi, M., Azizan, O., & Rasti-Barzoki, M. (2023). The effect of green organizational culture on organizational commitment: The mediating role of job satisfaction. Journal of Human Behavior in the Social Environment, 33(2), 180-197. iut.ac.ir
10. Pedrosa, J., Sousa, L., Valentim, O., & Antunes, V. (2021). Organizational culture and nurse's turnover: A systematic literature review. International Journal of Healthcare Management, 14(4), 1542-1550. [HTML]
11. Abdi, Z., Lega, F., Ebeid, N., & Ravaghi, H. (2022). Role of hospital leadership in combating the COVID-19 pandemic. Health services management research, 35(1), 2-6. sagepub.com
12. Jankelová, N., Joniaková, Z., Blštáková, J., Skorková, Z., & Procházková, K. (2021). Leading employees through the crises: Key competences of crises management in healthcare facilities in coronavirus pandemic. Risk management and healthcare policy, 561-573. tandfonline.com
13. DeMartino, L. & Weiser, S. G. (2021). Administrative leadership in times of a global health crisis: Voices and images from the field. Frontiers in Education. frontiersin.org
14. Chowdhury, S., Mok, D., & Leenen, L. (2021). Transformation of health care and the new model of care in Saudi Arabia: Kingdom's Vision 2030. Journal of Medicine and Life. nih.gov
15. Cerchione, R., Centobelli, P., Riccio, E., Abbate, S., & Oropallo, E. (2023). Blockchain's coming to hospital to digitalize healthcare services: Designing a distributed electronic health record ecosystem. Technovation, 120, 102480. sciencedirect.com
16. Lærum, H., H Karlsen, T., & Faxvaag, A. (2004). Use of and attitudes to a hospital information system by medical secretaries, nurses and physicians deprived of the paper-based medical record: a case report. ncbi.nlm.nih.gov
17. Mahendradhata, Y., Andayani, N. L. P. E., Hasri, E. T., Arifi, M. D., Siahaan, R. G. M., Solikha, D. A., & Ali, P. B. (2021). The capacity of the Indonesian healthcare system to respond to COVID-19. Frontiers in public health, 9, 649819. frontiersin.org
18. Vellela, S. S., Reddy, B. V., Chaitanya, K. K., & Rao, M. V. (2023, January). An integrated approach to improve e-healthcare system using dynamic cloud computing platform. In 2023 5th International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 776-782). IEEE. [HTML]
19. Hoover, S. & Bostic, J. (2021). Schools as a vital component of the child and adolescent mental health system. Psychiatric services. psychiatryonline.org
20. Shafek Atta, I. & A Alzahrani, R. (2020). Perception of Pathology of Otolaryngology-Related Subjects: Students' Perspective in an Innovative Multidisciplinary Classroom. ncbi.nlm.nih.gov
21. Meguid, C., E Ryan, C., H Edil, B., D Schulick, R., Gajdos, C., Boniface, M., E Schefter, T., Thomas Purcell, W., & McCarter, M. (2015). Establishing a framework for building multidisciplinary programs. ncbi.nlm.nih.gov
22. Unger, J. P., Morales, I., De Paepe, P., & Roland, M. (2020). Integrating clinical and public health knowledge in support of joint medical practice. ncbi.nlm.nih.gov
23. Leaver, C. A., Stanley, J. M., & Veenema, T. G. (2022). Impact of the COVID-19 pandemic on the future of nursing education. Academic Medicine. lww.com
24. Vela, M. B., Erondu, A. I., Smith, N. A., Peek, M. E., Woodruff, J. N., & Chin, M. H. (2022). Eliminating explicit and implicit biases in health care: evidence and research needs. Annual review of public health, 43(1), 477-501. annualreviews.org
25. Alavudeen, S. S., Easwaran, V., Mir, J. I., Shahrani, S. M., Aseeri, A. A., Khan, N. A., ... & Asiri, A. A. (2021). The influence of COVID-19 related psychological and demographic variables on the effectiveness of e-learning among health care students in the southern region of Saudi Arabia. Saudi Pharmaceutical Journal, 29(7), 775-780. sciencedirect.com
26. Alnowibet, K., Abduljabbar, A., Ahmad, S., Alqasem, L., Alrajeh, N., Guiso, L., Zaindin, M., & Varanasi, M. (2021). Healthcare Human Resources: Trends and Demand in Saudi Arabia. ncbi.nlm.nih.gov
27. Wager, K. A., Lee, F. W., & Glaser, J. P. (2021). Health care information systems: a practical approach for health care management. [HTML]
28. Marchildon, G. P., Allin, S., & Merkur, S. (2021). Health Systems in Transition Third Edition. who.int

29. Grinspan, Z. M., Patel, A. D., Shellhaas, R. A., Berg, A. T., Axeen, E. T., Bolton, J., ... & Pediatric Epilepsy Learning Healthcare System. (2021). Design and implementation of electronic health record common data elements for pediatric epilepsy: Foundations for a learning health care system. Epilepsia, 62(1), 198-216. wiley.com
30. Aljuaid, M., Mannan, F., Chaudhry, Z., Rawaf, S., & Majeed, A. (2016). Quality of care in university hospitals in Saudi Arabia: a systematic review. ncbi.nlm.nih.gov