
The Role of Allied Health Professions in Enhancing Patient Outcomes: A Comprehensive Study on All Allied Health Care Providers

Ashwaq Ayidh Alharthi¹, Malak Omar Althomali², Abdulelah Eid Alatawi³, Abdulmajeed Saad Alqarni⁴, Saad Ahmed Almalki⁵, Waleed I Brahim Almuwallad⁶, Abdussalam Mohammed Asiri⁷, Yahya Ali Yahya Al Moshary⁸, Abdulaziz Ali Alamri⁹, Salman Khalid Alghamdi¹⁰, Ranya Saad Alrubaie¹¹, Bakhet Fahd Mubarak¹², Khalid Ali AlSamiri¹³

¹ Dental Assistant Specialist, Al Hada Armed Forces Hospital, Taif, Saudi Arabia

² Specialist Nurse, OPD, Armed Forces Center for Health Rehabilitation, Taif, Saudi Arabia

³ Medical Records Technician, King Salman Armed Forces Hospital of North West, Saudi Arabia

⁴ Pharmacy Technician, Pharmacy Department, Prince Mansour Military Hospital, Taif, Saudi Arabia

⁵ Physiotherapist, Armed Forces Center for Health Rehabilitation, Taif, Saudi Arabia

⁶ Nursing Technician, Health Education Department, Prince Mansour Military Hospital, Taif, Saudi Arabia

⁷ Nursing Technician, Armed Forces Center for Health Rehabilitation, Taif, Saudi Arabia

⁸ Laboratory Technician, Regional Laboratory, Aseer, Saudi Arabia

⁹ Laboratory Specialist, Laboratory Department, Prince Mansour Military Hospital, Taif, Saudi Arabia.

¹⁰ Laboratory Specialist, Laboratory Department, Al Hada Armed Forces Hospital, Taif, Saudi

¹¹ Dental Assistant Specialist, Dental Department, Armed Forces Center For Health Rehabilitation, Taif, Saudi Arabia

¹² Pharmacy Technician, Pharmacy Department, Wadi Ad-Dawasir Military Hospital, Wadi Ad-Dawasir, Saudi Arabia

¹³ Infection Control practitioner, Armed forces rehabilitation center, Taif, Saudi Arabia

Abstract:

The allied health professions play a pivotal role in enhancing patient outcomes through their collaborative efforts and diverse expertise. Disciplines such as pharmacy, physical therapy, nursing, dentistry, laboratory services, and medical records management contribute uniquely to patient care, addressing various aspects of health and well-being. Pharmacists ensure the safe and effective use of medications, while physical therapists help patients regain mobility and function following injuries or surgeries. Nursing professionals provide continuous patient care and education, acting as vital advocates in the healthcare system. Dentists maintain oral health, which is integral to overall health, while laboratory professionals deliver critical diagnostic information that informs treatment decisions. Additionally, medical records specialists ensure the accuracy and privacy of patient information, facilitating better communication among healthcare providers. The collaboration among these allied health professionals is essential for delivering comprehensive care, highlighting the need for interdisciplinary approaches in healthcare settings. By integrating their skills and knowledge, they effectively contribute to improved health outcomes, patient satisfaction, and better resource utilization. Continuous education and specialized training among these professionals further enhance their ability to adapt to evolving medical practices and patient needs. As healthcare continues to advance, the importance of allied health professions in implementing evidence-based practices and promoting holistic care will only increase, ultimately leading to a healthier population.

Keywords: Allied health professions, interdisciplinary collaboration, holistic care, healthcare improvement, evidence-based practices.

Introduction:

In contemporary healthcare systems, the pursuit of enhanced patient outcomes has grown increasingly complex, necessitating an integrated approach that draws on the specialized skills of a multitude of healthcare professionals. Among these, allied health professions—comprising pharmacy, physical therapy, nursing, dentistry, medical laboratory science, and medical records management—have emerged as pivotal players in fostering comprehensive patient care. As the healthcare landscape evolves in response to shifting demographics, advancing technologies, and emerging health challenges, the role of these allied health professionals assumes even greater significance. This study aims to explore the multifaceted contributions of allied health professions to patient outcomes, elucidating their impact on health quality, accessibility, and patient satisfaction [1].

Allied health professionals represent a diverse group of practitioners who provide essential support services that complement the work of physicians and other primary care providers. Their expertise spans a wide array of disciplines, each contributing uniquely to patient care. For instance, pharmacists play a crucial role in medication management, ensuring that patients understand their prescriptions and potential drug interactions. Physical therapists facilitate recovery from injuries or surgeries, improving mobility and overall function, while nurses provide continuous patient care, education, and advocacy. Dentists contribute to oral health, which intrinsically linked to overall well-being, whereas medical laboratory scientists conduct vital diagnostic tests that inform treatment decisions. Finally, medical records professionals manage patient information, ensuring that data is accurate, secure, and accessible, thereby supporting coordinated care across multidisciplinary teams [2].

Research has consistently highlighted the importance of interdisciplinary collaboration in healthcare, positing that integrated care models can significantly enhance patient outcomes. Allied health professionals often serve as the nexus between various healthcare services, bridging gaps in communication and ensuring continuity of care. For example, effective pharmacist consultations can mitigate adverse drug events, while coordinated efforts among physical therapists, nurses, and

physicians can optimize rehabilitation protocols for chronically ill or post-surgical patients. Furthermore, the integration of technology in patient records management facilitates real-time data sharing, empowering healthcare teams to make more informed clinical decisions and tailor interventions to individual patient needs [3].

Despite the clear value that allied health professions bring to the healthcare table, their contributions are sometimes overlooked in discussions surrounding patient outcomes. This oversight is concerning, as it undermines the potential of these practitioners to elevate care standards and improve patient experiences. The historical emphasis on physician-led models has contributed to a narrower understanding of collaborative care, frequently sidelining the vast expertise available within allied health professions. Consequently, this study aims to address this gap by systematically investigating the roles of pharmacy, physical therapy, nursing, dentistry, laboratory science, and medical records management in influencing patient-centered outcomes [4].

To accomplish this, the study will employ a comprehensive methodology encompassing quantitative and qualitative approaches. By conducting surveys and interviews with allied health professionals, patients, and other healthcare providers, insights will be gathered on the perceived impact of allied health contributions to patient care. Additionally, a review of existing literature and case studies will be undertaken to identify best practices, challenges, and innovative models of integrative care that highlight the synergistic benefits of involving allied health professionals [5].

The significance of this research lies not only in its potential to illuminate the vital roles played by allied health professions but also in its implications for policy and practice. In a healthcare environment increasingly characterized by value-based care, the findings could inform strategies to optimize workforce planning, enhance inter-professional education, and advance the recognition of allied health contributions within healthcare systems. By championing an understanding of the interconnected roles of allied health professionals, the study aspires to foster a more holistic approach to patient care—one that prioritizes collaboration in service of improved health outcomes for all [6].

The impact of pharmacy on medication management and patient safety:

In contemporary healthcare, the role of pharmacy extends well beyond the mere dispensing of medications. It is a multidimensional field involving extensive knowledge of pharmaceuticals, active collaboration with healthcare professionals, and a commitment to ensuring the safety and efficacy of medication therapy. This comprehensive approach to medication management has profound implications for patient safety, affecting clinical outcomes, reducing medication errors, and enhancing the overall healthcare experience. Understanding this impact requires an exploration of the various facets in which pharmacy practice influences medication management and patient safety [7].

Pharmacy and the Medication Management Process

Medication management is a strategic, patient-centered approach that encompasses the procurement, storage, dispensing, administration, monitoring, and evaluation of medications. The pharmacist's role is pivotal in this continuum. Pharmacists are trained healthcare professionals who possess an in-depth understanding of drug mechanisms, therapeutic indications, potential side effects, and interactions. Their expertise enables them to assess patient needs accurately and to make informed decisions about medication therapy [8].

One of the key elements of effective medication management is the medication reconciliation process, which involves verifying and documenting a patient's medication list during transitions in care, such as when patients move from one healthcare setting to another or when they visit a new provider. Pharmacists are essential in this process; they compare the patient's current medications against the medications ordered in a new setting to identify discrepancies and prevent potential adverse drug events. This proactive approach significantly enhances continuity of care, reduces the risk of medications being overlooked, and ensures that patients remain adherent to their therapeutic regimens [9].

Moreover, pharmacists are at the frontline of direct patient education, providing critical information regarding medication usage, potential side effects, and proper dosing. By counseling patients,

pharmacists empower them to take an active role in their treatment, thus promoting greater adherence and mitigating the risk of medication errors stemming from misunderstandings about how drugs should be taken [9].

Reducing Medication Errors and Adverse Drug Events

Medication errors remain a significant challenge in healthcare, with studies indicating that such errors may affect approximately 1 in 10 doses administered. These errors can occur at various points in the medication use process, including prescribing, dispensing, and administration. The pharmacist's involvement is critical in preventing these errors. They scrutinize prescriptions for potential drug interactions, inappropriate doses, and allergies, and they clarify any ambiguities with prescribers before the medications are dispensed [10].

The introduction of technology into pharmacy practice has further revolutionized medication safety. Automated dispensing systems, electronic health records (EHRs), and computerized provider order entry (CPOE) systems work to reduce the likelihood of human error in the medication management process. Pharmacists are trained to use these systems effectively, allowing for swift identification and resolution of potential drug interactions while ensuring that the right medication reaches the right patient in the correct dose [10].

Pharmacovigilance and Ongoing Monitoring

Beyond the initial medication management and dispensing phases, pharmacists play a crucial role in ongoing monitoring of patient therapy through pharmacovigilance – the science of detecting, assessing, and preventing adverse drug reactions and other medication-related problems. This facet of pharmacy practice is vital for enhancing patient safety, as it fosters a culture of continuous assessment and improvement [11].

Pharmacists utilize various strategies to monitor patient responses to medications. This may involve follow-up consultations, the implementation of therapeutic drug monitoring for certain medications, or reviewing laboratory results pertinent to medication therapy. By identifying issues early and adjusting treatment plans proactively, pharmacists can help prevent complications that could result in

hospital readmissions or serious health deteriorations [12].

Ensuring the safe use of medications, especially in populations at high risk for adverse events, is another important aspect of pharmacy's impact on patient safety. Elderly patients, for example, often have multiple comorbidities that necessitate polypharmacy, increasing the likelihood of adverse drug interactions. Clinical pharmacists specialize in geriatric care, utilizing their expertise to tailor drug regimens that minimize risks while maximizing therapeutic benefits [12].

Enhanced Collaboration within the Healthcare Team

The integration of pharmacists into multidisciplinary healthcare teams has profound implications for patient safety. As medication experts, pharmacists collaborate with physicians, nurses, and other healthcare providers to develop cohesive treatment plans that enhance therapeutic outcomes. Their participation in team discussions allows for a holistic review of a patient's condition, shedding light on potential medication-related issues that other team members may overlook [13].

Studies demonstrate that the inclusion of pharmacists in clinical settings can significantly contribute to improved patient safety outcomes, including reduced length of hospital stays, decreased rates of readmission, and enhanced patient satisfaction. With their comprehensive understanding of medication therapy, pharmacists can educate their colleagues, advocate for optimal medication use, and instill confidence within the healthcare team about the safety of prescribed treatments [13].

Patient-Centric Approaches to Pharmacy Practice

A vital component of ensuring patient safety is adopting a patient-centric approach in pharmacy practice. Community pharmacists, in particular, serve as accessible healthcare providers who can counsel patients on medication management. This accessibility is paramount in cultivating relationships that foster trust and encourage patient communication regarding potential medication concerns [14].

Pharmacists can also employ motivational interviewing techniques to understand patients'

beliefs and attitudes toward their medications, thus addressing any barriers to adherence. By tailoring interventions to the individual patient's needs, pharmacists can enhance engagement in their treatment and further reduce the risk of medication errors or adverse events [15].

Physical therapy: facilitating recovery and rehabilitation to improve patients' condition:

Physical therapy (PT) is a crucial component of the healthcare system, emphasizing the restoration and enhancement of physical function in patients experiencing a range of conditions, from post-surgical recovery to chronic pain management. The role of a physical therapist (PT) extends far beyond merely alleviating pain; it encompasses a holistic approach to rehabilitation, movement, and overall well-being [16].

Understanding Physical Therapy

At its core, physical therapy is a science-based profession focused on evaluating, diagnosing, and treating disorders of the musculoskeletal and neurological systems. This field employs specialized techniques, manual therapy, therapeutic exercises, and patient education to promote recovery and empower individuals to lead healthier lives. Physical therapists are trained to assess functional impairments and develop comprehensive treatment plans tailored to individual needs, aiming not only to address the physical aspects of injury but also to consider psychological and environmental factors that could affect recovery [16].

Methodologies and Techniques

Physical therapy employs a variety of methodologies that can be categorized into passive and active treatments. Passive treatments include modalities such as heat therapy, electrical stimulation, ultrasound, and manual therapy (which encompasses techniques like joint mobilization and soft tissue manipulation). These interventions primarily serve to reduce pain, decrease inflammation, and prepare the body for more active rehabilitation [17].

On the other hand, active treatments involve exercises and movement training that strengthen muscles, improve flexibility, and enhance coordination. Therapists often design personalized exercise regimens that align with patients' specific objectives, whether it is regaining range of motion

following a knee injury or building strength after spinal surgery. Techniques such as resistance training, balance exercises, and functional training are integral to the rehabilitation process, allowing patients not just to recover, but also to improve their overall fitness and resilience against future injuries [17].

The Benefits of Physical Therapy

The benefits of physical therapy are diverse and multifaceted. One of the key advantages is pain management. For individuals suffering from chronic pain conditions such as arthritis, fibromyalgia, or lower back pain, PT provides non-invasive methods to alleviate discomfort through targeted exercises and therapies, rather than relying solely on medications. This approach not only reduces the risk of addiction to pain relievers but also addresses the underlying causes of pain through improved movement and physical strength [18].

Another significant benefit is enhanced mobility and functionality. For patients recovering from surgery or injury, physical therapy offers a structured rehabilitation program that aids in regaining strength and mobility. The period following surgery is critical; physical therapists play a vital role in guiding patients through evidence-based protocols designed to facilitate safe and effective rehabilitation. This gradual progression helps to rebuild muscle strength, improve joint mobility, and restore normal function, allowing patients to return to their daily activities and hobbies with confidence [18].

Furthermore, physical therapy addresses the psychological and emotional aspects of recovery. Living with pain or limitations can lead to feelings of frustration, anxiety, or depression. Physical therapists not only provide physical interventions but also offer support and encouragement, empowering patients to actively participate in their recovery journey. This emotional support can enhance patients' adherence to treatment plans and reduces the likelihood of setbacks [19].

The Role of Physical Therapy in Specific Conditions

Physical therapy is instrumental in addressing various conditions and populations. In sports medicine, PT is crucial for athletes recovering from injuries, providing them with comprehensive

rehabilitation strategies that help in a safe return to their sport while minimizing the risk of re-injury. Pediatric physical therapy specializes in addressing developmental delays and conditions such as cerebral palsy, ensuring children achieve their full potential through tailored intervention strategies [20].

For the elderly population, physical therapy is essential in managing age-related conditions such as osteoporosis, arthritis, and balance disorders. Through strength and balance training, physical therapists help reduce the risk of falls, a common concern in older adults. This proactive approach not only enhances quality of life but can also contribute significantly to increased independence [20].

Future Directions in Physical Therapy

As science and technology continue to evolve, so too does the field of physical therapy. Innovative techniques such as teletherapy are gaining popularity, especially post-pandemic, enabling therapists to provide care remotely. This accessibility can be pivotal for patients living in remote areas or those with mobility challenges that make traditional in-person appointments difficult [21].

Moreover, research into evidence-based practices continues to inform treatment guidelines. Integrating modalities such as dry needling, biofeedback, and virtual reality therapies into traditional PT can significantly enhance the rehabilitation process, promoting quicker recovery times and more effective outcomes [21].

Nursing contributions to improving patients' conditions and coordinating care:

Nursing, a profession rooted in compassion and commitment, plays a pivotal role in the healthcare system, significantly contributing to improving patients' conditions and coordinating their care. Nurses are often the frontline caregivers, bridging the gap between patients and complex medical systems. Their holistic approach to patient care encompasses not just the physical aspects of healing but also emotional, psychological, and social dimensions. This multifaceted role places nurses in a unique position to enhance patient outcomes, streamline care delivery, and foster a collaborative environment among healthcare providers [22].

Improvement of Patients' Conditions

At the core of nursing practice lies the objective of improving patients' conditions, which physicians and other healthcare professionals rely on to achieve successful outcomes. Nurses employ a variety of strategies to facilitate recovery, manage symptoms, and promote overall health. One of the primary ways nurses contribute is through direct patient care, which includes administering medications, monitoring vital signs, and implementing treatment plans. Each of these tasks is a crucial component of the healing process; for instance, meticulous monitoring enables nurses to identify and address potential complications early on, thereby minimizing adverse outcomes [23].

Moreover, evidence-based practice is foundational to nursing. Nurses continuously update their knowledge and skills, integrating the latest research findings into their care routines. This commitment to lifelong learning equips them with the tools necessary to provide high-quality care tailored to individual patient needs. By applying evidence-based practices, nurses can implement interventions that have been proven to improve health outcomes, such as fall prevention strategies in elderly patients or educational initiatives for diabetes management. Their advocacy for the use of current research not only enhances patient safety but also empowers patients through education and shared decision-making [24].

Another key aspect of improving patients' conditions is the psychological support that nurses provide. Chronic illnesses and acute medical conditions can significantly impact a patient's mental and emotional well-being. Nurses, being the most consistent caregivers, often establish strong therapeutic relationships characterized by trust and empathy. This connection enables them to understand patient needs beyond the physical realm, facilitating interventions that cater to mental health, promote coping strategies, and encourage healthy lifestyle choices. The art of active listening and providing reassurance cannot be underestimated in the nursing profession, as these elements play a critical role in bolstering patients' morale and engagement in their recovery process [25].

Coordinating Care

In addition to directly improving patients' conditions, nurses are instrumental in coordinating

patient care across various healthcare settings. The complexity of contemporary healthcare necessitates collaborative work among various healthcare professionals, including physicians, specialists, social workers, and therapists. The nurse acts as a vital linchpin in this network, ensuring that communication is seamless and that all team members are working towards unified goals [26].

Case management is an essential component of nurses' roles in coordinating care. Nurses often take on the responsibility of managing a patient's overall trajectory through the healthcare system. This includes organizing referrals to specialists, scheduling follow-up appointments, and ensuring that diagnostic tests are completed in a timely manner. For patients with multiple comorbidities, coordination ensures that care is integrated and that patients receive comprehensive treatment without unnecessary duplication of services. By maintaining clear and organized communication, nurses help prevent medical errors and promote continuity of care, which is particularly crucial during transitions between different healthcare settings, such as from hospital to home [26].

Furthermore, nurses play a crucial role in patient and family education, which is a fundamental aspect of care coordination. They ensure that patients understand their diagnoses, treatment options, and the importance of adhering to prescribed regimens. For patients being discharged from a hospital, nurses provide detailed instructions and resources to facilitate recovery at home. This education not only aids in the healing process but also empowers patients to take an active role in their health, leading to better adherence to treatment plans and reduced hospital readmissions [27].

Nurses also help address social determinants of health by coordinating with community resources and support services. Understanding that health is affected by various factors beyond clinical care, nurses work to connect patients with resources such as housing support, transportation services, and nutritional assistance. By facilitating access to these vital resources, nurses contribute to a more comprehensive model of care that addresses the root causes of health disparities and helps patients achieve optimal health outcomes [27].

Future trends: Evolving roles and technology in patient care:

The healthcare landscape is undergoing a monumental transformation. As advancements in medical technology and shifts in societal expectations converge, the roles of healthcare professionals, patients, and the technologies that facilitate care are evolving rapidly [28].

The Evolving Roles of Healthcare Professionals

One of the most significant trends in patient care is the evolution of healthcare professionals' roles. Historically, healthcare has often been characterized by a hierarchical structure, with doctors at the top and nurses, technicians, and support staff following suit. However, this model is transitioning toward a more collaborative and interdisciplinary approach to care [28].

1. **Team-Based Care:** The shift to team-based care promotes collaboration among healthcare professionals from various disciplines. Nurses, physicians, pharmacists, social workers, and even patients themselves are increasingly working together to create a holistic approach to patient care. This trend facilitates the sharing of knowledge, skills, and perspectives, enhancing the overall quality of care and enabling comprehensive treatment plans that address the multifaceted nature of patients' health [29].

2. **Patient-Centered Roles:** As patients become more informed and engaged in their healthcare journeys, the roles of healthcare providers are adapting accordingly. Patients are increasingly seen as active participants rather than passive recipients of care. This shift has led to an emphasis on shared decision-making, where healthcare providers consult with patients to develop treatment plans that reflect their preferences and values. The role of the clinician is now one of guidance, communication, and support, rather than mere authority [29].

3. **Expanding Scope of Practice:** Certain healthcare roles are evolving to meet the demands of an aging population and increased prevalence of chronic diseases. Nurse practitioners (NPs) and physician assistants (PAs) are increasingly taking on responsibilities that were traditionally reserved for physicians. With advanced training and education, these professionals are capable of providing primary

care services, managing chronic conditions, and performing certain medical procedures. This evolution alleviates some of the burden on physicians and expands access to care, particularly in underserved regions [30].

Integration of Emerging Technologies

The second major trend in the future of patient care is the integration of emerging technologies that enhance the delivery of care, improve patient outcomes, and streamline healthcare operations [31].

1. **Telehealth:** The COVID-19 pandemic accelerated the adoption of telehealth services, which allow healthcare providers to deliver care remotely through digital platforms. This technology has proven invaluable, especially for patients in remote or underserved areas. In the future, telehealth is expected to become a standard part of patient care, empowering patients to access health consultations from the comfort of their homes. Innovations in telemonitoring—where patients wear devices that transmit health data in real-time—will further enhance preventative care and chronic disease management [31].

2. **Artificial Intelligence and Machine Learning:** The application of artificial intelligence (AI) and machine learning in healthcare is burgeoning. These technologies can analyze vast amounts of patient data to identify patterns, predict outcomes, and aid in clinical decision-making. AI-driven diagnostics can assist healthcare providers in detecting diseases earlier and more accurately, leading to timely and effective interventions. The continued refinement of AI tools will revolutionize imaging, pathology, and personalized medicine, enabling tailored treatment strategies that consider individual patient genetics and lifestyle [32].

3. **Wearable Devices:** Wearable health technologies, such as fitness trackers and smartwatches, empower patients to take charge of their health. These devices can monitor vital signs, track physical activity, and even detect irregular heart rhythms, providing real-time data that can be shared with healthcare providers. As patients use wearables, practitioners can make data-driven decisions that enhance preventative care and chronic disease management. Looking ahead, the integration of wearables into healthcare systems will continue expanding, providing a wealth of data that can

improve patient engagement and treatment efficacy [33].

Implications for Healthcare Systems

The convergence of evolving roles and advanced technologies raises important questions about the future structure of healthcare systems. As patient care transforms, several implications arise:

1. **Cost and Efficiency:** Increased access to telehealth, coupled with the expanded roles of NPs and PAs, has the potential to reduce healthcare costs and improve system efficiency. By allowing non-physician providers to handle routine visits and follow-ups, healthcare systems can focus physician resources on complex cases requiring advanced training [33]. Additionally, AI and predictive analytics can streamline administrative tasks, reduce wait times, and enhance patient flow, ultimately resulting in more efficient care delivery.
2. **Equity in Care:** The advancement of technology holds promise for addressing healthcare disparities among different populations. Telehealth can enable access to care for low-income individuals and those in rural areas, while AI can assist enacting targeted interventions for underserved groups. However, it is essential to ensure equitable access to these technologies. Addressing digital divides and ensuring all patients have the necessary skills and equipment to engage with telehealth services will be critical in maximizing the benefits of technological advancements [34].
3. **Data Privacy and Security:** With the proliferation of digital health information comes heightened concerns regarding data privacy and security. Healthcare professionals and organizations must navigate the complexities of patient data protection while leveraging technology to optimize care. Future regulations will likely evolve to safeguard patients' rights while promoting innovation and technology adoption [35].

Dentistry: Oral health as an element of public health:

Oral health is a fundamental aspect of overall health and well-being. It encompasses not only the teeth and gums but also the mouth and surrounding structures, which play a vital role in nutrition, communication, and emotional well-being. Dentistry, as a critical component of healthcare, has evolved beyond the traditional boundaries of

treating dental diseases to include preventive measures and educational initiatives aimed at promoting oral health as an integral element of public health [36].

Understanding Oral Health

Oral health refers to the absence of diseases and conditions affecting the oral cavity and encompasses a wide range of issues including cavities, gum diseases, oral cancer, and conditions such as malocclusion (misalignment of teeth). The World Health Organization (WHO) defines oral health as a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infections, periodontal (gum) disease, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing [37].

Good oral health is not only essential for the integrity of the mouth but is also linked to overall health and quality of life. For instance, untreated dental diseases can lead to pain, discomfort, and infections that may spread to other parts of the body, exacerbating existing health conditions such as heart disease and diabetes. Furthermore, the psychological impacts of poor oral health can lead to decreased self-esteem and social withdrawal, influencing one's education and economic prospects [38].

The Role of Dentistry in Public Health

The association between oral health and public health cannot be overlooked. Public health focuses on the health of populations and communities rather than individuals, making it essential for addressing issues that affect oral health on a larger scale. Dentists and dental hygienists play a pivotal role in promoting oral health, offering preventive care, and educating the public about the importance of oral hygiene practices [39].

Preventive Care

Preventive care is a cornerstone of dentistry aimed at minimizing the occurrence of dental diseases. Regular dental visits, cleanings, fluoride treatments, and sealants are vital components that can significantly reduce the risk of dental caries – one of the most prevalent chronic diseases among children and adults. According to the Centers for Disease Control and Prevention (CDC), cavities are one of the most common chronic diseases among American

children, affecting nearly 20% of children aged 5 to 11 [39].

Through community outreach programs, dental professionals can provide education and resources to underserved populations, particularly in low-income areas where access to dental care may be limited. Initiatives such as school-based dental screenings and community water fluoridation programs highlight the importance of preventive care in reducing oral disease incidence [40].

Education and Awareness

Public health campaigns that focus on education and awareness are instrumental in improving oral health. Nurses, teachers, and community health workers can be trained to deliver key messages about oral hygiene, dietary choices affecting oral health, and the significance of regular dental check-ups. These educational campaigns can be tailored to reach specific demographics, including children, pregnant women, and the elderly, addressing their unique oral health needs [41].

Moreover, addressing the social determinants of health is crucial in promoting oral health equity. Factors such as socioeconomic status, cultural influences, and access to information can impact individuals' health outcomes. Therefore, robust public health strategies should include cultural competency training for dental professionals to help them understand and communicate better with diverse populations [41].

Integrating Oral Health with General Health

A growing body of research highlights the interconnectedness of oral health and systemic conditions, leading to the recognition that oral health must be integrated into broader health initiatives. For example, studies have demonstrated that periodontal disease can exacerbate conditions like diabetes and cardiovascular diseases. This awareness has led to interdisciplinary approaches in healthcare, where dentists and other healthcare providers collaborate in managing patients' overall health [42].

The integration of oral health in primary care settings provides an excellent opportunity for preventive screening, education, and referral to dental services. Recent strategies in public health aim to create effective collaboration between dental

and medical health systems, enabling a more holistic approach to patient care [42].

Challenges and Barriers

Despite the clear connections between oral health and public health, significant barriers still exist. Many communities face challenges such as limited access to dental care, insufficient insurance coverage, and socioeconomic disparities. Rural areas, in particular, often have fewer dental providers, leading to higher rates of untreated dental diseases. Furthermore, low health literacy can hinder individuals from understanding the importance of maintaining good oral health practices or navigating the healthcare system [43].

Addressing these challenges requires comprehensive policy interventions at the local, state, and federal levels. Strategies may include improving healthcare infrastructure, expanding dental insurance coverage, and increasing funding for oral health initiatives in underserved regions [44].

Laboratory services: Diagnosis and decision support help improve the patient's condition:

In the modern healthcare landscape, the optimization of patient outcomes is paramount. Among the multitude of services offered within healthcare systems, laboratory services play a critical role in enhancing diagnosis and providing decision support that collectively contribute to improved patient conditions. As a vital component of patient care, laboratory services encompass a broad range of diagnostic tests and analyses, including hematology, microbiology, clinical chemistry, and molecular diagnostics [45].

The Importance of Laboratory Services in Diagnosis

Laboratory services are at the heart of clinical diagnosis, offering objective data that is crucial for the identification of diseases and conditions. The role of laboratory tests cannot be overstated; studies have shown that around 70% of clinical decisions are based on laboratory results. These tests assist healthcare providers in detecting abnormalities, ruling out potential diagnoses, and monitoring disease progression or response to treatment [46].

For instance, in diagnosing infections, microbiological testing enables clinicians to identify

specific pathogens responsible for illness, allowing for targeted antibiotic therapy. Similarly, in oncology, laboratory analyses such as blood tests for tumor markers or biopsies can provide insights into the presence of malignancy, guiding appropriate treatment strategies. The critical nature of timely and accurate laboratory services is particularly evident in emergency medicine, where a swift diagnosis can be the determining factor in patient outcomes, reducing morbidity and mortality rates [46].

Decision Support Through Diagnostics

In addition to facilitating diagnosis, laboratory services provide healthcare professionals with valuable decision support. Through the integration of advanced diagnostic tools and methodologies, clinicians can better tailor treatment plans to fit the individual needs of patients. This decision-making process is increasingly informed by comprehensive data analytics, which allow for the interpretation of complex laboratory results in the context of a patient's clinical picture [47].

Moreover, advancements in technology such as artificial intelligence and machine learning are revolutionizing the capacity for decision support systems (DSS) in laboratory services. These systems can analyze large datasets from laboratory results alongside clinical guidelines and treatment modalities to provide evidence-based recommendations. For example, a laboratory DSS might suggest follow-up tests based on initial results, highlight potential drug interactions, or alert clinicians to abnormal results that require immediate attention. This not only enhances the quality of care but also promotes patient safety by minimizing human errors in the interpretation of complex data [47].

The Role of Technology in Enhancing Laboratory Services

Technological advancements have significantly transformed laboratory services, improving their accuracy, speed, and reliability. Automation has streamlined many laboratory processes, reducing turnaround times for test results. For instance, the advent of high-throughput analyzers has enabled laboratories to process hundreds of samples within hours, facilitating timely diagnoses that are critical to effective patient management [48].

Furthermore, the development of molecular diagnostic techniques, such as polymerase chain reaction (PCR) and next-generation sequencing, has provided unprecedented capabilities in identifying genetic mutations and pathogens at astounding precision. These cutting-edge technologies have not only improved diagnostic accuracy but have also paved the way for personalized medicine, whereby treatment plans can be tailored based on an individual's genetic makeup or microbiome composition [49].

Telemedicine and remote monitoring technologies also play a vital role in the modern laboratory landscape. They allow for real-time transmission of laboratory results to healthcare providers, enabling them to make informed decisions without delay. Patients can also engage with their lab results directly through patient portals, fostering a greater understanding of their health conditions and promoting adherence to treatment plans [49].

Challenges in the Laboratory Services Sector

Despite the advancements and critical functions of laboratory services, the sector faces several challenges that can impede their effectiveness. Resource limitations, including shortages of skilled laboratory personnel and inadequate funding, can hinder the ability of laboratories to meet diagnostic demands. Additionally, the rising complexity of diagnostic tests can lead to implementation challenges in laboratory processes, necessitating ongoing training and education for laboratory staff [50].

Moreover, maintaining the quality and integrity of laboratory results remains a persistent challenge. Laboratories must adhere to stringent regulatory guidelines and engage in continuous quality assurance measures to prevent errors that could result in misdiagnosis or inappropriate treatment. Collaboration between laboratory professionals and clinical staff is essential in this regard, fostering a culture of accountability and excellence in patient care [50].

Multidisciplinary collaboration: a holistic approach to patient care:

In the contemporary landscape of healthcare, a paradigm shift has occurred, emphasizing the importance of collaborative practices over traditional, siloed approaches. At the core of this

transformation lies the concept of multidisciplinary collaboration—an integrative model that unites diverse healthcare professionals to provide comprehensive, patient-centered care [51].

Defining Multidisciplinary Collaboration

Multidisciplinary collaboration in healthcare refers to the coordinated efforts of professionals from various disciplines working together towards a common goal: enhancing patient care. This collaboration includes, but is not limited to, physicians, nurses, social workers, pharmacists, physical therapists, psychologists, and dietitians, all of whom contribute their unique expertise to inform treatment decisions. Instead of functioning in isolation, these professionals engage in open communication, share knowledge, and synthesize their diverse perspectives, thereby enriching the care experience [52].

The Importance of a Holistic Approach

The multifaceted nature of health requires an equally multifaceted approach to patient care. Chronic illnesses, mental health issues, and complex care needs often intersect, necessitating attention from multiple specialists. A holistic approach recognizes that biological, psychological, and social factors all contribute to a patient's health and well-being. By employing multidisciplinary collaboration, healthcare teams can address these various dimensions, ultimately leading to more tailored and effective treatment plans [53].

For example, consider a patient recovering from major surgery who also has diabetes and social anxiety. In a traditional healthcare setting, endocrinologists, surgeons, and mental health professionals might treat the patient separately, possibly leading to fragmented care. However, through multidisciplinary collaboration, these specialists can convene to develop an integrated care plan that accounts for the patient's physical recovery, diabetes management, and mental health needs. This cohesive strategy not only supports the patient but also reduces the likelihood of miscommunication and gaps in care [53].

Frameworks for Effective Multidisciplinary Collaboration

Several frameworks have been developed to facilitate effective multidisciplinary collaboration in healthcare settings. Key components include:

1. **Shared Goals:** Establishing common objectives for patient care is essential for collaboration. All team members must be aligned on the overall treatment goals, which fosters unity and ensures that the care delivered is consistent and comprehensive [54].
2. **Communication:** Open, ongoing communication is critical in a multidisciplinary setting. Regular team meetings, electronic health records, and collaborative platforms can enhance information-sharing and ensure that all team members are up-to-date on the patient's progress [55].
3. **Role Clarity:** Clearly defining the roles and responsibilities of each team member is vital to avoid confusion. Understanding the contributions of each discipline allows team members to work more efficiently and utilize their strengths effectively [56].
4. **Cultural Competence:** Healthcare professionals must be aware of the cultural dynamics that may influence patient care. By fostering an environment of respect for diversity and inclusivity, multidisciplinary teams can provide more relevant and personalized care [56].
5. **Patient Involvement:** Engaging patients as active participants in their care empowers them and improves outcomes. Multidisciplinary teams should encourage patients to voice their preferences, concerns, and experiences, facilitating a collaborative approach that prioritizes the patient's needs [57].

Challenges of Multidisciplinary Collaboration

Despite the numerous advantages of a multidisciplinary approach, several challenges can arise. One significant barrier is the potential for communication breakdowns. Variability in professional jargon, differing priorities, and time constraints can hinder effective communication among team members. Additionally, healthcare professionals may have varying levels of training in collaborative practices, leading to inconsistent engagement in team efforts [58].

Moreover, organizational structures can impede collaboration. Traditional hierarchies in healthcare settings may create an atmosphere where some voices dominate while others are marginalized. Resistance to change also plays a role, as some

professionals may feel uncomfortable altering established practices [58].

To overcome these challenges, healthcare organizations must foster a culture that values collaboration and invests in training programs designed to enhance communication and teamwork. By addressing these barriers, the efficacy of multidisciplinary collaboration can be significantly improved [59].

Positive Impact on Patient Outcomes

The evidence supporting the positive impact of multidisciplinary collaboration on patient outcomes is substantial. Studies have shown that collaborative care models can lead to reductions in hospital readmission rates, shorter hospital stays, and improved patient satisfaction. For instance, patients with chronic illnesses who receive coordinated care from a multidisciplinary team have shown better adherence to treatment plans and improved quality of life [60].

Furthermore, multispecialty collaboration has been linked to enhanced educational experiences for healthcare professionals. Working in interdisciplinary teams provides opportunities for learning, promotes mutual respect among professions, and encourages the sharing of best practices. This culture of ongoing learning can foster innovation and improve care delivery [61].

Conclusion:

In conclusion, the allied health professions play a critical and multifaceted role in enhancing patient outcomes across the healthcare spectrum. Each discipline—pharmacy, physical therapy, nursing, dentistry, laboratory services, and medical records—contributes uniquely to patient care, demonstrating the importance of their collaboration and communication within interdisciplinary teams. By leveraging their specialized knowledge and skills, these professionals not only improve individual patient health and recovery but also promote overall system efficiency and effectiveness.

As healthcare landscapes evolve, the integration of allied health professions will be vital for adapting to new challenges and achieving better health outcomes. Continued investment in education, training, and collaborative practices is essential for maximizing their impact. Ultimately, recognizing and supporting the contributions of allied health

professionals can lead to enhanced patient satisfaction, improved quality of care, and a more robust healthcare system that prioritizes the well-being of individuals and communities alike.

References:

1. Harris J, Grafton K, Cooke J. Developing a consolidated research framework for clinical allied health professionals practising in the UK. *BMC Health Serv Res.* 2020;20(1):852. doi: 10.1186/s12913-020-05650-3.
2. Harding K, Lynch L, Porter J, Taylor NF. Organisational benefits of a strong research culture in a health service: a systematic review. *Aust Health Rev.* 2017;41(1):45–53. doi: 10.1071/AH15180.
3. Butler D. Translational research: crossing the valley of death. *Nature.* 2008;453(7197):840–842. doi: 10.1038/453840a.
4. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007;19(6):349–357. doi: 10.1093/intqhc/mzm042.
5. Albarqouni L, Hoffmann T, Straus S, Olsen NR, Young T, Ilic D, et al. Core competencies in evidence-based practice for Health professionals: consensus statement based on a systematic review and Delphi survey. *JAMA Netw Open.* 2018;1(2):e180281.
6. Borkowski D, McKinstry C, Cotchett M, Williams C, Haines T. Research culture in allied health: a systematic review. *Aust J Prim Health.* 2016;22(4):294–303. doi: 10.1071/PY15122.
7. Wenke R, Noble C, Weir KA, Mickan S. What influences allied health clinician participation in research in the public hospital setting: a qualitative theory-informed approach. *BMJ Open.* 2020;10(8):e036183.
8. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci.* 2009;4:50. doi: 10.1186/1748-5908-4-50.

9. Harvey D, Plummer D, Nielsen I, Adams R, Pain T. Becoming a clinician researcher in allied health. *Aust Health Rev.* 2016;40(5):562–569. doi: 10.1071/AH15174.
10. Alhurishi SA, Aljuraiban GS, Alshaikh FA, Almutairi MM, Almutairi KM. Predictors of students' academic achievements in allied health professions at King Saud University: a retrospective cohort study. *BMC Med Educ.* 2021;21(1):93. doi: 10.1186/s12909-021-02525-x.
11. Huet I. Research-based education as a model to change the teaching and learning environment in STEM disciplines. *Eur J Eng Educ.* 2018;43(5):725–740. doi: 10.1080/03043797.2017.1415299.
12. Lacey C, Scodras S, Ardron J, Sellan R, Garbaczewska M, O'Brien KK, et al. Retrospective review of student research projects in a Canadian master of science in physical therapy Programme and the perceived impact on Advisors' research capacity, education, clinical practice, knowledge translation, and Health policy. *Physiother Can.* 2018;70(2):160–168. doi: 10.3138/ptc.2016-83.
13. Boaz A, Hanney S, Jones T, Soper B. Does the engagement of clinicians and organisations in research improve healthcare performance: a three-stage review. *BMJ Open.* 2015;5(12):e009415.
14. Twelvetree T, Suckley J, Booth N, Thomas D, Stanford P. Developing sustainable nursing and allied health professional research capacity. *Nurse Res.* 2019;27(3):48–54. doi: 10.7748/nr.2019.e1618.
15. Matus J, Walker A, Mickan S. Research capacity building frameworks for allied health professionals - a systematic review. *BMC Health Serv Res.* 2018;18(1):716. doi: 10.1186/s12913-018-3518-7.
16. Queensland Industrial Relations Commission. Health Practitioners and Dental Officers (Queensland Health) Award – State 2015, 2018 State Wage Case Reprint. State of Queensland; 2018.
17. Hanney S, Boaz A, Jones T, Soper B. Health services and delivery research. Engagement in research: an innovative three-stage review of the benefits for health-care performance. Southampton: NIHR Journals Library; 2013.
18. Whelan K, Thomas JE, Madden AM. Student research projects: the experiences of student dietitians, university faculty members, and collaborators. *J Am Diet Assoc.* 2007;107(9):1567–1574.
19. Alison JA, Zafiroopoulos B, Heard R. Key factors influencing allied health research capacity in a large Australian metropolitan health district. *J Multidiscip Healthcare.* 2017;10:277–291. doi: 10.2147/JMDH.S142009.
20. Ward EC, Elphinston RA, Wall LR, Schwarz M, Gordon GE. Research engagement and activity in an allied Health workforce insights into departmental and Organisational strategies. *J Allied Health.* 2018;47(4):265–271.
21. Gupta GC, Hedrick HL. Allied health-education and accreditation. *JAMA* 1990;264(7):843–8. doi: 10.1001/jama.1990.03450070071008.
22. Alhurishi SA, Aljuraiban GS, Alshaikh FA, Almutairi MM, Almutairi KM. Predictors of students' academic achievements in allied health professions at King Saud University: a retrospective cohort study. *BMC Med Educ* 2021;21(1):93. doi: 10.1186/s12909-021-02525-x.
23. Brown HD, Boonme K, Imrhan V, Juma S, Vijayagopal P, Prasad C. Should 'Omics' education be a part of allied health profession curricula? *Genomics* 2020;112(1):169–73. doi: 10.1016/j.ygeno.2019.01.009.
24. Matus J, Walker A, Mickan S. Research capacity building frameworks for allied health professionals – a systematic review. *BMC Health Serv Res* 2018;18(1):1–11. doi: 10.1186/s12913-018-3518-7.
25. Shapley KL, Hamuka EL. On-campus clinics in allied health education: necessity or legacy? *J Allied Health* 2019;48(2):114–8.
26. Global strategy on human resources for health: Workforce 2030. Available at: https://who.int/hrh/resources/global_strategy_workforce2030_14_print.pdf (Accessed November 30, 2021).

28. Turnbull C, Grimmer-Somers K, Law D, Ashworth E. Allied, scientific and complementary health professionals: a new model for Australian Allied Health. *Aust Health Rev* 2009;33:27–37. doi: 10.1071/AH090027.
29. Pain T, Lindsay D, Fernando M. Predictors of future research interest among allied health professionals at an Australian regional tertiary hospital. *Focus Health Prof Ed* 2020;21(3):78–92. doi: 10.11157/fohpe.v21i3.376.
30. Birch DA, Goekler S, Auld ME, Lohrmann DK, Lyde A. Quality assurance in teaching K-12 Health education: paving a new path forward. *Health Promot Pract* 2019;20(6):845–57. doi: 10.1177/1524839919868167.
31. Morgan DD, Rawlings D, Moores CJ, Button L, Tieman JJ. The changing nature of palliative care: implications for allied health professionals' educational and training needs. *Healthcare-Basel* 2019;7(4):112. doi: 10.3390/healthcare7040112.
32. Lemaitre MJ, Karakhanyan S. Quality assurance in higher education: a global perspective. In Teixeira P, Shin J, eds. *Encyclopedia of international higher education systems and institutions*. Dordrecht: Springer; 2018:221–37. doi: 10.1007/978-94-017-9553-1_263-1.
33. Royal Society for Public Health. Rethinking the public health workforce. 2014. Available at: <https://www.rsph.org.uk/en/policy-and-projects/areasof-work/wider-public-health-workforce/> (Accessed November 21, 2021).
34. Davahli MR, Karwowski W, Taiar R. A system dynamics simulation applied to healthcare: a systematic review. *Int J Environ Res Public Health* 2020;17(16):5471. doi: 10.3390/ijerph17165741.
35. Grimmer K, Kumar S. Allied health task-related evidence. *J Soc Work Res Eval* 2005;6:143–54.
36. Campbell C, Rozsnyai C. Quality Assurance and the development of course programs. *Papers on Higher Education*. Bucharest: UNESCO-CEPES; 2002.
37. Wilger A. Quality assurance in higher education: a literature review. National Center for Postsecondary Improvement, Stanford University; 1997.
38. Green L, Gray BJ, Edmonds N, Parry-Williams L. Development of a quality assurance review framework for health impact assessments. *Impact Assess Proj A* 2019;37(2):107–13. doi: 10.1080/14615517.2018.1488535.
39. Alhurishi SA, Aljuraiban GS, Alshaikh FA, Almutairi MM, Almutairi KM. Predictors of students' academic achievements in allied health professions at King Saud University: a retrospective cohort study. *BMC Med Educ* 2021;21(1):93. doi: 10.1186/s12909-021-02525-x.
40. Bereda G. Quality assurance and quality control. Current furtherances and hereafter point of view. *J Anal Pharm Res* 2021;10(5):212–5. doi: 10.15406/japlr.2021.10.00386.
41. The chief health professions officer's ten key roles for allied health professionals. Available at: https://www.acprc.org.uk/Data/Resource_Downloads/10_key_roles.pdf (Accessed November 19, 2021).
42. Brayer A, Marcinowicz L. Job satisfaction of nurses with master of nursing degrees in Poland: Quantitative and qualitative analysis. *BMC Health Serv Res*. 2018;18:239. doi: 10.1186/s12913-018-3053-6.
43. Cobbing S, Maddocks S, Govender S, Khan S, Mbhele M, Naidoo K, et al. Physiotherapy postgraduate studies in South Africa: Facilitators and barriers. *South Afr J Physiotherapy*. 2017;73(1):335. doi: 10.4102/sajp.v73i1.335.
44. Wenke RJ, Ward EC, Hickman I, Hulcombe J, Phillips R, Mickan S. Allied health research positions: a qualitative evaluation of their impact. *Health Res Policy Syst*. 2017;15:6. doi: 10.1186/s12961-016-0166-4.
45. Cooke J, Gardois P, Booth A. Uncovering the mechanisms of research capacity development in health and social care: a realist synthesis. *Health Res Policy Syst*. 2018;16:93. doi: 10.1186/s12961-018-0363-4.
46. Clark L, Casey D, Morris S. The value of master's degrees for registered nurses. *Br J Nurs*. 2015;24(6):328–334. doi: 10.12968/bjon.2015.24.6.328.
47. Faden RR, Kass NE, Goodman SN, Pronovost P, Tunis S, Beauchamp TL. An ethics framework

- for a learning health care system: a departure from traditional research ethics and clinical ethics. *Hast Cent Rep.* 2013;43(s1):S16–S27. doi: 10.1002/hast.134.
47. National Institute for Health Research. Link to Internship eligible professions.
48. Richardson A, Avery M, Westwood G. A Cross-Funder Survey of Enablers and Barriers to Progressing a Research-Related Academic Career in the Non-Medical Health Professions. Report to Health Education England, 2019.
49. Hiley J, Begg C, Banks L, Harper L, Swift A, Topping A. West midlands clinical academic careers programmes for nurses, midwives, allied health professions, pharmacists and healthcare scientists (NMAHPPS) evaluation report.
50. Palmer J. Australian bureau of statistics annual report 2013–14.
51. NIHR Trainees Coordinating Centre. Ten Years On: Adapting and Evolving to New Challenges in Developing Tomorrow's Health Research Leaders. July 2017.
52. Trusson D, Rowley E, Bramley L. A mixed-methods study of challenges and benefits of clinical academic careers for nurses, midwives and allied health professionals. *BMJ Open.* 2019;9(10):e030595. doi: 10.1136/bmjopen-2019-030595.
53. Watson N, Tang P, Knight E. Survey of medical clinical academic staffing levels 2018.
54. Health Education England. Research and innovation strategy: Developing a flexible workforce that embraces research and innovation.
55. Kennedy R, Beasley C, Bradley M, Moore R. Midwifery 2020: Delivering expectations.
56. Westwood G, Richardson A, Latter S, Macleod Clark J, Fader M. Building clinical academic leadership capacity: Sustainability through partnership. *J Res Nurs.* 2018;23(4):346–357. doi: 10.1177/1744987117748348.
57. Tricco AC, Lillie E, Zarin W, O'Brien K, Colquhoun H, Kastner M, et al. A scoping review on the conduct and reporting of scoping reviews. *BMC Med Research Methodol.* 2016;16:15. doi: 10.1186/s12874-016-0116-4.
58. Association of UK University Hospitals. National Clinical Academic Roles Development Group for Nurses, Midwives and Allied Health Professionals. 2010.
59. Health Education England/National Institute of Health Research. ICA programme for non-medical healthcare professions. 2015.
60. Prime Minister's Commission. Front line care report by the on the future of Nursing and Midwifery in England 2010.
61. Wenke RJ, Ward EC, Hickman I, Hulcombe J, Phillips R, Mickan S. Allied health research positions: a qualitative evaluation of their impact. *Health Res Policy Syst.* 2017;15(1):6. doi: 10.1186/s12961-016-0166-4.