INVESTIGATING THE BENEFITS OF 5G TO LEVERAGE THE DIGITAL TRANSFORMATION IN HEALTHCARE: A SYSTEMATIC REVIEW ON PERSONALIZED DIABETES SELF-MANAGEMENT

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This systematic literature review explores the innovative potential of 5G technology in global healthcare, focusing on personalized diabetes self-management. The COVID-19 pandemic increased the adoption of digital solutions related to health, creating new opportunities. This review examines the role of 5G technology in overcoming the specific challenges associated with diabetes self-care, emphasizing its vital features, such as low latency and high reliability, enabling real-time data transmission and remote monitoring for improving patient care. Adhering to PRISMA guidelines, it synthesizes findings from reliable databases, exploring 5G's diverse influence. Key research questions include its contribution to healthcare digital transformation, SWOT analysis in diabetes management, challenges in various diabetes types, and its role in designing digital solutions. Findings reveal significant advancements, such as increased data transmission speeds, supporting real-time remote patient monitoring and telemedicine. A proposed framework guides digital solution development, highlighting future research areas and implementation challenges, emphasizing the need to fully employ 5G's potential features in healthcare.

Keywords:
5G Technology, digital transformation, healthcare, personalized diabetes self-management, systematic literature review

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1 Introduction

The emergence of 5th Generation (5G) technology signifies a new phase in healthcare, providing unique opportunities for digital transformation and personalized medicine. This transformation has been improved by the COVID-19 pandemic, which has highlighted the opportunity for healthcare delivery that is not restricted by time or place (Ostovari et al., 2023; Williams et al., 2023). The need for innovation more pressing than in the management of chronic diseases like diabetes, which impact over 537 million people worldwide and costing healthcare systems more than USD 966 billion annually (IDF Diabetes Atlas, 9th edition, 2021).

With its features such as low latency, high speed, and extensive device connectivity, 5G technology stands as a powerful initiator for chronic disease management (Turab et al., 2023; Wersényi, 2022). As shown in Figure 1, 5G promises to improve chronic disease management, particularly in diabetes management, through its capabilities in facilitating real-time data transmission, personalized care, and facilotating more meaningful user interactions.

This Systematic Literature Review (SLR), investigates the impact of 5G on healthcare, focusing specifically on personalized diabetes self-management.

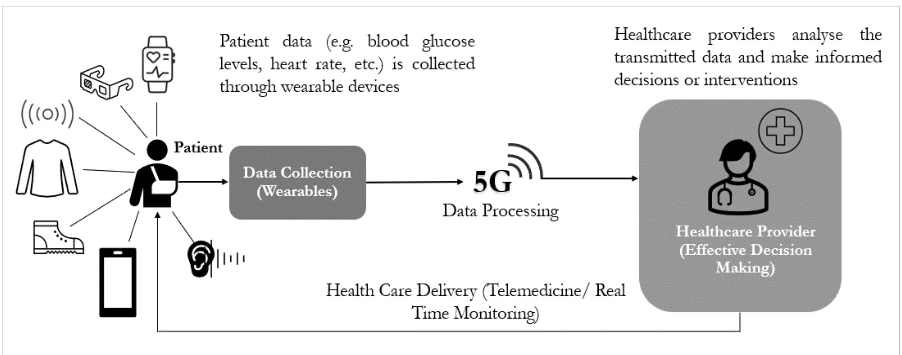

Figure 1: 5G Technology in Healthcare
Source: Own

The SLR aims to investigate four key research questions:

- How does the integration of 5G technology contribute to the digital transformation in healthcare, with a focus on personalized diabetes self-management?
- What are the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis of 5G in the context of healthcare, particularly with respect to the challenges and opportunities it presents for personalized diabetes self-management?
- What are the challenges and impacts on healthcare delivery posed by diabetes types 1, 2, and gestational, and how can 5G supported digital solutions address these challenges?
- How do digital solutions, especially those leveraging 5G capabilities, influence and support self-management in diabetes care, and what features are essential for the design of an effective dashboard for personalized diabetes self-management?

The paper explores key components, beginning with background exploration (Section 2), followed by methodology (Section 3) and findings synthesis (Section 4). Discussion (Section 5), limitations and future research directions are outlined in Section 6. Ultimately, Section 7 concludes the paper by summarizing key insights and contributions.

2 Background and Related Work

The shift towards digital healthcare represents a great shift in patient-centric care models. Outstanding innovations such as electronic health records (EHRs), AI-driven diagnostics, and telemedicine platforms have been helpful in enhancnig the accessibility and quality of healthcare services (Kruse et al., 2023). These innovations have considerably improved patient outcomes and operational efficiencies (Aliberti et al., 2022; Lauman & Dennis, 2021).

Similarly, prsonalized medicine, incorporating genetic information and predictive analytics have also gained considerable importance, particularly in the management of chronic conditions like diabetes (Burford et al., 2019; El-Gayar et al., 2021; Rohilla et al., 2023). The arrival of 5G technology empowers real-time health data analytics,

supports the Internet of Medical Things (IoMT), and facilitates advanced telemedicine services. These capabilities offer numerous opportunities for the advancement of personalized medicine and patient-centered care (Chen et al., 2021; Moglia et al., 2022).
The digital health innovations, while pioneering, often face challenges related to data latency, connectivity issues, and limited real-time capabilities (Blonde et al., 2022; Lightfoot et al., 2022). 5G technology, with its low latency and high reliability, can mitigate these constraints, providing a strong foundation for personalized medicine applications.

Previous studies have pointed out the use of 5G in enhancing remote patient monitoring, and implement comprehensive telemedicine services for diabetes care (Makroum et al., 2022). These findings highlight the potential of 5G and digital health technologies, which together can create more comprehensive, effective personalized solutions for diabetes management (Min et al., 2021; Taimoor & Rehman, 2022).

3 Methodology

This study employed a SLR following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to investigate the integration of 5G technology in healthcare, specifically on personalized diabetes self-management (See Appendix 3 for the PRISMA flow diagram). A search strategy was executed to capture the most relevant literature across four major academic databases namely, MEDLINE, Scopus, CINAHL, and IEEE Xplore. These databases were preferred for their comprehensive coverage of healthcare management, medical, and technological literature.

The inclusion criteria were crafted to cover studies involving individuals with diabetes that investigated the role of 5G technology in enhancing digital healthcare solutions related to diabetes self-management. Also, the exclusion criteria were applied to filter the studies not directly related to diabetes or 5G technology, articles published before 2017 and non-english articles to ensure relevance and latest findings.

Search strings utilized a combination of related keywords and MeSH terms, structured around the PICO framework (Patient, Intervention, Comparison, Outcome), to optimize the database search. This approach was helpful in identifying a notable increase in research publications from 2017 onwards, signifying a significant contribution to the field of 5G technology and related concepts (See Appendix 2).

The screening process involved a thorough review of titles and abstracts, followed by a full-text review of filtered studies. This approach ensured the inclusion of studies that directly addressed the integration of 5G in personalized diabetes self-management. Data extraction focused on key variables such as the technological aspects of 5G, its impact on diabetes management, and the features of 5G-enabled healthcare solutions. (See Appendix 1 for a more details related to the methodology, search string and inclusion and exclusion criteria).

4 Synthsesis of Results

4.1 Publication Trend Analysis

Analysis reveals an interest in the application of 5G technology in healthcare, with publication peaks in 2019 and continued through to 2023. This trend highlights the progress in 5G technologies such as Internet of Things (IoT) in healthcare, stressed during the COVID-19 pandemic, reflecting an accelerated shift towards digital health solutions specially during the crisis. (See Appendix 4).

4.2 Qualitative Content Analysis

Key components identified through qualitative analysis, such as remote patient monitoring (RPM), real-time data transmission, and personalized treatment plans demonstrate the significant impact of 5G in healthcare (Rghioui et al., 2020). Studies demonstrate 5G's capability to enhance diabetes self-management through continuous monitoring, immediate medical interventions, and data-driven care plans, marking a significant increase towards personalized healthcare (El-Rashidy et al., 2021; Magsi et al., 2018).

RPM: This element is recognized as a crucial application of 5G, improving healthcare system efficiency. By integrating machine learning (ML) algorithms for real-time data analysis, 5G supports timely interventions and contribute for future healthcare models (Subramanian & Thampy, 2021).

Real-Time Data Transmission: 5G facilitates real-time data transmission, enabling remote surgeries and telemedicine (Coats-Thomas et al., 2022). AI and IoT device integration enhance patient monitoring and support tactile Internet systems, promising comprehensive mobile medicine solutions for various demographics, including the elderly people (Mohanta et al., 2019; Wu et al., 2021; Zhu et al., 2023).

Personalized Treatment Plans: Leveraging 5G's high-speed data capabilities, innovations like the 5G-Smart Diabetes system have emerged, incorporating sensing, diagnosis, and data-sharing layers (Chen et al., 2018). These innovations contribute for sustainable and intelligent healthcare solutions (Latif et al., 2017; Taimoor & Rehman, 2022).

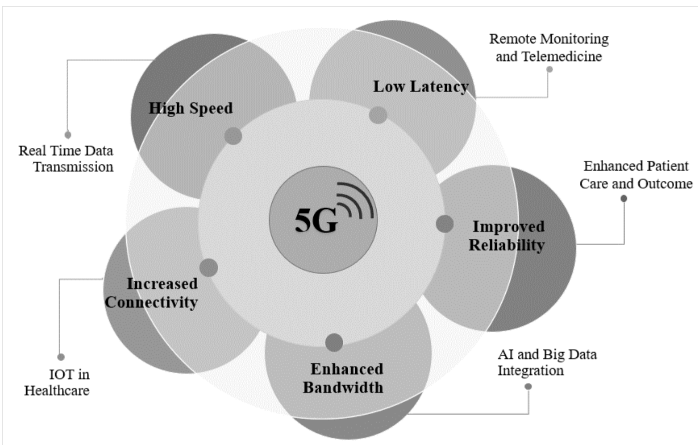

Figure 2: Key Features of 5G Technology and Their Benefits for Healthcare
Source: Own

The capabilities of 5G technology, including high-speed data transmission, network reliability, and low latency significantly enhance health service delivery, facilitating self-care, monitoring, and remote surgery (Chih-Ping et al., 2017; Gupta et al., 2021) as shown in Figure 2. (Detailed tables and figures with exmaple raw data can be found in Appendix 5).

4.3 SWOT Analysis of 5G in Healthcare

The integration of 5G technology into diabetes management offers numerous strengths, such as high-speed data transmission and low latency. These capabilities facilitate real-time monitoring and efficient communication of vital health data (Moglia et al., 2022). The 5G networks offer enhanced connectivity and reliability, ensuring stable platforms for continuous remote monitoring and personalized interventions (Magsi et al., 2018). The capacity of 5G can handle massive data volumes also creates opportunities for comprehensive diabetes management and efficient telemedicine (Chen et al., 2021). However, there are weaknesses, such as infrastructure challenges in terms of coverage and high deployment costs, security concerns regarding sensitive health data (Mohanta et al., 2019), and potential dependency on technological competence among healthcare professionals (Latif et al., 2017). Opportunities include advancements in telemedicine, innovation in wearable devices (Vesselkov et al., 2018), and efficient data analytics (Chen et al., 2018), which can enhance diabetes care. Nonetheless, there are threats to consider, including privacy concerns (Moglia et al., 2022), regulatory and compliance challenges. Figure 3 dipicted the summary of SWOT analysis. Addressing these threats and weaknesses through strategic approaches is essential to utilize the full potential of 5G in diabetes management (Yangan Zhang et al., 2020).

Strengths	**Weaknesses**
▪ High speed ▪ Low latency ▪ Enhanced connectivity and reliability ▪ Capacity for massive data handling and improved remote services	▪ Infrastructure changes ▪ Security challenges ▪ Dependency on technological competence ▪ Occasional service interruptions and older models of smartphones do not support 5G
Opportunities	**Threats**
▪ Advancements in telemedicine ▪ Innovation in wearable devices ▪ Efficient data analytics ▪ Application of encryption technologies available for 5G to secure data	▪ Privacy concerns ▪ Regulatory and compliance challenges ▪ Technological obsolescence

Figure 3: SWOT Analysis Summary: Integration of 5G in Healthcare

Source: Own

4.4 Diabetes Care Challenges and Thematic Analysis

Below Table 1 demontrates the summary of thematic analyses on how 5G technology can address the unique challenges associated with different types of diabetes, offering tailored solutions that align with the specific healthcare needs of each group.

Table 1: Challenges and 5G Solutions for Different Types of Diabetes

Type of Diabetes	Type 1 Diabetes
Healthcare Needs	Continous insulin therapy, blood glucose monitoring, carbohydrate management (Morone, 2019)
Challenges	Constant need for blood glucose monitoring and insulin administration. Education for self-management is crucial (Morone, 2019)
Thematic Analysis	Theme 1: Immediate Data Access and Response - 5G enables real-time monitoring and insulin dose adjustments, facilitating real-time blood glucose monitoring (Min Chen et al., 2018; Mohanta et al., 2019)
5G Solutions	Real-time monitoring for accurate insulin adjustments (Rghioui et al., 2020)
Type of Diabetes	Type 2 Diabetes
Healthcare Needs	Lifestyle modifications, medications, monitoring for comorbidities (Bertsimas et al., 2017)
Challenges	Management complicated by comorbidities and lifestyle intervention needs. Ensuring patient adherence to treatment plans (Twohig et al., 2019)
Thematic Analysis	Theme 2: Accessibility and Convenience - 5G supports remote management and counseling with seamless, real-time interaction between patients and healthcare providers (Chen et al., 2021; Moglia et al., 2022)
5G Solutions	Facilitates educational content delivery and improves medication adherence. Supports regular follow-ups and personalized care plans (El-Rashidy et al., 2021; Taimoor & Rehman, 2022)
Type of Diabetes	Gestational Diabetes
Healthcare Needs	Blood glucose monitoring, dietary adjustments, postpartum monitoring (Alqudah et al., 2019; Fareed et al., 2023)

Challenges	Limited intervention time and need for monitoring to prevent complications during pregnancy (Fareed et al., 2023)
Thematic Analysis	Theme 3: Continuous Health Tracking and IoT Integration - 5G supports continuous monitoring for timely interventions, optimizing maternal and fetal health (Chen et al., 2018; Zhu et al., 2023)
5G Solutions	Supports remote monitoring, reducing hospital visits. Provides infrastructure for remote monitoring solutions (Alqudah et al., 2019)

4.5 Emerging Trends and Gap Analysis

The evolution of diabetes care has been greatly influenced by digital technologies, marking a shift from traditional manual tracking to advanced real-time monitoring and management systems enabled by advancements such as 5G technology (Chen et al., 2018; Zhu et al., 2023). Historical analysis reveals a transformative journey from self-management practices to the predictive analytics for preventive care systems significantly enhancing patient independence and care outcomes (Chen et al., 2018; Zhu et al., 2023).

As shown in figure 4, early adoption and theoretical development were prominent before 2017, focusing on developing healthcare and personalized diabetes management (Bertsimas et al., 2017; Latif et al., 2017). The subsequent period (2018-2021) shows an expansion of practical applications and pilot studies, notably in remote patient monitoring and mobile health, showcasing the growing role of 5G in healthcare (El-Rashidy et al., 2021; Rghioui et al., 2020). Integration of 5G with digital health tools gained attention, especially with wearable devices and IoT for real-time monitoring (Chen et al., 2018; Zhu et al., 2023), and the COVID-19 pandemic accelerated the adoption of 5G-enabled telemedicine applications (Moglia et al., 2022). Challenges such as infrastructure and security were addressed, with a growing focus on personalized healthcare solutions in recent years, particularly in type 2 diabetes management (Devi et al., 2023; Fareed et al., 2023; Mohanta et al., 2019). Ongoing research is exploring advanced applications and AI integration with 5G for predictive analytics in diabetes care, indicating promising future prospects (Taimoor & Rehman, 2022).

The gap analysis highlights several areas in current research on 5G-enabled diabetes healthcare. First, there is a lack of unified patient-centric dashboard that integrates various complex data streams, presenting an opportunity for future research to develop interactive and personalized interfaces that encourage patient engagement (Dagliati et al., 2018). Second, there's a need for integration of machine learning, 5G, and the Internet of Medical Things (IoMT) to enhance predictive analytics and patient outcomes, which has not been extensively examined (Rghioui et al., 2020; Riaz et al., 2023). Third, research should focus on patient-centered models using blockchain, 5G, and IoMT for personalized care, addressing data privacy, security concerns, and cultural sensitivity in diabetes management (Morone, 2019; Subramanian & Sreekantan Thampy, 2021). Additionally, understanding the impact of 5G and IoMT technologies on healthcare utilization and cost across diverse patient populations in chronic disease management requires further investigation (Ames et al., 2021). Addressing these gaps will contribute to more comprehensive, secure, and user-friendly healthcare solutions, ultimately improving patient care and outcomes.

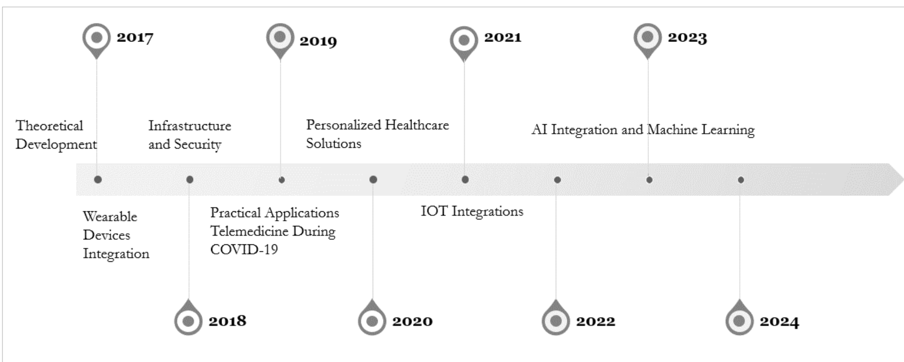

Figure 4: Evolution and Current Trends of 5G Technology in Diabetes Healthcare
Source: Own

4.6 Feature Analysis for the Development of an Effective 5G-Enabled Dashboard for Personalized Diabetes Self-Management

The advanced capabilities of 5G technology offer significant advantages in facilitating a comprehensive and real-time approach to personalized diabetes self-management. Utilizing feature analysis from the literature, some essential features identified and outlined in Table 2 for a 5G-enabled dashboard specifically tailored for type 2 diabetes. These features empower individuals to actively engage in their care, leading to more informed decisions and improved health outcomes. Additionally, the dashboard should include user-friendly interfaces, multilingual support, secure data management protocols, integrate with medical devices, and community and social support features to enhance accessibility, security, and patient engagement (El-Rashidy et al., 2021; Mohanta et al., 2019; Twohig et al., 2019; Morone, 2019; Ames et al., 2021; Fareed et al., 2023).

By leveraging the advanced capabilities of 5G technology, personalized diabetes self-management can be further enhanced, promoting better health outcomes for individuals with type 2 diabetes.

Table 2: Essential Features for a 5G-Enabled Dashboard for Personalized Diabetes Self-Management (Type 2)

Feature	5G Advantage
Continuous Remote Monitoring	Real-time monitoring for timely adjustments
AI-Driven Personalized Insights	High-speed data processing for personalized recommendations
Telemedicine Integration	Effective virtual consultations for regular check-ins
Wearable Device Compatibility	Real-time data from sensors for holistic health monitoring
Medication Adherence Tracking	Swift data transfer for effective medication management

5 Discussion

The SLR clarifies the transformative potential of 5G technology in healthcare, with a particular emphasis on personalized diabetes self-management. Integrating the proposed framework, as shown in Figure 5 into the discussion, it was observed the alignment of 5G capabilities with healthcare digital transformation needs, highlighting 5G's high-speed data transmission, low latency, and robust connectivity, and the requirements for effective diabetes self-management systems.

The SWOT analysis within the framework recognises the strengths, weaknesses, opportunities, and threats of 5G in healthcare, echoing the findings from Moglia et al. (2022) and Magsi et al. (2018). It highlights the 5G's role in enhancing personalized care models through real-time data analysis and remote monitoring, addressing the unique challenges posed by different types of diabetes as discussed by Chen et al. (2018).

Figure 5: Proposed Framework
Source: Own

Upon the framework's insights, expanding personalized diabetes self-management, it becomes evident that the integration of 5G technology holds substantial promise for enhancing patient care. Real-time data transmission and remote monitoring, as essential features for a 5G-enabled diabetes management dashboard, are crucial in facilitating immediate medical interventions and data-driven care plans. Thus, advancing the overall quality of healthcare services. This aligns with the contributions and the predictive analytics in developing personalized care plans (Taimoor & Rehman, 2022).

Moreover, the framework serves as a valuable guide for the development of digital solutions addressing the diverse healthcare delivery challenges associated with various types of diabetes. The ability of 5G to support differentiation in healthcare needs enhances the patient-centric approach, which is vital for effective diabetes management and improved patient outcomes.

6 Limitations and Future Research

While our study highlights the potential advantages of 5G in healthcare innovation, it is important to recognize its limitations and areas for further exploration. One key implication for practice is the necessity for focused research to fully realize the benefits of 5G technology. This should also include investigating cost-effective deployment strategies, particularly in remote and underserved regions, to ensure access to digital healthcare (Devi et al., 2023). Additionally, comprehensive studies are needed to develop stong cybersecurity frameworks that safeguard data privacy in 5G-enabled systems (Mohanta et al., 2019). Furthermore, the discovery and implementation of AI and ML algorithms will ensure enhancing predictive analytics and tailoring personalized diabetes management plans, leveraging the advanced capabilities of 5G (Taimoor & Rehman, 2022). The development and assessment of patient-centered care models that incorporate 5G for improved patient engagement and care outcomes are crucial (Giordanengo et al., 2019). Research into developing regulatory policies that ensure the safe integration of 5G in healthcare is equally important (Moglia et al., 2022). Therefore, interdisciplinary research and collaboration remain significant for attending existing challenges and unlocking the full potential of 5G in revolutionizing digital healthcare and chronic disease management.

7 Conclusion

In conclusion, this SLR has shown the potential of 5G technology in healthcare, specifically in the domain of personalized diabetes self-management. In accordance with PRISMA guidelines and the synthesis of insights from esteemed databases highlight the pivotal role of 5G in enabling real-time data transmission and remote patient monitoring. Beyond healthcare, exploring the implications involves considerations of patient privacy and data security, which parallel the broader societal impacts similar to the exploration of AI's influence. This perspective highlights ongoing research to overcome technological and regulatory obstacles, paving the way for innovative and advanced solutions in personalized healthcare that can improve patient outcomes and operational efficacy while evolving the future of healthcare delivery.

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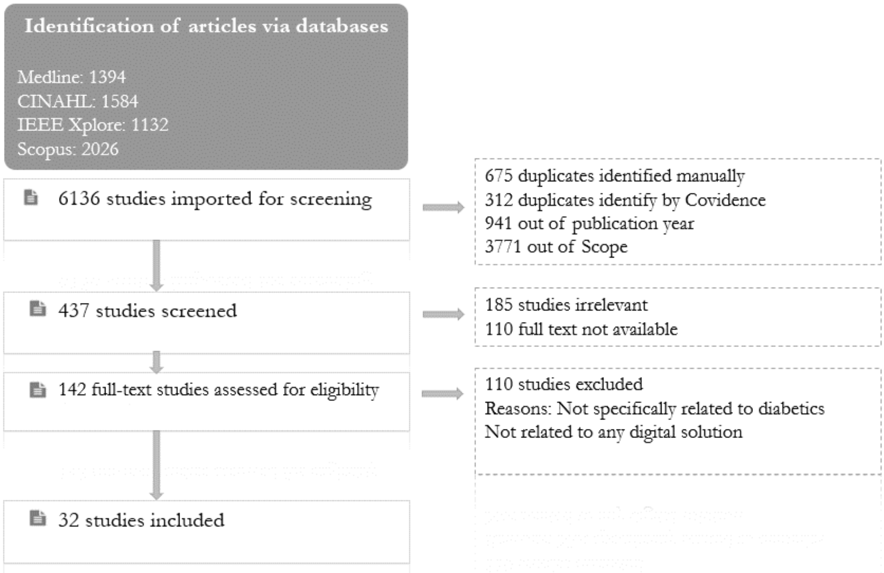
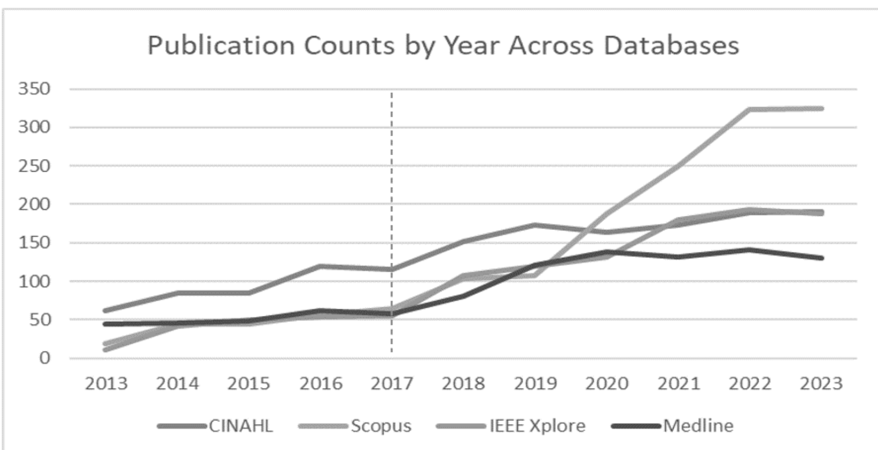
Appendix1: PRISMA Flow Diagram



Appendix 2: Publications Per Year



Appendix 3: Detailed Methodology Components

1. Search String based on PICO Search Strategy

Diabetes AND (5G Technology OR Fifth Generation Wireless Technology) AND (Digital healthcare OR Health Information Technology) AND (Non-digital healthcare OR Traditional healthcare) AND (Self-management OR Self-care OR Healthcare)

2. Inclusion and Exclusion Criteria

To maintain the relevance and quality of the studies included in the review, specific inclusion and exclusion criteria were applied.

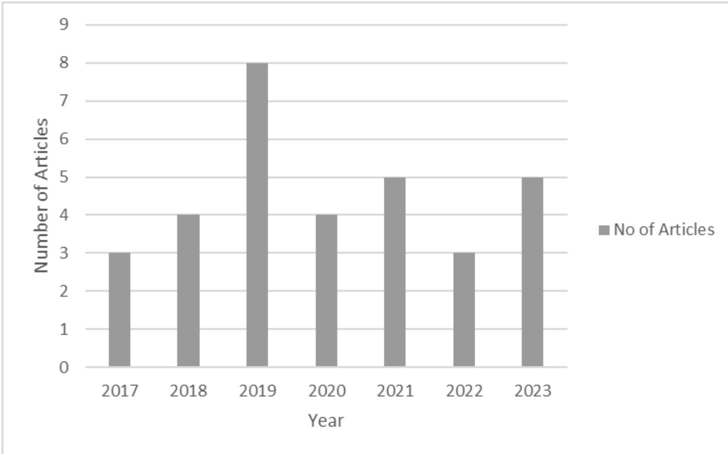
Inclusion Criteria

- Studies involving individuals diagnosed with diabetes
- Research specifically examining the integration of 5G technology or digital healthcare solutions
- Studies published from 2017 onwards to ensure relevance to the research scope
- Articles written in English for accessibility

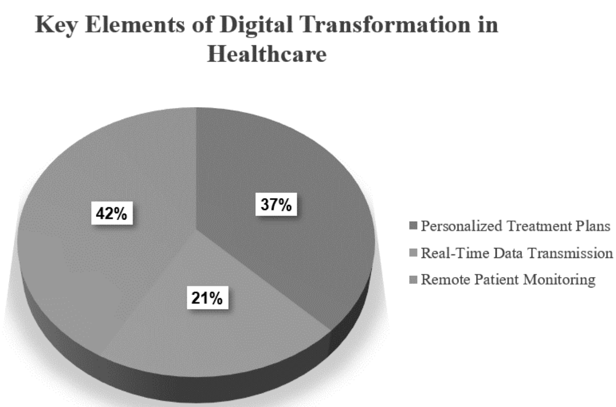
Exclusion Criteria

- Studies not related to diabetes
- Studies not directly related to 5G technology in healthcare
- Publications before 2017 to prioritize recent developments
- Non-English articles to maintain consistency and accessibility

Appendix 4: Publication trend analysis



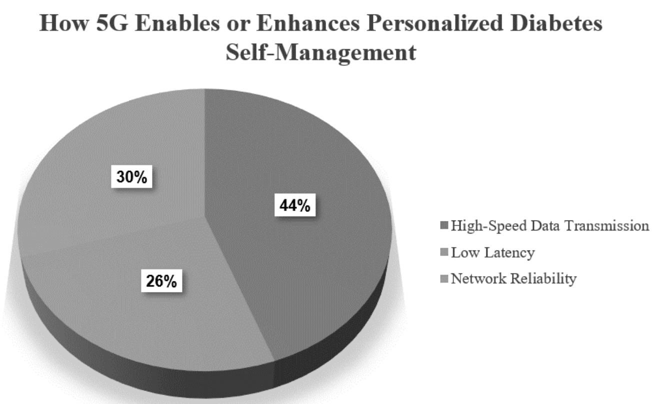
Appendix 5: Tables and Figures with Example Raw Data Qualitative Analysis- Summary of Articles Included in the Review



Key Element	Author and Year	Study Summary/ Findings
Remote Patient Monitoring (RPM)	Rghioui et al. (2020)	Advocated for advanced healthcare systems with 5G networks at their core to enhance RPM's efficiency. Proposed an architecture for monitoring diabetic patients using 5G, integrating ML algorithms for real-time data analysis and timely emergency notifications.

Key Element	Author and Year	Study Summary/ Findings
Remote Patient Monitoring (RPM)	El-Rashidy et al. (2021)	Conducted a comprehensive survey on RPM systems, focusing on data acquisition, transmission protocols, and cloud-based processing. Emphasized EHR integration and early intervention as critical aspects for enhancing RPM systems. Provided insights for potential improvements in privacy and data transmission speed.
Remote Patient Monitoring (RPM)	Magsi et al. (2018)	Explored how 5G has revolutionized medical healthcare, especially RPM and its implications for diabetes care. Introduced a 5G-based sensor node architecture for efficient health monitoring. Highlighted the role of 5G in providing healthcare services anywhere and improving the diagnosis of critical conditions.
Real-Time Data Transmission	Mohanta et al. (2019)	Explored AI, IoT, and 5G integration for real-time patient monitoring, emphasizing telemedicine and remote surgeries. Highlighted the role of AI in smart wearables and how IoT devices with AI overcome limitations in fourth-generation healthcare systems. Focused on the urgent healthcare needs of remote surgeries and Tactile Internet, facilitated by 5G.
Real-Time Data Transmission	Zhu et al. (2023)	Addressed the demand for real-time blood glucose prediction in managing type 1 diabetes, leveraging IoMT and deep learning. Introduced an innovative deep learning model integrated into an IoMT-enabled wearable device for accurate blood glucose prediction and hypoglycemia detection. Demonstrated IoMT's potential in revolutionizing type 1 diabetes management.
Real-Time Data Transmission	Wu et al. (2021)	Presented a comprehensive mobile medicine system for elderly health monitoring, focusing on real-time data transmission. Described a system architecture involving data collection, analysis, decision-making, and transmission, emphasizing early warnings for doctors. Addressed the importance of remote medical services for elderly populations living alone.

Key Element	Author and Year	Study Summary/ Findings
Personalized Treatment Plans	M. Chen et al. (2018)	Introduced the 5G-Smart Diabetes system, incorporating sensing, personalized diagnosis, and data-sharing layers. Enabled sustainable, cost-effective, and intelligent diabetes diagnosis through wearables, ML, and big data, with seamless data transmission through the 5G network. Aimed to provide comprehensive sensing and analysis for diabetic patients.
Personalized Treatment Plans	Latif et al. (2017)	Emphasized 5G's potential in revolutionizing global healthcare systems, including personalized treatment plans, with IoT, AI, big data, and ML as catalysts. Highlighted technical advancements and research opportunities in realizing this transformative vision.
Personalized Treatment Plans	Taimoor and Rehman (2022)	Explored the evolving landscape of personalized healthcare services driven by IoT and 5G technology. Advocated for interconnected healthcare systems tailored to individual needs, with a focus on AI and ML algorithms. Outlined key requirements for Comprehensive Personalized Healthcare Services (CPHS) and a three-layer architecture for IoT-based healthcare systems.



Feature	Author and Year	Study Findings
High-Speed Data Transmission	Riaz et al. (2023)	5G technology enables high-speed data transmission for wearable head imaging devices, enhancing real-time monitoring.
	Devi et al. (2023)	5G's low latency and high-speed data transmission improve RPM by immediately transmitting patient data to medical staff.
	Zhang et al. (2020)	5G facilitates remote consultations with fast transmission of medical image data, improving diagnosis accuracy.
	Rghioui et al. (2020)	5G integrates with sensors for real-time data transmission and processing, revolutionizing diabetes management.
	Chen et al. (2021)	5G enables real-time transmission of medical data, improving remote medical procedures and patient outcomes.
Low Latency	Rghioui et al. (2020)	5G's low latency and high device capacity optimize healthcare communication, improving patient monitoring and diagnosis.
	Devi et al. (2023)	5G supports URLLC, reducing latency for real-time data transmission in healthcare applications.
	Chen et al. (2021)	5G's low latency is crucial for real-time retinopathy treatment via telemedicine.
Network Reliability	Magsi et al. (2018)	5G ensures reliable connectivity for wearable health devices, enhancing personal health monitoring and disease management.
	Devi et al. (2023)	5G's reliability supports continuous monitoring, clinical decision-making, and AI integration in wearable devices.
	Taimoor and Rehman (2022)	Strategies are discussed to improve network reliability in IoT, including healthcare applications.