**International Journal of Medical Toxicology & Legal Medicine** **Volume 27, No. 4S, 2024**
**e-ISSN: 0974-4614**
**p-ISSN: 0972-0448**
**https://doi.org/10.47059/ijmtlm/V27I4S/075**

# Multidisciplinary Approach to Managing Diabetes Complications: The Roles of Nursing, Pharmacy, Radiology, Physiotherapy, and Public Health Teams

**Faisal Mohammed Alolaywi[1], Sukaina Ali Alhamad[2], Emad Abdulrahman Mutiq Abumariqah[3], Tayseer Farhan Salem AL Onazy[4], Abdullah Mohammed Alshahrani[5], Abdullah Mousa Ali Alatef[6], Hussain Amin Hussain Ajwah[7], Alhumaydhan Ibrahim Mohammed F[8], Alsehaim Mohammad Ibrahim A[8], Alharbi Ali Ghazi F[8], Saud Ghazi Alshammari[9], Hashim Mohammad Alshammari[10]**

[1]General Dental Practitioner, Department of Dentistry, Alkharj Military Hospital, Alkharj, Saudi Arabia
[2]Dental Assistant, King Faisal general hospital
[3]Epidemiology Specialist, Aseer Health Cluster, Health sector in Wadi Bin Hashbal, Primary Health Care Center in Yaara
[4]Pharmacy, Maternity and Children's Hospital in Hail
[5]Public Health, King Fahad Specialist Hospital Tabuk
[6]Public Health Technician, Abha Sector
[7]Nursing technician, Duba general hospital
[8]Physiotherapy,Buredah central Hospital
[9]Radiological Technologist, Department of Radiology,Sharaf Hospital, Hail Health Cluster, Hail, Saudi Arabia
[10]Radiological Technologist, Department of Radiology, King Salman Specialist Hospital, Hail Health Cluster, Hail, Saudi Arabia

Received: 15.09.2024 Revised: 12.10.2024 Accepted: 10.11.2024

**ABSTRACT**

**Introduction:** Diabetes mellitus is a chronic metabolic disorder characterized by increased blood glucose levels that result from either impaired insulin production, action, or both. It affects millions of people across the globe and is linked with varying complications that may tremendously affect health and quality of life in individuals. The differential and systemic nature of the complications of diabetes really calls for a multidisciplinary approach in the management where various professionals in health care come on board to offer a more integrated and holistic management option.

**Aim of work:** To explore the pivotal roles of nursing, pharmacy, radiology, physiotherapy, and public health teams in managing diabetes complications.

**Methods:** We conducted a comprehensive search in the MEDLINE database's electronic literature using the following search terms: Multidisciplinary, Approach, Managing, Diabetes, Complications, Roles, Nursing, Pharmacy, Radiology, Physiotherapy, and Public Health Teams. The search was restricted to publications from 2016to 2024 in order to locate relevant content. We performed a search on Google Scholar to locate and examine academic papers that pertain to my subject matter. The selection of articles was impacted by certain criteria for inclusion.

**Results:** The publications analyzed in this study encompassed from 2016 to 2024. The study was structured into various sections with specific headings in the discussion section.

**Conclusion:**The multidisciplinary approach towards managing complications brought about by diabetes brings together the roles of nursing, pharmacy, radiology, physiotherapy, and public health teams. Every single profession brings its own skill and perspective in order to solve complex problems brought about by diabetes. Nurses are taught with the provision of care and nursing education to empower patients when it comes to self-management of the condition. Pharmacists optimize medication regimens with a safety profile as well as efficacy in treating the conditions. Radiologists use advanced imaging of detection that would also enable shadowing of the complications, while physiotherapists enhance function and mobility. Education prevention and in policy advocacy are what public health teams tackle. They concern themselves with diabetes at the population level through all these professionals' collaboration and allow for a very comprehensive patient-centered approach that allows individual needs of patients living with diabetes to be packed into management. It

can be said that healthcare teams can mitigate the effects of complications, improve quality of life, and reduce the burden of diabetes.

**Keywords:** Multidisciplinary, Approach, Managing, Diabetes, Complications, Roles, Nursing, Pharmacy, Radiology, Physiotherapy, and Public Health Teams

## INTRODUCTION

Diabetes mellitus is essentially a chronic disorder of metabolism characterized by high blood glucose levels owing to the impairment of insulin production, action, or both. It affects millions of people across the globe, associated with a far-ranging variety of complications that have significant impact on health and quality of life (Arokiasamy et al., 2021). Some of these complications such as cardiovascular diseases, neuropathy, nephropathy, retinopathy, and foot ulcers require procedures that are usually complex as well as lifelong management. The nature of these complications is diverse and systemic, underlining the necessity for multidisciplinary approach; that is, all health professionals must work together to provide integrated management of care (Andersen et al., 2023).

In fact, the multidisciplinary approach is the backbone for effective management of diabetes complications, so that every person is able to receive not only holistic care but care tailored to their needs as well. Each of them has his or her unique part to play-from specialist to nurse-in taking care of a person with diabetes. The nurse educates the patient and checks blood glucose levels while providing direct patient care for problems such as wounds or infections (Okorie, 2018). Pharmacists are tasked with optimizing the medication regimen, educating patients about drug therapies, and resolving issues related to adherence (Alenazi et al., 2023). Radiologists are the backbone in diagnosing complications like diabetic foot infections and vascular anomalies using imaging techniques that assist in a timely intervention (Boulton et al., 2018).

They offer necessary physiotherapy in the prevention and handling of musculoskeletal problems, with enhancements to mobility and physical capabilities retarding or bearing the brunt of diabetes and its many complications. Public health teams work towards prevention and community-based approaches by tackling risk factors and encouraging lifestyles that ultimately reduce the diabetes complication burden on both the individuals and the health system at large. Such professionals form very strong, albeit complementary, pillars upon which the management of diabetes rests, ensuring that no aspect of patient care is left unattended (Harris-Hayes et al., 2023).

The management of diabetes becomes really complicated because patients have to be assessed regarding their ability to cope with their treatment regimens and specific lifestyle changes. These will include such social ties as family support and financial constraints. Multidisciplinary teams can address these situations quite perfectly by bringing in the particular strengths of different professionals to give coordinated and patient-centered care (Andersen et al., 2023). A nurse may focus on bloods glucose and wound care while public health would carry out community-based interventions related to the patient’s diet and physical activity. And a pharmacist’s comment regarding possible interactions between drugs and adherence will descend as a transparency over the physiotherapist’s interventions in rehabilitation and physical mobility enhancement (Conca et al., 2018).

Reducing healthcare expenses through a collaborative approach can enhance patient outcomes by decreasing hospital visits and incidents of severe complications as well as resource utilization. The early identification and resolution of complications via cities reduce disease burdens significantly and create long-term health improvements. For example, early radiological imaging coupled with pharmacist-led medication review could prevent the progression of complications that otherwise may become associated with highly expensive interventions-for example, surgical procedures or longer hospital stays (Thomas, 2022).

## AIM OF WORK

This review focuses on the pivotal roles played by nursing, pharmacy, radiology, physiotherapy, and public health teams in managing diabetes complications. It highlights the interprofessional teams' contributions toward holistic care while promoting the necessity of interprofessional collaboration for the best patient outcomes. By establishing how these multidisciplinary concepts synergise, the work continuously enlightens on how such an approach enhances diabetes care quality and effectiveness while improving patients' lives, and at the same time, taking on the wider challenge of managing diabetes as a whole.

## METHODS

A thorough search was carried out on well-known scientific platforms like Google Scholar and Pubmed, utilizing targeted keywords such as Multidisciplinary, Approach, Managing, Diabetes, Complications, Roles, Nursing, Pharmacy, Radiology, Physiotherapy, and Public Health Teams. The goal was to collect all pertinent research papers. Articles were chosen according to certain criteria. Upon conducting a comprehensive analysis of the abstracts and notable titles of each publication, we eliminated case reports, duplicate articles, and publications without full information. The reviews included in this research were published from 2016 to 2024.

## RESULTS

The current investigation concentrated on the contributions of various disciplines within multidisciplinary healthcare teams, specifically examining the roles of health security, nursing, medical laboratories, social work, medical secretaries, and physiotherapybetween 2016 and 2024. As a result, the review was published under many headlines in the discussion area, including:Health Security: Safeguarding the Healthcare Environment, Nursing: The Backbone of Patient Care, Medical Laboratories: The Cornerstone of Diagnostics, Social Work: Addressing Psychosocial Needs, Medical Secretaries: Ensuring Administrative Efficiency, Physiotherapy: Promoting Rehabilitation and Recovery and Integration of Multidisciplinary Teams in Patient Care

## DISCUSSION

Diabetes is a worldwide epidemic that increases faster among different people. It is a chronic metabolic disorder that is characterized by hyperglycemia and exerts its effect on a number of organs and comes with serious complications like cardiovascular disease, neuropathy, nephropathy, retinopathy, and foot ulcers (Balaji et al., 2019). The definition and application of these complications needed multi-disciplinary treatment approaches wherein different health care professionals combine their expertise towards good patient outcomes. This review highlights the significance of nursing, pharmacy, radiology, physiotherapy, and public health teams in diabetes complications management, emphasizing the need for teamwork in delivering patient-centered care for the disease's long-term impacts.

### Nursing in Diabetes Complication Management

Nurses, as cornerstones in the management of diabetes, offer direct patient care, education and emotional support. Their role goes beyond clinical intervention to include patient empowerment through knowledge and skills generation. They teach patients all about blood glucose monitoring and administration of insulin as well as developing a diet plan and making lifestyle changes for successful control of diabetes and prevention of its complications. An important part of this education is the awareness of early signs of complications, for example, numbness in extremities, changes in vision, and other conditions, that would require immediate medical attention (Aleid et al., 2022).

Nurses will offer wound care and lookout for infection and educate the patients regarding foot hygiene to prevent further deterioration in the case of diabetic foot ulcers. Their intervention is crucial in cardiovascular complications because they will monitor patients' blood pressures, cholesterol levels, and risk factors while promoting treatment adherence. They have ongoing links with the health professionals to co-ordinate the care plan that ensures an extension of satisfactory follow-ups and holistic care by tackling psychosocial challenges like depression or anxiety common with chronic diseases (Alsallum et al., 2022).

However, they also play a significant role in end-of-life care for patients suffering from advanced complications of diabetes, like end-stage renal disease. They take care of the patient's physical and emotional needs related to comfort and pain management, as well as managing quality of life. With a combination of technical expertise with nursing compassion, nurses are a very important part of the multidisciplinary health care for reducing the health risks of diabetes (DalalNaser et al., 2024).

### The Role of Pharmacy in Diabetes Management

Pharmacists are fundamental to medication therapy optimization in diabetes and its complications, with the end result that patients receive the best care while limiting adverse effects. Pharmacists are also pharmacology experts who give critical advice on drug interactions, dosing regimens, and side effects- important factors for patients with comorbidities that may be on complex medication regimens (Hughes et al., 2017).

Pharmacists manage diabetic medications such as insulin and oral hypoglycemics and tailor regimens to the needs of individual patients. They teach patients how to use their medications properly and inform them about common problems of storage, timing, and techniques of administering insulin. This contributes to reducing medication errors and improving adherence, thus improving glycemic control (Alhabib et al., 2016).

In complication management, they prescribe and monitor medications for associated conditions, for example antihypertensives for cardiovascular risk, statins for dyslipidemia, and anticoagulants for thrombotic events. Their involvement is crucial in polypharmacy management because diabetics are commonly found on multiple concomitant medications. This is a risk factor for drug-drug interactions and adverse event occurrence. They work very closely together with physicians and nurses for adaption of treatment medications according to individual clinical response and lab tests for the best therapeutic outcome (Brewster et al., 2020).

Community pharmacies provide convenient pickup points for healthcare service delivery, facilitate ADS prescription and regular check-ups, and screen for diabetic complications such as hypertension and diabetic neuropathy. Their importance is significantly felt in making healthcare accesible to patients and therefore bridging the gap between them and the healthcare systems, particularly in the underserved areas, using this form of n expertise in improving access to quality health care (Brewster, 2023).

**The Role of Radiology in Identifying Diabetes Complications**

Modern imaging technologies such as radiology have enabled the clear and very detailed insights into disease progression, which will improve early detection and interventions against complications of diabetes. Radiologists team professionals in determining and monitoring conditions such as diabetic retinopathy, cardiovascular disease, which could undergo screening and monitoring for diabetic foot ulcers as a means of timely necessary intervention (Mourad et al., 2023).

With the imaging modalities like optical coherence tomography (OCT) and fluorescein angiography, fine and detailed views of retinal structures and vascular abnormalities can be obtained in patients suffering from diabetic retinopathy. Such imaging modalities allow microvascular changes to be detected early and guide therapeutic decisions, e.g., laser therapy or intravitreal injections, to avert vision loss. Just as with other types of cardiac imaging, echocardiography, coronary computed tomography angiography, and magnetic resonance imaging are part of the assessment of cardiovascular complications (Abraham et al., 2024).

In diabetic foot management, X-ray, MRI, and ultrasound studies will be used for infection, osteomyelitis, or vascular insufficiency assessments. Radiologists contribute to the decision-making in surgical intervention, wound management, which will include vascular interventions and thus prevent amputations (Mponponsuo et al., 2021).

Moreover, radiology assists in the management of diabetic nephropathy, where ultrasound imaging is done for assessing the size, structure, and blood flow to the kidney to provide early diagnosis regarding renal impairment. This highlights that Modern imaging technologies such as radiology have enabled the clear and very detailed insights into disease progression, which will improve early detection and interventions against complications of diabetes. Radiologists team professionals in determining and monitoring conditions such as diabetic retinopathy, cardiovascular disease, which could undergo screening and monitoring for diabetic foot ulcers as a means of timely necessary intervention (Mourad et al., 2023).

**The Role of Physiotherapy in Managing Diabetes Complications**

Physiotherapy is frequently overlooked yet stills an important component in the management of diabetes, especially when it comes to addressing mobility and physical functioning complications. The exercise program designed and implemented by a physiotherapist becomes a major pathway towards improving glycemic control, cardiovascular benefits, and overall physical fitness (Sheraz et al., 2024).

However, diabetes management would be incomplete without an exercise program, and physiotherapists ensure that patients will gain maximum advantage from safe and effective activities. Assessing fitness levels against a background of comorbidity and activity restriction due to complications such as joint pain or neuropathy enables exercise-planning for the inclusion of low-impact exercises. Such exercises may include swimming or cycling for patients with peripheral neuropathy who are at increased risk for exercising injury (Proctor, 2023).

Physiotherapists further participate actively in the management of diabetic foot complications by gait training, balance exercises, fall prevention measures, and improving mobility for individuals with diabetes. Rehabilitation services, including component training, integrate rehabilitation of diabetic amputees into improved living standards and qualifications for diabetes management (JahantighAkbari et al., 2020).

Physiotherapists prescribe monitored exercise sessions and education on life changes in the cardiac rehabilitation program delivered by patients displaying cardiovascular complications. As such, it is possible to enhance cardiovascular endurance, stress reduction, and therapy adherence. In addition to targeted therapies for restoring motion and reducing pain, physiotherapists also treat associated musculoskeletal problems, such as frozen shoulder, which is more prevalent in diabetic persons (Walke&Telang, 2022). Through incorporating physical activity into diabetes management, physiotherapists alleviate complications and allow patients to participate actively in improving health.

**The Role of Public Health Teams in Diabetes Prevention and Management**

The public health teams concern themselves with the population by addressing diabetes through prevention, early detection, and education to minimize its burden. These efforts are particularly helpful in minimizing complication risks through the promotion of health literacy and environments conducive to healthy lifestyles. (Miller-Rosales & Rodriguez, 2021).

To improve the overall health of the public, the public health initiatives focus on poor diet, physical inactivity, and obesity, risk factors through which diabetes develops and progresses. Healthy eating, regular exercise, and smoking cessation campaigns reduce the incidence of adult-onset diabetes and its complications. The public health teams work in conjunction with community organizations, schools, and workplaces to create and implement behavior-change programs and environmental support for healthy living (Mozaffarian, 2016).

Screening programs are a vital aspect of public health in that they allow for early detection of diabetes and its complications. Screening blood glucose, blood pressure, and cholesterol in the community would easily identify at-risk individuals for timely interventions and reduction in the likelihood that they would need serious

complications. Public health actions afford greater access to care within underserved populations by trying to address disparities in healthcare delivery that disproportionately influence low-income and minority communities (Ting et al., 2016).

If at any point you wish to return to important topographical or historical study as a part of your diabetes education, then consider including this also as an idea of demand in the national constitution. There should be provisions in legislation or policy to allow the government to introduce provisions on public diabetes prevention education. This will be a foundation for diagnosis and treatment with policy changes such as sugar taxes, food labeling regulations, increased funding for diabetes research, and much more (Abusaq et al., 2023). The workings of these public health teams extend beyond that of a single patient to the really prevention model of understanding diabetes as a societal challenge with respect to community engagement and prevention care.

**Collaboration Among Disciplines in Diabetes Management**

Effectively managing diabetes complications would require nursing, pharmacy, radiology, physiotherapy, and public health teams to work together. Each of these disciplines is characterized by unique expert input relating to comprehensive patient care. Hence, an example of how integrated care works can involve a nurse observing compliance issues on the part of a patient who would then seek to bring a pharmacist on board to redefine the treatment plan. So too could the findings of the radiologist related to vascular complications help in formulating a rehabilitation protocol for a physiotherapist, with public health teams taking care of larger obstructions to care (Tu et al., 2024).

Interdisciplinary communication ensures cohesion of care plans around the patient. Thus, regular team meetings and co-shared electronic health records become vital as well as joint decision-making activities in coordinating care and consequently reduce the risks of fragmentation in service and improve patient outcomes (Alshehri et al., 2024). Besides this, this multi-knack also promotes patient empowerment through patient-related activities concerning their conditions. Thus, patients are prepared at best for future hospital, medical, social, and physical needs and conditions of diabetes. As a result, they will undergo more comprehensive care and reduced complication effects on their lives (Alshehri et al., 2024).

## CONCLUSION

Diabetes is a long-term illness that can complicate most organ systems and therefore requires a holistic approach for prevention and management of complication. The multidisciplinary strategy- nursing, pharmacy, radiology, physiotherapy, and public health teams- is indispensable in meeting the complex needs of patients. Each profession contributes unique skills to create care plans that embrace the individual's physical to emotional, social, and psychological well-being.

Nurses will help care for and educate patients so that they can learn how to manage and recognize early complications. Pharmacists make sure patients follow safe and effective medication for each individual while limiting the dangers and risks associated with the use of these drugs. Radiologists are also essential contributors; they provide advanced imaging-good early detection and monitoring of complications such as retinopathy, heart diseases, and diabetic foot conditions. Physiotherapists are active in making mobility possible, designing exercise programs, and facilitating the recovery from some complications like neuropathy or amputations. Public health teams initiate community-based prevention and population health programs for reducing risk factors, improving early detection, and promoting health equity throughout the population.

Collaborative practice between these disciplines integrates, patient-centered integrates and, above all else, meets individual needs. This teamwork optimizes clinical outcomes and improves the quality of life for patients, empowering them to live as actively and confidently as possible with diabetes. An integrated approach brings to the fore the importance of communication, shared decision-making, and coordination in the management of any disease as complex as diabetes. The rising prevalence of diabetes globally provides an increasing impetus to multidisciplinary care. With the combined skills of all the professionals involved, multidisciplinary care has the best opportunity to provide an excellent framework for managing diabetes complication, facilitating optimal disease burden reduction, and improving the well-being of patients overall.

## REFERENCES

1. Abraham, G., Nethaji, P., &Deepesh, A. (2024).Role of Imaging in Managing Diabetic Complications. In Management of Diabetic Complications: Calling for a Team Approach (pp. 87-99). Singapore: Springer Nature Singapore.
2. Abusaq, H. M. A., Al Mutarid, O. A. O., Alyami, M. M. O., Alyami, S. A. S., &Almohamedh, H. S. F. (2023). Empowering Communities Through Health Education: A Critical Evaluation Of Medical Staff's Role In Public Health Awareness. Journal of Survey in Fisheries Sciences, 10(3), 758-764.
3. Aleid, T. A., Alamutairi, A. M. S., AlSuhaymi, D. D. A., Alahmadi, K. H., Alshammari, R. B., Otaif, H. A., ... &Almutairi, G. M. (2022). Understanding The Role Of Nursing Interventions In Managing Diabetes Mellitus Complications. Journal of Namibian Studies: History Politics Culture, 31, 1414-1422.

4. Alenazi, F. S., Alshammari, A. H., Alanazi, A. M., Alotaibi, H. A., Alenazi, T. M., Alanazi, N. S. A., ... &Alharbi, Y. A. A. (2024). The Role of Pharmacists in Improving Treatment Adherence and Patient Outcomes among Diabetic Patients. Journal of International Crisis and Risk Communication Research, 1375-1383.
5. Alhabib, S., Aldraimly, M., &Alfarhan, A. (2016). An evolving role of clinical pharmacists in managing diabetes: Evidence from the literature. Saudi Pharmaceutical Journal, 24(4), 441-446.
6. Alsallum, O. D., Almalki, D. J. H., Softah, A. A., Alhazmi, K. A. A., Alfahad, A. R. Z., Alaibani, Z. A. T., ... &Masmali, U. M. (2022). The Integral Role Of Doctors And Nurses In Diabetes Care: From Diagnosis To Treatment. Journal of Namibian Studies: History Politics Culture, 32, 2127-2138.
7. Alshehri, H. M., Alharbi, M. H., Juharji, H. M., Albishry, M. A., Omairan, A. M., Albeshri, Y. M. A., ... &safarAlqurashi, 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.
8. Andersen, J. D., Jensen, M. H., Vestergaard, P., Jensen, V., Hejlesen, O., &Hangaard, S. (2023). The multidisciplinary team in diagnosing and treatment of patients with diabetes and comorbidities: A scoping review. Journal of multimorbidity and comorbidity, 13, 26335565231165966.
9. Arokiasamy, P., Salvi, S., &Selvamani, Y. (2021).Global burden of diabetes mellitus.In Handbook of global health (pp. 1-44). Cham: Springer International Publishing.
10. Balaji, R., Duraisamy, R., & Kumar, M. P. (2019). Complications of diabetes mellitus: A review. Drug Invention Today, 12(1).
11. Boulton, A. J., Armstrong, D. G., Kirsner, R. S., Attinger, C. E., Lavery, L. A., Lipsky, B. A., ... & Steinberg, J. S. (2018). Diagnosis and management of diabetic foot complications.
12. Brewster, S. (2023). The role of community pharmacy in supporting people with diabetes who have a history of repeated non-attendance at healthcare appointments (Doctoral dissertation, University of Southampton).
13. Brewster, S., Holt, R., Portlock, J., & Price, H. (2020). The role of community pharmacists and their position in the delivery of diabetes care: an update for medical professionals. Postgraduate medical journal, 96(1138), 473-479.
14. Conca, T., Saint-Pierre, C., Herskovic, V., Sepúlveda, M., Capurro, D., Prieto, F., & Fernandez-Llatas, C. (2018). Multidisciplinary collaboration in the treatment of patients with type 2 diabetes in primary care: analysis using process mining. Journal of medical Internet research, 20(4), e8884.
15. DalalNaser, A., Alqurashi, H. A., Aldossri, E. A., Almubrook, A. S., Alamri, A. S., Alanazi, A. S. F., ... &Aldossary, G. S. O. (2024). The Role of Nursing in Diabetes Management: The Impact of Biochemical Markers on Diagnosis, Complications, and Patient Outcomes through Comprehensive Care and Support. Egyptian Journal of Chemistry, 67(13), 1235-1249.
16. Harris-Hayes, M., Schootman, M., Schootman, J. C., & Hastings, M. K. (2020).The role of physical therapists in fighting the type 2 diabetes epidemic. Journal of orthopaedic& sports physical therapy, 50(1), 5-16.
17. Hughes, J. D., Wibowo, Y., Sunderland, B., &Hoti, K. (2017). The role of the pharmacist in the management of type 2 diabetes: current insights and future directions. Integrated Pharmacy Research and Practice, 15-27.
18. JahantighAkbari, N., Hosseinifar, M., Naimi, S. S., Mikaili, S., &Rahbar, S. (2020). The efficacy of physiotherapy interventions in mitigating the symptoms and complications of diabetic peripheral neuropathy: A systematic review. Journal of Diabetes & Metabolic Disorders, 19, 1995-2004.
19. Miller-Rosales, C., & Rodriguez, H. P. (2021). Interdisciplinary primary care team expertise and diabetes care management. The Journal of the American Board of Family Medicine, 34(1), 151-161.
20. Mourad, T., Saad, W., & Ahmed, O. (2023).Interventional Radiology Approaches for Managing Postpancreatic Transplant Complications and Type 1 Diabetes Mellitus. Techniques in Vascular and Interventional Radiology, 26(4), 100927.
21. Mozaffarian, D. (2016). Dietary and policy priorities for cardiovascular disease, diabetes, and obesity: a comprehensive review. Circulation, 133(2), 187-225.
22. Mponponsuo, K., Sibbald, R. G., &Somayaji, R. (2021).A comprehensive review of the pathogenesis, diagnosis, and management of diabetic foot infections. Advances in Skin & Wound Care, 34(11), 574-581.
23. Okorie, C. (2018). The role of nurses as educators in preventing the complications of type 1 diabetes among young patients: A systematic literature review.
24. Proctor, C. (2023). The role of physiotherapists and kinesiologists in physical activity interventions for diabetes management in primary care settings: a modified Delphi study.
25. Sheraz, S., Razzaq, A., & Malik, A. N. (2024).PULMONARY COMPLICATIONS OF DIABETES AND ITS PHYSIOTHERAPY MANAGEMENT. Pakistan Journal of Rehabilitation, 13(2), 17-22.
26. Thomas, L. (2022). The Impact of Using Community Health Workers in Collaboration with Nurse Case Managers in Effecting Change in the Quality of Life for Diabetes Patients.

27. Tillman, L., Tabish, T. A., Kamaly, N., Moss, P., El-Briri, A., Thiemermann, C., ...&Yaqoob, M. M. (2022). Advancements in nanomedicines for the detection and treatment of diabetic kidney disease. Biomaterials and Biosystems, 6, 100047.
28. Ting, D. S. W., Cheung, G. C. M., & Wong, T. Y. (2016). Diabetic retinopathy: global prevalence, major risk factors, screening practices and public health challenges: a review. Clinical & experimental ophthalmology, 44(4), 260-277.
29. Tu, Q., Lin, S., Hyun, K., Hafiz, N., Manandi, D., Koh, A. S., &Redfern, J. (2024). The effects of multidisciplinary collaborative care on cardiovascular risk factors among patients with diabetes in primary care settings: A systematic review and meta-analysis. Primary Care Diabetes.
30. Walke, R., &Telang, A. A. (2022). Strengthening Exercises In Management Of Shoulder Pain In Diabetic Population. Journal of Pharmaceutical Negative Results, 2860-2864.