

Understanding the Diverse and Essential Roles in Contemporary Healthcare Systems

Tariq Saeed Saleh Al-Ghamdi¹, Maha Saad Ali Haydan², Naif Mohammed Alsidrah³,
Maha Raki Alruwaili⁴, Afrah Habis Faleh Alshammari⁵, Abdulrhman Saad Alqahtani⁶,
Khalid Mohammed Abdu Madkhali⁷, Ghaith Saleh Alharbi⁸, Rafat Hussam
Abushanab⁹, Yahya Ahmed Mater Mahzari¹⁰, Sulaiman Abdulrahman Mohammed
Alrasheed¹¹, Fahad Hussain Kammass¹²

¹Occupational specialization Jeddah Health Center II

²Nursing Specialist Prince Faisal Bin Khalid Cardiac Center

³Physical Therapy Special Security Forces

⁴Nursing Specialist Domat Al-Jandal Hospital

⁵Specialist – Nursing Al-Shannan Hospital

⁶Medical Devices Jazan Armed Forces Hospital

⁷Clinical Nutrition Al-Harith General Hospital in Jazan

⁸Health Information Technician Meeqat Hospital

⁹Preventive Medicine Specialist King Abdullah Medical Complex, Jeddah

¹⁰Technician - Anesthesia Technology Abu Arish General Hospital

¹¹Specialist – Physiotherapy Al Salam General Medical Centre

¹²General Physician King Abdullah Medical Complex

Received: 18.09.2024

Revised: 10.10.2024

Accepted: 20.11.2024

ABSTRACT

Healthcare systems today are complex and dynamic networks requiring the collaboration of diverse professionals, each bringing specialized skills to improve patient outcomes. These systems cater to a wide range of needs, from disease prevention and diagnosis to treatment and rehabilitation. The roles within healthcare have evolved significantly, driven by advancements in technology, medical research, and the growing complexity of patient care. This review explores the contributions of various healthcare specializations, ranging from general physicians who provide holistic, primary care to preventive medicine specialists who focus on health promotion and disease prevention. Additionally, the roles of nursing specialists, physical therapists, clinical laboratory scientists, medical device experts, and more are highlighted, demonstrating their collective impact on modern healthcare delivery. Understanding these roles is essential to appreciating the collaborative framework that ensures efficient, patient-centered care in contemporary healthcare systems.

Keywords: Healthcare systems, multidisciplinary collaboration, nursing, physical therapy, clinical laboratory science, medical devices, clinical nutrition, health information technology, preventive medicine, anesthesia technology, specialist physiotherapy, general physicians

INTRODUCTION

The healthcare system has evolved into a complex network where diverse professionals work together to ensure comprehensive care. This review aims to analyze the pivotal roles of various disciplines, their contributions to healthcare delivery, and the significance of collaboration in achieving optimal patient outcomes(1).

Healthcare systems are dynamic and complex entities that reflect the intricacies of human health and the relentless advancement of science and technology. From the earliest forms of medicine practiced in ancient civilizations to today's high-tech, multidisciplinary networks, healthcare has continuously evolved to address the changing needs of populations. Modern healthcare systems are no longer confined to isolated services provided by a single physician or healer. Instead, they consist of a vast array of interconnected roles and services, each designed to tackle the diverse challenges associated with improving and maintaining public health(2).

At the heart of contemporary healthcare lies a delicate balance: the art of human compassion and the science of cutting-edge innovation. This balance is achieved through the collaboration of a diverse set of professionals,

each bringing unique skills, knowledge, and perspectives to the table. From primary care providers managing routine health needs to specialized surgeons performing life-saving operations, and from administrators ensuring smooth operations to health informatics experts leveraging data for better outcomes, every role is essential⁽³⁾.

The modern healthcare system is a multifaceted ecosystem where professionals from diverse disciplines collaborate to deliver holistic patient care. This review explores the roles and interconnections among various healthcare sectors, including nursing, physical therapy, clinical laboratory science, medical devices, clinical nutrition, health information technology, preventive medicine, anesthesia technology, specialist physiotherapy, and general physicians. Each discipline contributes uniquely to diagnosing, treating, and managing health conditions, emphasizing the importance of multidisciplinary approaches in enhancing healthcare outcomes. By examining the specific functions, collaborative practices, and challenges within these domains, this article underscores the necessity of integrated healthcare systems to meet the complex needs of patients in the 21st century⁽⁴⁾.

This article delves into the wide spectrum of roles in healthcare systems, emphasizing their interdependence and collective impact on patient outcomes. Understanding these roles not only highlights the sophistication of modern medicine but also underscores the importance of collaboration, adaptability, and innovation in tackling contemporary health challenges

1. The Foundation: Primary Care Providers

Primary care providers (PCPs) serve as the first point of contact for patients and play a pivotal role in preventative care, diagnosis, and the management of chronic conditions. General practitioners, family physicians, and nurse practitioners are central figures in this category. Their responsibilities include:⁽⁵⁾

- Performing routine check-ups and screenings.
- Addressing acute illnesses and injuries.
- Coordinating care with specialists.
- Educating patients on health maintenance and disease prevention.

2. Specialized Medical Professionals

Beyond primary care, healthcare systems rely on specialists to address complex medical conditions. These professionals, such as cardiologists, oncologists, and neurologists, focus on specific body systems or diseases⁽⁶⁾.

➤ Education and Training

Becoming a specialized medical professional requires several years of education and hands-on training. After completing a general medical degree, these professionals must undergo residency programs in their chosen specialty, which can last anywhere from three to seven years, depending on the field. Afterward, many opt for fellowship programs to further refine their skills in sub-specialties or to stay updated with the latest medical advancements⁽⁶⁾.

Certification by professional boards is also an essential component of becoming a recognized expert in a specific medical area. Board certification ensures that specialists maintain high standards of practice and stay current with advances in their field⁽⁷⁾.

➤ Importance in Healthcare

Specialized medical professionals play a critical role in the healthcare system. Their advanced expertise enables them to provide more accurate diagnoses and personalized treatment plans. In addition, they often engage in cutting-edge research and clinical trials, contributing to innovations in medical care⁽⁸⁾.

Specialists are vital when dealing with complex medical conditions or rare diseases. For example, a pediatric cardiologist is better equipped to handle the intricacies of a child's heart condition than a general cardiologist. Similarly, oncologists are trained to provide tailored treatments for various types of cancers, offering patients better outcomes⁽⁹⁾.

Moreover, specialized medical professionals contribute to improving the overall quality of life for patients with chronic conditions. For instance, neurologists can help manage progressive diseases like Parkinson's, ensuring patients maintain mobility and independence for as long as possible ⁽¹⁰⁾.

3. Allied Health Professionals

Allied health professionals encompass a broad spectrum of roles, including physical therapists, occupational therapists, radiologic technologists, and dietitians. Their work is crucial for:⁽¹¹⁾

- Enhancing patient mobility and functionality.
- Supporting recovery and rehabilitation efforts.
- Conducting diagnostic imaging and laboratory tests.
- Guiding patients in nutritional planning and lifestyle adjustments.

4. Healthcare Administrators and Support Staff

Behind the scenes, healthcare administrators and support staff ensure that systems run smoothly. These roles include hospital administrators, billing specialists, and medical records technicians. Their responsibilities involve:(4).

- Managing budgets and resources.
- Ensuring compliance with regulations.
- Overseeing staff and facility operations.
- Maintaining accurate patient records and data security.

➤ Nursing

Nursing specialists form the backbone of healthcare systems, delivering compassionate care, addressing patient needs, and bridging gaps between physicians and other healthcare professionals. Their roles are as diverse as the environments in which they work, ranging from hospitals and clinics to community settings and research facilities(12).

Advanced Practice Nurses (APNs)

APNs are highly trained professionals who go beyond traditional nursing roles to provide specialized care, often working autonomously or in collaboration with physicians(13).

- **Nurse Practitioners (NPs):** NPs diagnose illnesses, prescribe treatments, and manage patient care. They are often the first point of contact for patients in primary and specialty care settings.
- **Clinical Nurse Specialists (CNSs):** CNSs focus on specific populations or medical conditions, such as pediatrics, cardiology, or oncology, serving as experts and consultants in their chosen areas.
- **Certified Nurse Midwives (CNMs):** CNMs specialize in women's health, particularly pregnancy, childbirth, and postpartum care, ensuring safe deliveries and promoting maternal and infant health.
- **Certified Registered Nurse Anesthetists (CRNAs):** CRNAs play a pivotal role in administering anesthesia and managing pain, particularly in surgical and trauma settings.

Specialty Nurses

Specialty nurses are trained to address the unique needs of specific patient populations or medical conditions(14).

- **Pediatric Nurses:** These professionals provide care for infants, children, and adolescents, ensuring they achieve developmental milestones and recover from illnesses effectively.
- **Geriatric Nurses:** Specializing in elder care, geriatric nurses manage age-related conditions, such as dementia and chronic illnesses, with sensitivity and expertise.
- **Critical Care Nurses:** Working in high-pressure environments like ICUs, these nurses handle life-threatening conditions, providing rapid interventions and round-the-clock monitoring.

Roles Beyond Clinical Settings

Nursing specialists also excel in non-clinical roles, contributing to healthcare systems through education, research, and leadership(15).

- **Nurse Educators:** These professionals train the next generation of nurses, ensuring a highly skilled workforce equipped to meet future healthcare challenges.
- **Nurse Researchers:** Engaged in medical and nursing research, they develop evidence-based practices and innovate solutions to improve patient care.
- **Nurse Administrators:** Managing teams and overseeing healthcare operations, nurse administrators ensure the efficient delivery of quality care within organizations.

Impact of Technology in Nursing

The integration of technology into nursing practice has transformed patient care delivery. Electronic health records (EHRs), telehealth platforms, and advanced medical devices enable nurses to provide more accurate and timely care. Nurse informaticists, a growing field within nursing, focus on optimizing these technologies to improve workflows and patient outcomes(16).

The Human Connection

Despite technological advancements, nursing remains deeply rooted in compassion and empathy. Nurses often act as patient advocates, ensuring that individuals' voices are heard and their dignity respected during vulnerable times(17).

➤ Physical Therapy

Physical therapists specialize in improving mobility, reducing pain, and restoring function through evidence-based interventions. Their work extends beyond rehabilitation, encompassing preventive care to mitigate the risk

of injury or deterioration in chronic conditions. Techniques such as manual therapy, therapeutic exercises, and the use of assistive devices are tailored to individual needs, ensuring that patients regain independence and enhance their quality of life. Collaboration with other disciplines further ensures that therapy goals align with overall patient care plans(18).

1. Sports Medicine and Rehabilitation: PTs working in sports medicine focus on athletes recovering from injuries. They use cutting-edge techniques like neuromuscular re-education and biomechanical analysis to enhance performance and prevent re-injury.

2. Neurological and Pediatric Care: PTs play a crucial role in treating neurological conditions such as stroke, cerebral palsy, and multiple sclerosis. Pediatric PTs focus on developmental disorders, helping children achieve milestones and improve motor skills.

➤ **Clinical Laboratory Science**

Clinical laboratory scientists provide diagnostic services by analyzing biological samples, including blood, urine, and tissue. Their expertise ensures the accuracy and reliability of test results that inform critical clinical decisions. From identifying pathogens to monitoring chronic diseases, their contributions are vital in both acute care settings and preventive medicine. Advances in laboratory technologies, such as molecular diagnostics and automation, continue to expand their role in personalized medicine and early disease detection(19).

1. Specialization in Diagnostics: CLS professionals often specialize in areas like microbiology, hematology, or molecular biology. Their work includes identifying pathogens, analyzing DNA, and detecting biomarkers for diseases like cancer.

2. Laboratory Automation and Quality Assurance: With advances in laboratory technology, CLS professionals ensure the accurate and efficient operation of automated systems while maintaining rigorous quality control standards.

➤ **Medical Devices**

Medical devices range from diagnostic tools to therapeutic equipment, significantly influencing healthcare delivery. Innovations such as wearable health monitors, imaging technologies, and robotic-assisted surgical systems have enhanced precision in diagnosis and treatment. Medical device professionals are responsible for maintaining equipment, ensuring compliance with safety standards, and training healthcare teams on device usage. Their contributions are integral to advancing minimally invasive procedures and improving patient safety (20).

1. Biomedical Engineers: These professionals design and innovate medical devices, such as prosthetics, imaging machines, and robotic surgical systems. Their work improves treatment precision and patient outcomes.

2. Clinical Engineers: Clinical engineers focus on the application and maintenance of devices within healthcare settings. They ensure compliance with safety regulations and provide technical training to healthcare staff.

➤ **Clinical Nutrition**

Clinical nutritionists focus on dietary interventions to promote health and manage diseases. They work closely with patients to assess nutritional needs, develop individualized meal plans, and provide counseling on lifestyle changes. In critical care settings, clinical nutritionists play a pivotal role in designing enteral and parenteral nutrition plans to support recovery. Their expertise in managing conditions like obesity, diabetes, and gastrointestinal disorders underscores the importance of nutrition in disease prevention and management(21).

Clinical nutritionists are pivotal in managing diet-related health conditions. They assess nutritional needs and design meal plans tailored to individual health goals(21).

1. Chronic Disease Management: Nutritionists work with patients managing diabetes, cardiovascular diseases, and renal disorders. They develop interventions to improve clinical outcomes and quality of life.

2. Specialized Nutrition Support: In cases where patients cannot consume food orally, nutritionists oversee enteral (tube feeding) or parenteral (IV feeding) nutrition. Their expertise ensures proper nutrient delivery and minimizes complications.

➤ **Health Information Technology (HIT)**

HIT professionals optimize data management systems to improve healthcare delivery. By leveraging electronic health records, telemedicine, and data analytics, they enhance efficiency, accuracy, and patient engagement. Their work facilitates seamless communication among providers, reduces errors, and supports evidence-based practices. The growing role of artificial intelligence and machine learning in HIT promises further advancements in predictive analytics and personalized medicine, revolutionizing how care is delivered(22).

1. Electronic Health Records (EHRs): HITs are instrumental in implementing and maintaining EHR systems, enabling seamless communication between healthcare providers.

2. Data Analytics and Compliance: Beyond record-keeping, HITs analyze healthcare data to identify trends, improve care delivery, and ensure compliance with privacy laws such as HIPAA.

➤ **Preventive Medicine**

Preventive medicine focuses on strategies to prevent diseases and promote health. Practitioners conduct risk assessments, design community health programs, and advocate for policies that enhance public health. Screening programs for conditions such as cancer, hypertension, and diabetes are central to their work.

Preventive medicine also addresses social determinants of health, emphasizing equitable access to resources and education to reduce disparities in health outcomes(23).

1. Epidemiology and Public Health: These specialists investigate disease outbreaks, study health patterns, and develop intervention strategies to reduce the spread of infectious diseases.

2. Lifestyle Medicine: Preventive medicine includes promoting healthy behaviors, such as smoking cessation, weight management, and physical activity, to mitigate chronic disease risks.

➤ **Anesthesia Technology**

Anesthesia technologists support anesthesiologists by managing equipment and ensuring patient safety during surgical procedures. Their responsibilities include preparing and calibrating anesthesia machines, monitoring patients' vital signs, and troubleshooting equipment issues. Their expertise is critical not only in routine surgeries but also in emergency and high-risk situations, where precision and efficiency directly impact patient outcomes. Continuing education and certification ensure that these professionals remain adept at evolving technologies and techniques(24).

1. Preoperative Preparation: They ensure the availability and functionality of anesthesia equipment and supplies.

2. Intraoperative and Postoperative Support: Technicians monitor patients' vital signs during procedures and assist in their transition to recovery rooms, ensuring safety and comfort.

➤ **Specialist Physiotherapy**

Specialist physiotherapists provide advanced care for specific conditions, such as pediatric, geriatric, or sports-related injuries. They employ specialized techniques, such as vestibular rehabilitation for balance disorders or aquatic therapy for joint issues. These professionals often collaborate with surgeons, neurologists, and other specialists to create comprehensive treatment plans tailored to complex cases. Their ability to address unique patient needs enhances recovery rates and fosters long-term well-being(25).

➤ **General Physicians**

General physicians serve as the first point of contact in healthcare, offering comprehensive assessments and coordinating care among specialists. They manage a wide range of conditions, from acute illnesses to chronic diseases, emphasizing holistic patient care. General physicians also play a key role in preventive care, guiding patients on lifestyle changes and early detection strategies. Their ability to build long-term patient relationships fosters trust and continuity of care, essential for managing complex health challenges(26).

1. Primary Care and Preventive Services: GPs perform regular check-ups, vaccinations, and screenings to detect and prevent diseases early.

2. Chronic Disease Management: They oversee long-term management of conditions like diabetes, asthma, and hypertension, ensuring continuity of care.

General physicians (GPs) provide holistic, patient-centered care. They address a broad spectrum of medical conditions and coordinate care with specialists.

5. Emerging Roles in Healthcare

The rapid advancement of technology and evolving patient needs have given rise to new roles in the healthcare system. Examples include:(27).

- **Health informatics specialists**, who manage electronic health records and analyze data to improve patient outcomes.
- **Telehealth coordinators**, facilitating remote consultations and expanding access to care.
- **Genetic counselors**, helping patients understand genetic testing results and implications.
- **Community health workers**, who act as liaisons between healthcare providers and underserved populations.

6. The Importance of Interdisciplinary Collaboration

The effectiveness of modern healthcare systems hinges on the collaboration among diverse roles. Interdisciplinary teams, combining expertise from various specialties, ensure:(28).

- Holistic patient care that addresses physical, emotional, and social needs.
- Improved communication and reduced errors.
- Enhanced innovation and problem-solving through diverse perspectives.

➤ **Collaboration in Healthcare Systems**

The integration of diverse disciplines fosters comprehensive patient care. Collaborative practices reduce errors, enhance communication, and improve patient satisfaction. For example, managing a stroke patient may involve a coordinated effort among neurologists, physical therapists, nurses, and clinical nutritionists to address various aspects of recovery. Effective collaboration requires structured communication channels, shared decision-making, and mutual respect among professionals(29).

❖ Challenges and Future Directions

Despite the benefits of multidisciplinary collaboration, challenges such as communication barriers, resource constraints, and professional silos persist. Addressing these issues requires investment in team-based training, the adoption of interoperable technology systems, and policies that encourage cross-disciplinary partnerships. As healthcare systems evolve, fostering innovation and adaptability will be critical to meeting the growing complexity of patient needs(3).

While the diversity of roles enriches healthcare, it also presents challenges such as:

- Ensuring adequate training and workforce distribution.
- Addressing disparities in access to care.
- Adapting to technological advancements and integrating them into practice.

To overcome these challenges, healthcare systems must prioritize continuous education, equitable resource allocation, and robust policy frameworks.

CONCLUSION

The diverse roles within contemporary healthcare systems are vital to addressing the complexities of patient care. Understanding and enhancing collaboration among these disciplines will continue to be essential for advancing healthcare delivery and improving outcomes. By leveraging the unique strengths of each profession, the healthcare system can achieve greater efficiency, equity, and patient satisfaction.

Understanding the diverse and essential roles within contemporary healthcare systems is crucial for appreciating the complexity and efficiency of modern medicine. Each role, from primary care providers to emerging specialists, contributes uniquely to patient outcomes and the overall functionality of healthcare systems. By fostering collaboration and adapting to change, these systems can continue to evolve and meet the needs of diverse populations effectively.

REFERENCES

1. Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., ... & Zurayk, H. (2010). Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *The lancet*, 376(9756), 1923-1958.
2. Fiscella, K., & McDaniel, S. H. (2018). The complexity, diversity, and science of primary care teams. *American Psychologist*, 73(4), 451.
3. National Academies of Sciences, Medicine Division, & Committee on Integrating Social Needs Care into the Delivery of Health Care to Improve the Nation's Health. (2019). *Integrating social care into the delivery of health care: moving upstream to improve the nation's health*.
4. Friedman, L., Goes, J., Coddington, D. C., & Linenkugel, N. (2001). Why integrated health networks have failed/Commentaries/Reply. *Frontiers of Health Services Management*, 17(4), 3.
5. Glasby, J., & Dickinson, H. (2014). *Partnership working in health and social care: what is integrated care and how can we deliver it?*. Policy Press.
6. Arora, S., Kalishman, S., Dion, D., Som, D., Thornton, K., Bankhurst, A., ... & Yutzy, S. (2011). Partnering urban academic medical centers and rural primary care clinicians to provide complex chronic disease care. *Health affairs*, 30(6), 1176-1184.
7. Cassell, E. J. (2002). *Doctoring: The nature of primary care medicine*. Oxford University Press.
8. Ball, J. R., Miller, B. T., & Balogh, E. P. (Eds.). (2015). *Improving diagnosis in health care*.
9. Popa, S. L., Ismaiel, A., Brata, V. D., Turtoi, D. C., Barsan, M., Czako, Z., ... & Dumitrascu, D. I. (2024). Artificial Intelligence and medical specialties: support or substitution?. *Medicine and Pharmacy Reports*, 97(4), 409.
10. Singh, B., Dutta, P. K., & Kaunert, C. (2024). Synchronizing neural networks, machine learning for medical diagnosis, and patient representation: looping advanced optimization strategies assisting experts. *Hybrid Information Systems: Non-Linear Optimization Strategies with Artificial Intelligence*, 1.
11. Lecca, P. J., Valentine, P., & Lyons, K. J. (2003). *Allied health: Practice issues and trends in the new millennium*. Routledge.
12. Duffy, J. R. (2022). *Quality caring in nursing and health systems: Implications for clinicians, educators, and leaders*. Springer Publishing Company.
13. Mulcahy, A. (2014). An organization functions only as well as the people who help to run it. Nurses are most often the backbone of what keeps large health care organizations operating functionally and efficiently. Nurses are the body, mind, and spirit of most.
14. Ghannam, D. (2022). *Resilience, absorptive capacity, and compassion: the case of the parents of children with disability in a highly fragmented healthcare system* (Doctoral dissertation, Nantes Université).
15. Tabish, S. A. (2024). *Nursing Services*. In *Health Care Management: Principles and Practice* (pp. 391-434). Singapore: Springer Nature Singapore.
16. Perlstein, S. (1996). Really caring: Why a comprehensive healthcare system includes the arts. *HIGH*

- Performance-Los Angeles-, 19, 23-27.
17. Boykin, A., Schoenhofer, S. O. B., & Valentine, K. L. (2013). *Health care system transformation for nursing and health care leaders: Implementing a culture of caring*. Springer Publishing Company.
 18. Delitto, A., George, S. Z., Van Dillen, L., Whitman, J. M., Sowa, G., Shekelle, P., ... & Werneke, M. (2012). Low back pain: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *Journal of orthopaedic & sports physical therapy*, 42(4), A1-A57.
 19. McDonough, C. M., Harris-Hayes, M., Kristensen, M. T., Overgaard, J. A., Herring, T. B., Kenny, A. M., & Mangione, K. K. (2021). Physical therapy management of older adults with hip fracture: clinical practice guidelines linked to the International Classification of Functioning, Disability and Health From the Academy of Orthopaedic Physical Therapy and the Academy of Geriatric Physical Therapy of the American Physical Therapy Association. *Journal of Orthopaedic & Sports Physical Therapy*, 51(2), CPG1-CPG81.
 20. Singh, A. B., Khandelwal, C., & Dangayach, G. S. (2024). Revolutionizing healthcare materials: Innovations in processing, advancements, and challenges for enhanced medical device integration and performance. *Journal of Micromanufacturing*, 25165984241256234.
 21. Tappenden, K. A., Quatrara, B., Parkhurst, M. L., Malone, A. M., Fanjiang, G., & Ziegler, T. R. (2013). Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. *Journal of the Academy of Nutrition and Dietetics*, 113(9), 1219-1237.
 22. Okolo, C. A., Ijeh, S., Arowoogun, J. O., Adeniyi, A. O., & Omotayo, O. (2024). Reviewing the impact of health information technology on healthcare management efficiency. *International Medical Science Research Journal*, 4(4), 420-440.
 23. Woolf, S. H., Jonas, S., & Kaplan-Liss, E. (Eds.). (2008). *Health promotion and disease prevention in clinical practice*. Lippincott Williams & Wilkins.
 24. Room, M. O. M. A. O. "The Role of Operating Room and Anesthesia Technicians in Ensuring Surgical Success and Patient Safety.
 25. Milne, N., Springberry, M., Baumann, A., & Farley, J. (2019, October). Linking the essential core paediatric competencies in entry-level physiotherapy education to an australian entry-level extended-masters physiotherapy curriculum: a case study. In *TRANSFORM 2019 Physiotherapy Conference*.
 26. Bodenheimer, T. (2008). Coordinating care-a perilous journey through the health care system. *New England Journal of Medicine*, 358(10), 1064.
 27. Thacharodi, A., Singh, P., Meenatchi, R., Tawfeeq Ahmed, Z. H., Kumar, R. R., V, N., ... & Hassan, S. (2024). Revolutionizing healthcare and medicine: The impact of modern technologies for a healthier future—A comprehensive review. *Health Care Scienc*
 28. Alshehri, A. S., Al Ghamdi, M. S. K., Ali Almuqathili, O. T., Saleh Alsaiaari, F. M., Saad Al-Malki, S. A., & Mohammed Alsaiaari, A. A. (2024). Synergistic Effects Of Multidisciplinary Healthcare Approaches On Patient Care Quality In Hospital: A Meta-Analysis. *Journal of Advanced Zoology*, 45(3).
 29. Alshehri, H. M., Alharbi, M. H., Juharji, H. M., Albishry, M. A., Omairan, A. M., Albeshri, Y. M. A., ... & safar Alqurashi, H. O. (2024). Integrating Nursing and Family Medicine: A Comprehensive Review of Interdisciplinary Approaches in Patient-Centered Care. *Journal of Ecohumanism*, 3(7), 2878-2888.