INTERNATIONAL JOURNAL OF UNANI AND INTEGRATIVE MEDICINE

E-ISSN: 2616-4558
P-ISSN: 2616-454X
www.unanijournal.com
IJUIM 2024; 8(2): 43-49
Impact Factor (RJIF): 6.3
Peer Reviewed Journal
Received: 12-04-2024
Accepted: 18-05-2024

Mohd Masroor Hasan
PG Scholar, Department of Ilmul Advia (Pharmacology), Government Tibbi College and Hospital, Patna, Bihar, India

Khalid Eqbal
Associate Professor, Department of Moalajat (Medicine), Sufia Unani Medical College, Hospital & Research Centre, Motihari, Bihar, India

Corresponding Author:
Mohd Masroor Hasan
PG Scholar, Department of Ilmul Advia (Pharmacology), Government Tibbi College and Hospital, Patna, Bihar, India

Historical background of diabetes and its treatment in Unani medicine

Mohd Masroor Hasan and Khalid Eqbal

DOI: https://doi.org/10.33545/2616454X.2024.v8.i2a.281

Abstract
Diabetes mellitus, a metabolic disorder characterized by elevated blood glucose levels, has been a significant health concern throughout human history. The understanding of this condition and its treatment has evolved over millennia, reflecting advancements in medical knowledge and cultural practices. The historical roots of diabetes can be traced back to ancient civilizations such as Egypt, India, and China, where descriptions of symptoms resembling diabetes were documented. Early medical texts, including the *Ebers Papyrus* and *Sushruta Samhita*, contained references to a condition characterized by excessive urination and sweet-tasting urine, indicative of what we now recognize as diabetes mellitus. In the Greco-Roman era, scholars like Hippocrates and Galen further contributed to the understanding of diabetes, proposing theories about its causes and potential treatments. However, it was not until the 19th and 20th centuries that significant strides were made in unraveling the pathophysiology of diabetes, leading to the discovery of insulin and advancements in modern medical management. Parallel to these developments in mainstream medicine, traditional systems like Unani medicine flourished in the Middle East, South Asia, and other regions. In Unani medicine, diabetes is understood as a disturbance in the balance of bodily humors. Treatment strategies focus on restoring this balance through dietary modifications, herbal remedies, physical therapies, and lifestyle interventions. Key medicinal plants and formulations such as bitter melon (*Momordica charantia*), fenugreek (*Trigonella foenum-graecum*), and cinnamon (*Cinnamomum verum*) have been traditionally used to manage diabetes symptoms in Unani practice. While modern medicine has revolutionized the management of diabetes with insulin therapy, oral medications, and lifestyle interventions, traditional systems like Unani medicine continue to offer valuable insights and complementary approaches to holistic healthcare. Integrating the principles of Unani medicine with contemporary medical practices may provide a more comprehensive and personalized approach to managing diabetes and improving overall health outcomes.

Keywords: Unani medicine, diabetes, historical background, herbal medicine

Introduction
The history of diabetes spans thousands of years, reflecting humanity's evolving understanding of this complex metabolic disorder [1]. Evidence of diabetes mellitus can be traced back to ancient civilizations such as Egypt, India, and China, where descriptions of its symptoms were documented in medical texts [2]. In ancient Egypt (circa 1550 BCE), the Ebers Papyrus described a condition characterized by excessive urination and sweet-tasting urine, symptoms consistent with diabetes mellitus [3] Similarly, the Indian medical treatise *Sushruta Samhita* (circa 600 BCE) identified a disease called "*madhumeha*", which translates to "honey urine," indicating high blood sugar levels and glucosuria [4]. Greek and Roman scholars further contributed to early understandings of diabetes [5] Hippocrates (circa 400 BCE) referred to a condition known as 'diabetes,' derived from the Greek word for "siphon," due to the excessive urination associated with the disease [6] Galen (circa 200 CE) proposed theories about the role of the kidneys in diabetes and recommended dietary restrictions to manage its symptoms [7]. Throughout the Middle Ages and into the Renaissance, diabetes continued to be recognized and documented, albeit with varying understandings of its causes and treatments [8]. Arabic scholars such as Avicenna (Ibn Sina) contributed to the medical literature with their observations and treatments for diabetes [9]. The modern era of diabetes research began in the 19th century with the groundbreaking work of Claude Bernard, who demonstrated the role of the liver in glucose metabolism [10]. In the early 20th century, the landmark discovery of insulin by Frederick Banting, Charles Best, and others revolutionized the treatment of diabetes, providing a life-saving therapy for individuals with type 1 diabetes [11].

Since then, advancements in medical science have led to a deeper understanding of diabetes pathophysiology, classification, and management [12]. Today, diabetes mellitus is recognized as a complex metabolic disorder with multiple etiological factors, including genetic predisposition, lifestyle factors, and environmental influences [13]. Contemporary approaches to diabetes management encompass a range of interventions, including insulin therapy, oral medications, dietary modifications, physical activity, and lifestyle counseling. Moreover, ongoing research continues to explore novel therapies, preventive strategies, and personalized approaches to diabetes care [14]. In summary, the history of diabetes reflects humanity's enduring quest to understand and effectively manage this prevalent and challenging medical condition. From ancient descriptions of its symptoms to modern scientific breakthroughs, the journey of diabetes research and treatment underscores the remarkable progress achieved in the field of medicine [15].

History of Ancient Period of diabetes

The history of diabetes stretches back thousands of years, with evidence of the disease appearing in ancient civilizations. Indeed, the history of diabetes is extensive, spanning thousands of years and leaving traces in the medical records and artifacts of ancient civilizations [16]. While the term 'diabetes' itself emerged much later, the symptoms and characteristics of the condition have been recognized throughout history. Ancient civilizations such as the Egyptians, Greeks, and Romans documented cases of what we now know as diabetes [17]. The Ebers Papyrus, an ancient Egyptian medical text dating back to around 1550 BCE, contains descriptions of a condition characterized by frequent urination and sweet-tasting urine, symptoms indicative of diabetes. In ancient Greece, physicians such as Hippocrates and later Galen described a similar condition known as 'diabetes,' meaning 'siphon' in Greek, reflecting the excessive urination associated with the disease [18]. Galen, a prominent Roman physician, further categorized diabetes into two types based on the sweetness of the urine. Throughout the Middle Ages, medical knowledge about diabetes continued to evolve, albeit slowly. Physicians like Avicenna in the Islamic Golden Age and later Paracelsus in Europe contributed to the understanding of diabetes as a distinct medical condition. Paracelsus, for instance, coined the term 'diabetes mellitus' in the 16th century to distinguish it from diabetes insipidus. However, it wasn't until the 19th and 20th centuries that significant advancements in the understanding and treatment of diabetes occurred [19]. The discovery of insulin by Frederick Banting and Charles Best in 1921 revolutionized the management of diabetes, transforming it from a fatal disease to a chronic but manageable condition. Today, diabetes remains a global health challenge, with millions of people affected worldwide. However, thanks to ongoing research, improved diagnostic tools, and advancements in treatment options, individuals with diabetes can lead fulfilling lives with proper management and care. The rich history of diabetes serves as a testament to the enduring quest for knowledge and understanding of this complex condition throughout the ages. By learning from the past and building upon centuries of medical insight, we continue to strive towards better prevention, diagnosis, and treatment of diabetes for generations to come [20].

Ancient Egypt (1550 BCE-300 BCE): The earliest known reference to diabetes comes from ancient Egyptian manuscripts dating back to around 1500 BCE. These texts describe a condition resembling diabetes and suggest treatments involving a mixture of bones, wheat, and water to be consumed by the patient [21].

Ancient Greece (800 BCE-146 BCE): The Greek physician Aretaeus of Cappadocia, around the first century CE, described a condition characterized by excessive urination (polyuria) and sweet-tasting urine (glycosuria), which resembled diabetes. He named this condition 'diabetes' after the Greek word for 'siphon' or 'to pass through,' reflecting the characteristic symptom of frequent urination [22].

Ancient India (around 600 BCE-1000 CE): Ayurvedic texts from ancient India also make references to a condition resembling diabetes. They describe it as '*Madhumeha*,' which translates to 'honey urine,' indicating the presence of sugar in the urine [23].

Ancient China (around 200 BCE-220 CE): Chinese medical texts from ancient times mention a condition similar to diabetes [24]. Traditional Chinese medicine identified symptoms such as excessive thirst and urination and prescribed treatments using herbal remedies. Throughout the ancient period, treatments for diabetes were primarily herbal remedies, dietary restrictions, and lifestyle modifications [25]. However, the understanding of the disease was limited, and the effectiveness of treatments varied. It wasn't until much later, with advancements in medical science and technology, that the mechanisms underlying diabetes and effective treatments were better understood.

History of medieval period of diabetes

During the medieval period, which spanned roughly from the 5th to the 15th century in Europe, the understanding of diabetes was quite limited compared to contemporary knowledge [26]. The term 'diabetes' itself comes from the Greek word meaning "siphon," reflecting the frequent urination characteristic of the condition. Medical knowledge during this time was heavily influenced by ancient Greek and Roman texts, primarily those of Galen and Hippocrates [27]. Galen, a prominent Roman physician, described diabetes as a condition characterized by excessive urination and sweet-tasting urine. He believed that diabetes resulted from the kidneys' inability to retain fluids, causing excessive urination.

Treatments during the medieval period were often based on Galenic principles, which focused on balancing the body's humors (blood, phlegm, black bile, and yellow bile). However, these treatments were largely ineffective in managing diabetes [28].

People with diabetes during the medieval period likely faced significant challenges due to the lack of effective treatments and understanding of the condition. Without modern methods of insulin therapy or blood sugar monitoring, managing diabetes would have been extremely difficult, if not impossible [29]. Furthermore, the stigma associated with chronic illnesses in medieval society may have added to the challenges faced by individuals with diabetes. They may have been viewed as having a weakness or moral failing,

rather than a medical condition. Overall, the medieval period was characterized by limited understanding and ineffective treatments for diabetes. It wasn't until much later, with significant advancements in medical science and technology that effective treatments for diabetes began to emerge.

Diabetes is a disease of the kidney

Paracelsus, a renowned Swiss-German physician and alchemist who lived during the Renaissance period, significantly contributed to the field of medicine with his revolutionary ideas and approaches [30]. While Paracelsus made significant advancements in medical understanding and treatment, his contributions to the understanding of diabetes did not specifically involve identifying it as a disease of the kidney [31]. Paracelsus challenged many prevailing medical theories of his time, advocating for empirical observation and experimentation rather than relying solely on ancient texts. He emphasized the importance of understanding the body's internal balance and the concept of "alteration" in disease, suggesting that illnesses were caused by imbalances in the body's internal environment rather than external factors alone [32]. While Paracelsus did not have access to modern diagnostic tools and knowledge about diabetes, it's unlikely that he specifically associated it with kidney disease. During his time, diabetes was often described as a condition characterized by excessive urination and sweet-tasting urine, but the understanding of its underlying mechanisms was limited [33]. Paracelsus's focus on the internal environment and balance in the body may have laid some groundwork for later advancements in understanding metabolic disorders like diabetes, but he did not provide detailed insights into the specific relationship between diabetes and kidney disease [34]. It wasn't until much later, with advancements in medical science and technology, that the association between diabetes and kidney disease became better understood. Today, we recognize diabetes as a metabolic disorder primarily affecting insulin production or utilization, which can lead to complications such as diabetic nephropathy, a form of kidney disease [35].

Diagnostic Period of Diabetes

Thomas Willis, an English physician and anatomist who lived during the 17th century, made significant contributions to medical science. One of his notable contributions to the understanding of diabetes was the addition of the term 'mellitus' to the name of the condition [36]. In 1675, Willis published a work titled "*Pharmaceutice Rationalis*," in which he coined the term 'diabetes mellitus.' [37]. The term "diabetes" had been used for centuries to describe a condition characterized by excessive urination and sweet-tasting urine [37]. However, Willis added "mellitus," derived from the Latin word for "honey," to distinguish diabetes mellitus from diabetes insipidus, another condition characterized by excessive urination but without the presence of sugar in the urine [38]. Willis's addition of 'mellitus' highlighted the distinguishing feature of diabetes mellitus the presence of sugar in the urine, which gave it a sweet taste. This distinction was crucial for differentiating between the two types of diabetes and laid the foundation for further understanding and research into the condition. As for the diagnostic period of diabetes, Willis's contribution occurred during a time when medical knowledge and understanding were advancing, but diagnostic methods were still limited [38]. Diagnosis of diabetes during this period primarily relied on the observation of symptoms such as excessive thirst, frequent urination, and sweet-tasting urine [39]. Willis's introduction of the term 'diabetes mellitus' provided a standardized nomenclature that helped in the identification and classification of the condition, laying the groundwork for further advancements in diagnosis and treatment in the centuries that followed [40].

Diabetes a disease of pancreas

Thomas Cawley, an English surgeon and anatomist, made significant contributions to medical knowledge during the late 18th century [41]. While Cawley did not specifically associate diabetes with the pancreas in 1788, his work contributed to the understanding of the pancreas's role in digestion and its potential relevance to diabetes. During Cawley's time, there was growing interest in understanding the functions of various organs in the body, including the pancreas [42]. However, the specific link between the pancreas and diabetes had not yet been established. Diabetes was primarily characterized by symptoms such as excessive thirst, frequent urination, and sweet-tasting urine, but its underlying mechanisms were not fully understood [43]. It wasn't until the 19th century that researchers began to explore the relationship between the pancreas and diabetes more closely. One of the key figures in this regard was Paul Langerhans, a German pathologist who, in 1869, discovered clusters of cells within the pancreas that would later be named 'islets of Langerhans.' These islets contain different types of cells, including beta cells, which produce insulin [44].

Subsequent research in the late 19th and early 20th centuries, including the work of scientists such as Eugene Opie and Israel Kleiner, provided further insights into the role of the pancreas in diabetes [45]. Opie's studies in the early 20th century demonstrated changes in the pancreas of individuals with diabetes, particularly the loss of beta cells in the islets of Langerhans [46]. The culmination of these discoveries led to the landmark discovery of insulin by Frederick Banting and Charles Best in 1921, which revolutionized the treatment of diabetes. This discovery firmly established the pancreas's role in diabetes, specifically in the context of insulin production and regulation of blood sugar levels [47]. While Thomas Cawley's contributions to medical knowledge were significant, his work did not directly link diabetes to the pancreas. However, his contemporaries and subsequent researchers built upon his contributions to gradually unravel the complex relationship between the pancreas and diabetes, leading to significant advancements in understanding and treatment over time [48].

Diabetes and Insulin Era

The era of diabetes and insulin marks a transformative period in medical history, particularly in the treatment of diabetes mellitus[49].

Discovery of Insulin

The breakthrough moment came in 1921 when Frederick Banting and Charles Best, Canadian researchers, discovered insulin at the University of Toronto. They were able to extract and purify insulin from the pancreas of dogs, demonstrating its ability to lower blood sugar levels in

diabetic animals. This discovery laid the foundation for the effective treatment of diabetes [50].

Clinical Use of Insulin

Following the discovery, insulin was quickly put into clinical use. The first successful human trial of insulin occurred in 1922 on a 14 year-old boy named Leonard Thompson, who was near death due to diabetes. The injection of insulin dramatically improved his condition, saving his life [51].

Manufacture and Distribution: Eli Lilly and Company began large-scale production of insulin in 1923, making it more widely available. This marked the beginning of insulin therapy for people with diabetes worldwide [52].

Evolution of Insulin Therapy

Over the decades, insulin therapy evolved with the development of different types of insulin, including rapid-acting, short-acting, intermediate-acting, and long-acting formulations. These advancements allowed for better control of blood sugar levels and increased flexibility in diabetes management [53].

Research and Innovation

The understanding of diabetes and insulin continued to advance with ongoing research. Scientists discovered insulin receptors on cells and elucidated the complex mechanisms of insulin signaling and glucose metabolism. This knowledge has led to further developments in insulin therapy and adjunctive treatments for diabetes [54].

Improvements in Delivery Methods

Insulin delivery methods have also evolved, from early glass syringes to modern insulin pens, pumps, and continuous glucose monitoring systems. These innovations have improved the convenience, accuracy, and comfort of insulin administration for people with diabetes [55].

Challenges and Future Directions

Despite the significant progress made in diabetes management, challenges remain, including the need for better insulin formulations, affordability and accessibility of insulin, and the development of treatments to address the underlying causes of diabetes. Research continues to explore new therapeutic approaches, including gene therapy, stem cell therapy, and artificial pancreas systems. Overall, the era of diabetes and insulin represents a monumental advancement in medicine, transforming diabetes from a life-threatening condition to a manageable chronic illness for millions of people worldwide [56, 57].

Concept of diabetes in Unani Medicine

Unani medicine, also known as Greco-Arabic medicine, is a traditional system of medicine that has its roots in ancient Greek and Roman medical traditions, as well as the medical knowledge of ancient Persia, India, and other civilizations [58]. In Unani medicine, diabetes is known as "*Ziabetes*" or "*Ziabitus*," and it is considered a chronic metabolic disorder characterized by elevated blood sugar levels. In Unani medicine, diabetes is believed to arise from an imbalance in the body's humors (blood, phlegm, yellow bile, and black bile) or "*Akhlāt*" (body fluids) [59, 60]. According to Unani principles, *Ziabetes* is primarily caused by an imbalance in the humors, leading to dysfunction in the organs involved in glucose metabolism, particularly the liver, pancreas, and kidneys [61, 62]. Unani physicians diagnose *Ziabetes* based on clinical symptoms, including excessive thirst (polydipsia), frequent urination (polyuria), increased appetite (polyphagia), and weight loss [63, 64]. They also consider other associated symptoms such as fatigue, blurred vision, slow wound healing, and recurrent infections. Treatment in Unani medicine aims to restore the balance of humors in the body and improve the function of organs involved in glucose metabolism. This may involve dietary modifications, lifestyle changes, herbal remedies, physical activity, and procedures such as cupping therapy (*Hijama*) or bloodletting (*Fasd*) [65]. Herbal medicines used in Unani practice to manage *Ziabetes* may include bitter melon (*Momordica charantia*), fenugreek (*Trigonella foenum-graecum*), cinnamon (*Cinnamomum verum*), and others believed to have antidiabetic properties. Unani medicine also emphasizes the importance of preventive measures to manage *Ziabetes* and its complications [66, 67, 68]. These may include dietary guidelines, exercise regimens, stress management techniques, and regular monitoring of blood sugar levels. While Unani medicine offers a holistic approach to managing *Ziabetes*, it's essential to note that its effectiveness may vary, and it's important for individuals with diabetes to consult qualified healthcare professionals for comprehensive management and treatment, including modern medical interventions such as insulin therapy, oral medications, and regular monitoring. Integrative approaches that combine Unani principles with evidence-based modern medicine may offer additional options for managing diabetes effectively.

Conclusion

The historical background of diabetes and its treatment in Unani medicine provides valuable insights into ancient medical traditions and their approach to managing this chronic metabolic disorder. Dating back to ancient Greek and Roman civilizations, Unani medicine incorporates principles of balancing the body's humors and restoring equilibrium to promote health and well-being. In Unani medicine, diabetes, known as *Ziabetes* or *Ziabitus*, is understood as a condition resulting from an imbalance in the body's humors, leading to dysfunction in organs involved in glucose metabolism. Diagnosis is based on clinical symptoms, and treatment aims to restore balance through dietary modifications, lifestyle changes, herbal remedies, and therapeutic procedures. Herbal medicines play a significant role in Unani treatment for diabetes, with various plant-based remedies believed to possess antidiabetic properties. These include bitter melon, fenugreek, cinnamon, and others, which are used to help manage blood sugar levels and alleviate associated symptoms. While Unani medicine offers a holistic approach to managing diabetes, it is essential to recognize that its effectiveness may vary, and modern medical interventions such as insulin therapy and oral medications remain crucial for comprehensive management. Integrative approaches that combine Unani principles with evidence-based modern medicine may offer promising avenues for optimizing diabetes care and improving patient outcomes. Overall, the historical background of diabetes and its treatment in Unani medicine underscores the rich diversity of medical traditions

and the ongoing quest to understand and address this complex condition throughout the ages. By drawing upon the wisdom of ancient healing practices and integrating them with modern scientific knowledge, we can strive to provide more holistic and personalized care for individuals living with diabetes today.

Author contributions
The authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Funding: Nil

Conflict of interest: Nil

References

1. Ahmed AM. History of *diabetes mellitus*. Saudi Medical Journal. 2002 Apr;23(4):373-8.
2. Eknoyan G. A history of *diabetes mellitus:* A disease of the kidneys that became a kidney disease. Journal of Nephrology. 2006 May-Jun;19 Suppl 10: S89-S93.
3. Eknoyan G, Nagy J. A history of *diabetes mellitus* or how a disease of the kidneys evolved into a kidney disease. Advances in Chronic Kidney Disease. 2005 Apr;12(2):223-9.
4. Karamanou M, Protogerou A, Tsoucalas G, Androutsos G, Rebelakou PE. Milestones in the history of *diabetes mellitus*: The main contributors. World Journal of Diabetes. 2016 Jan 10;7(1):1-7.
5. March CA, Libman IM, Becker DJ, Levitsky LL. From Antiquity to Modern Times: A History of *Diabetes Mellitus* and Its Treatments. Hormone Research in Paediatrics. 2022;95(6):593-607.
6. King KM, Rubin G. A history of *diabetes*: From antiquity to discovering insulin. British Journal of Nursing. 2003 Oct 9-22;12(18):1091-5.
7. Lakhtakia R. The history of *diabetes mellitus*. Sultan Qaboos University Medical Journal. 2013 Aug;13(3):368-70.
8. Dukan E, Milne I. History of *diabetes*. Journal of the Royal College of Physicians of Edinburgh. 2011 Dec;41(4):376-7.
9. Sina I. Al Qanoon Fil Tib. (Urdu translation by Kantoori GH). Vol. II. New Delhi: Idara Kitabul Shifa, 1031-33,353-54; c2007.
10. Pyke DA. Claude Bernard et l'étiologie du *diabète* [Claude Bernard and the Etiology of *diabetes*]. Journal Annuel Diabetologie Hotel Dieu; c1981, 153-61.
11. Barszczewski K, Karaś R, Biadasiewicz M, Kulik H, Lepich T. Sir Frederick Grant Banting - the discoverer of insulin. On the 100th anniversary on the Nobel Prize. Przeglad Epidemiologiczny. 2023;77(1):108-118.
12. Gupta S, Sharma N, Arora S, Verma S. *Diabetes*: a review of its pathophysiology, and advanced methods of mitigation. Current Medical Research and Opinion. 2024 May;40(5):773-780.
13. Banday MZ, Sameer AS, Nissar S. Pathophysiology of *diabetes*: An overview. Avicenna Journal of Medicine. 2020 Oct 13;10(4):174-188.
14. Lebovitz HE. Diagnosis, classification, and pathogenesis of *diabetes mellitus*. Journal of Clinical Psychiatry. 2001;62 Suppl 27:5-9; discussion 40-1.
15. Noor S, Zubair M, Ahmad J. Diabetic foot ulcer: A review on pathophysiology, classification and microbial etiology. Diabetes and Metabolic Syndrome. 2015 Jul-Sep;9(3):192-9.
16. Mohan V, Bhavadharini B, Mukhopadhyay S, Nallaperumal S, Tiwaskar M, Anjana RM, Unnikrishnan R. *Diabetes* in Pre-independence India: Rediscovering a Forgotten Era. Journal of the Association of Physicians of India. 2021 Aug;69(8):11-12.
17. Sapra A, Bhandari P. *Diabetes*. 2023 Jun 21. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. PMID: 31855345.
18. Hallmann-Mikołajczak A. Papirus Ebersa. Ksiega wiedzy medycznej egipcjan z XVI w P.N.E [Ebers Papyrus. The book of medical knowledge of the 16th century B.C. Egyptians]. Archiwum Historii i Filozofii Medycyny. 2004;67(1):5-14.
19. Fleifel M, Fleifel B, El Alam A. *Diabetes Mellitus* across the Arabo-Islamic World: A Revolution. International Journal of Endocrinology. 2023;2023:5541808.
20. Barszczewski K, Karaś R, Biadasiewicz M, Kulik H, Lepich T. Sir Frederick Grant Banting - the discoverer of insulin. On the 100th anniversary on the Nobel Prize. Przeglad Epidemiologiczny. 2023;77(1):108-118.
21. Guaraldi F, Pasquali R. *Diabetes*: From Ancient Egypt to the 18th Century. Journal of the Association of Physicians of India. 2015 Mar;63(3):128.
22. Rajasekharan S, Raju GS. Certain concepts of "prameha" (*diabetes*) in ayurveda (Indian system of medicine) with special reference to the relationship between ancient Indian and modern thoughts. Ancient Science of Life. 1982 Jul;2(1):17-22.
23. Tong XL, Dong L, Chen L, Zhen Z. Treatment of *diabetes* using traditional Chinese medicine: past, present and future. American Journal of Chinese Medicine. 2012;40(5):877-86.
24. Hu J, Gruber KJ, Liu H, Zhao H, Garcia AA. *Diabetes* knowledge among older adults with *diabetes* in Beijing, China. Journal of Clinical Nursing. 2013 Jan;22(1-2):51-60.
25. Zarshenas MM, Khademian S, Moein M. *Diabetes* and related remedies in medieval Persian medicine. Indian Journal of Endocrinology and Metabolism. 2014;18(2):142-149.
26. Kosaka K. History of medicine and changes in concept of *diabetes mellitus* in Japan. Diabetes Research and Clinical Practice. 1994 Oct;24 Suppl.
27. Henschen F. On the term *diabetes* in the works of Aretaeus and Galen. Medical History. 1969 Apr;13(2):190-2.
28. de Souza AL. Metformin: From medieval age to new therapeutic targets. International Journal of Diabetes in Developing Countries. 2008;28(1):31.
29. Bergmann A, Schulze J. *Diabetes*: Von der Diät zur Pharmakotherapie und Disease-Management [*Diabetes*: from dietary strategies to pharmacotherapy and disease management]. Zeitschrift für ärztliche Fortbildung und Qualitätssicherung. 2004 Feb;98(1):43-5.
30. Menendez JA, Piné QR, Gallego RE, Cufí S, Faja B, Cuyàs CE, *et al*. Oncobiguanides: Paracelsus' law and

nonconventional routes for administering diabetobiguanides for cancer treatment. Oncotarget. 2014 May 15;5(9):2344-8.
31. Patsch W, Stadlmayr A, Aigner E, Datz C. Relations of vitamin D status, gender and *type 2 diabetes* in middle-aged Caucasians: reply to Dr. Guo. Acta Diabetologica. 2016 Feb;53(1):127-8.
32. Triggle CR, Mohammed I, Bshesh K, Marei I, Ye K, Ding H, *et al*. Metformin: Is it a drug for all reasons and diseases? Metabolism. 2022 Aug;133:155223.
33. Cameron JS. The discovery of diabetic nephropathy: from small print to centre stage. Journal of Nephrology. 2006 May-Jun;19 Suppl 10: S102-S105.
34. Akhtar M, Taha NM, Nauman A, Mujeeb IB, Al-Nabet ADMH. Diabetic Kidney Disease: Past and Present. Advances in Anatomic Pathology. 2020 Mar;27(2):87-97.
35. Allan FN. The writings of Thomas Willis, M.D.; *diabetes* three hundred years ago. Diabetes. 1953 Jan-Feb;2(1):74-7.
36. Dall'Olio G, Dorizzi RM. Diagnosis of *diabetes mellitus* at the hospital of Venice in 1863. Clinica Chimica Acta. 2000 Jul;297(1-2):17-27.
37. Valenti G, Tamma G. History of *Diabetes Insipidus*. Giornale Italiano di Nefrologia. 2016 Feb;33 Suppl 66:33.S66.1.
38. Kuzina IA, Goncharova EV, Martirosian NS, Telnova ME, Nedosugova LV, Tulsky AA, Petunina NA. [Historical aspects of diagnosis and control of *diabetes mellitus*]. Terapevticheskii Arkhiv. 2022 Nov 22;94(10):1216-1220.
39. Katon W. Depression and *diabetes*: unhealthy bedfellows. Depression and Anxiety. 2010;27(4):323-326.
40. Stylianou C, Kelnar C. The introduction of successful treatment of *diabetes mellitus* with insulin. Journal of the Royal Society of Medicine. 2009;102(7):298-303.
41. Cawley T. A Singular Case of *Diabetes*, Consisting Entirely in the Quality of the Urine; with an Inquiry into the Different Theories of That Disease. London Medical Journal. 1788;9(Pt 3):286-308.
42. Yagihashi S. Advances in pathology of *diabetes* from pancreatic islets to neuropathy: A tribute to Paul Langerhans. Pathology International. 2015 Apr;65(4):157-69.
43. Domínguez RM. Historical background of pancreatic islet isolation. Advances in Experimental Medicine and Biology. 2016;938:1-9.
44. Hilgenfeld R, Seipke G, Berchtold H, Owens DR. The evolution of insulin glargine and its continuing contribution to *diabetes* care. Drugs. 2014;74(8):911-927.
45. Gerstein HC, Rutty CJ. Insulin Therapy: The Discovery That Shaped a Century. Canadian Journal of Diabetes. 2021 Dec;45(8):798-803.
46. Rosenfeld L. Insulin: discovery and controversy. Clinical Chemistry. 2002 Dec;48(12):2270-88.
47. Karamitsos DT. The story of insulin discovery. Diabetes Research and Clinical Practice. 2011 Aug;93 Suppl 1.
48. Kudva YC, Nair KS. *Diabetes Mellitus*: A Perspective on the Post-Insulin Era. Mayo Clinic Proceedings. 2020 Jan;95(1):15-21.
49. Diem P. Die Entdeckung des Insulins [The Discovery of Insulin]. Therapeutische Umschau. 2020 Sep;77(7):289-296.
50. Aschner P. Insulin Therapy in *Type 2 Diabetes*. American Journal of Therapeutics. 2020 Jan/Feb;27(1).
51. Lewis GF, Brubaker PL. The discovery of insulin revisited: Lessons for the modern era. Journal of Clinical Investigation. 2021 Jan 4;131(1).
52. Home P. The evolution of insulin therapy. Diabetes Research and Clinical Practice. 2021 May;175:108816.
53. Kalra S. Advances in insulin therapy. Journal of the Pakistan Medical Association. 2013 Jul;63(7):925-7.
54. Kennedy FP. Recent developments in insulin delivery techniques. Current status and future potential. Drugs. 1991 Aug;42(2):213-27.
55. Chatterjee S, Davies MJ. Current management of *diabetes mellitus* and future directions in care. Postgraduate Medical Journal. 2015 Nov;91(1081):612-21.
56. Ansari MA, Chauhan W, Shoaib S, Alyahya SA, Ali M, Ashraf H, *et al*. Emerging therapeutic options in the management of *diabetes*: Recent trends, challenges and future directions. International Journal of Obesity (London). 2023 Dec;47(12):1179-1199.
57. Eqbal K, Alam MA, Quamri MA, Sofi G, Bhat AMD. Efficacy of Qurs-e-Gulnar in Ziabetus (*type 2 Diabetes Mellitus*): A single blind randomized controlled trial. Journal of Complementary and Integrative Medicine. 2021 Mar 15;18(1):147-53.
58. Ibne Sina. Al Qanoon Fit Tib (Arabic). 1st Ed. Vol. III, Part 2. New Delhi: Jamia Hamdard, 263-64, 783-85, 1408Hijri.
59. Khan MA. Haziq. New Delhi: Jasem Book Depot, 387-90; c1983.
60. Majoosi AA. Kamilus Sana'ah, (Urdu translation by Kantoori GH). 1st Ed. New Delhi: Idara Kitabus Shifa, 154,467,472,527; c2010.
61. Jurjani AHI. Zakhira Khawarzam Shahi (Urdu translation by Khan HH) Vol. II, Part 6. New Delhi: Idara Kitabul Shifa, 540-41; c1996.
62. Ibne Zohar. Kitabut Taiseer (Urdu translation by CCRUM). New Delhi: CCRUM, 160-63,1986.
63. Ibne Hubal B. Kitabul Mukhtarat Fil Tib (Urdu translation by CCRUM). Vol. III. New Delhi: CCRUM, 326-8, 2005.
64. Alam A, Siddiqui MA, Quamri A, Fatima S, Roqaiya M, Ahmad Z. Efficacy of Spirulina (Tahlab) in patients of *type 2 diabetes mellitus* (Ziabetus Shakri): A randomized controlled trial. Journal of Diabetes and Metabolism. 2016 Oct 1;7(10):1-5.
65. Quamri MA, Begum S, Siddiqui MA, Alam MA. Efficacy of Kanduri (*Coccinia indica*) in *diabetes* associated dyslipidemia-A randomized single blind standard controlled study. Age (Mean±SD). 2017;43(7.845):44-9.
66. Alam MA, Haider N, Ahmed S, Alam MT, Azeez A, Perveen A. Tahlab (Spirulina) and few other medicinal plants having anti-oxidant & immunomodulatory properties described in Unani medicine-a review. International Journal of Pharmaceutical Sciences and Research. 2013 Nov 1;4(11):4158.

67. Nizamdeen FN, Quamri MA, Anzar Alam M. Efficacy of Habb-e-Asab in *diabetic peripheral neuropathy*: a randomized placebo control study. Journal of Basic and Clinical Physiology and Pharmacology. 2023 Nov 30;34(6):735-44.
68. Anzar MA. Drugs indicated for the management of ziabetus shakri (*diabetes mellitus*) in Unani medicine-An overview. International Journal of Pharmamedix India. 2013;1(3):460-74.

How to Cite This Article
Hasan MM, Eqbal K. Historical background of diabetes and its treatment in Unani medicine. International Journal of Unani and Integrative Medicine 2024;8(2):43-49.