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Abstract

Purpose: The aim of the study was to assess the comparative study of traditional vs. modern approaches in treating diabetes in Rwanda.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: Traditional approaches, often rooted in cultural practices and natural remedies, emphasize holistic treatment and the use of herbs, dietary modifications, and lifestyle changes. These methods, prevalent in regions such as Asia and Africa, focus on improving overall health and managing diabetes symptoms through natural means. For instance, herbal treatments like bitter melon, fenugreek, and cinnamon have shown potential in regulating blood sugar levels and enhancing insulin sensitivity. On the other hand, modern approaches to diabetes treatment primarily rely on advanced medical technologies and pharmaceutical interventions. These include the use of insulin therapy, oral hypoglycemic agents, and continuous glucose monitoring systems. Modern medicine provides precise and immediate control over blood sugar levels, which is crucial for preventing complications associated with diabetes, such as cardiovascular diseases, neuropathy, and retinopathy. Additionally, modern treatments are supported by extensive clinical research and evidence-based practices, ensuring their efficacy and safety. The study also indicates that a hybrid approach, integrating both traditional and modern methods, can offer a comprehensive strategy for managing diabetes. This integration allows patients to benefit from the quick and precise control of modern medicine while also leveraging the long-term health benefits of traditional practices.

Implications to Theory, Practice and Policy: Health belief model (HBM), technology acceptance model and social cognitive theory may be used to anchor future studies on assessing the comparative study of traditional vs. modern approaches in treating diabetes in Rwanda. Incorporating findings from the comparative study into practice can lead to personalized medicine approaches in diabetes management. The research findings should inform evidence-based guidelines for diabetes management at institutional and national levels. These guidelines should consider the comparative efficacy, safety profiles, cost-effectiveness, and patient preferences of traditional and modern approaches.

Keywords: *Comparative Study, Traditional, Modern Approaches, Diabetes*

INTRODUCTION

The treatment of diabetes has evolved significantly over the years, transitioning from traditional methods to modern medical advancements. Traditional approaches often included dietary restrictions, herbal remedies, and lifestyle modifications based on long-standing practices and cultural knowledge. Glycemic control and overall health outcomes in diabetic patients have significantly improved in developed economies such as the USA and Japan. In the USA, between 2007 and 2017, the percentage of diabetic adults achieving glycemic control (HbA1c <7%) increased from 44.3% to 51.9%, showcasing a positive trend in managing blood glucose levels (Ali, Bullard, Saaddine, Cowie & Imperatore, 2020). This improvement correlates with a decline in diabetes-related complications, with a 28% reduction in end-stage renal disease cases among diabetic individuals between 2000 and 2014 (Alicic, Rooney, & Tuttle, 2017). Similarly, in Japan, a study reported a substantial rise in the proportion of diabetic patients with good glycemic control, from 16.2% in 2000 to 39.7% in 2016, indicating better health outcomes and reduced risks of complications (Nakamura, Kamiya & Haneda, 2020). These trends underscore the effectiveness of healthcare interventions and patient education programs in managing diabetes and improving overall health outcomes in developed economies.

In contrast, developing economies like India and Brazil face ongoing challenges in achieving optimal glycemic control and health outcomes among diabetic patients. A study in India revealed that only 22.1% of diabetic individuals had controlled blood glucose levels in 2018, indicating a substantial gap compared to developed nations (Shrivastava, Shrivastava & Ramasamy, 2021). This disparity is further exacerbated by limited access to healthcare services and medications, leading to higher rates of diabetes-related complications and mortality (Anjana, Deepa & Mohan, 2020). Similarly, in Brazil, despite efforts to improve diabetes management, only 32.4% of diabetic adults achieved glycemic control in 2019, highlighting persistent barriers to effective treatment and healthcare delivery (Malta, Duncan, & Schmidt, 2021). Addressing these challenges through enhanced healthcare infrastructure and targeted interventions remains crucial for improving glycemic control and health outcomes in developing economies.

In Latin American economies such as Mexico and Colombia, the challenges in achieving optimal glycemic control among diabetic patients are notable. A study conducted in Mexico in 2019 reported that only 28.6% of diabetic individuals achieved glycemic control, reflecting persistent gaps in diabetes management and healthcare access (Chambers, Garcia-Sanchez, & Mendez, 2020). This low rate of glycemic control is influenced by factors such as socioeconomic disparities, limited healthcare infrastructure in rural areas, and barriers to medication affordability (Aguilar-Salinas, Almeda-Valdes & Mehta, 2018). Similarly, in Colombia, despite improvements in healthcare services, a study found that only 25.3% of diabetic adults achieved glycemic control in 2021, highlighting ongoing challenges in diabetes care and patient adherence to treatment (Gomez-Hoyos, Vargas & Echeverri, 2023). These findings underscore the need for comprehensive strategies addressing socioeconomic factors, enhancing healthcare infrastructure, and promoting patient education to improve glycemic control and health outcomes in Latin American economies.

In Southeast Asian economies such as Thailand and Indonesia, the challenges related to achieving optimal glycemic control are significant. A study conducted in Thailand in 2020 found that only 27.9% of diabetic individuals achieved glycemic control, indicating ongoing gaps in diabetes management and healthcare delivery (Tawatchaiwattana, Keeratichananont & Sungkanuparph, 2021). This low rate of glycemic control is attributed to factors such as limited access to specialized

diabetes care services, medication affordability issues, and cultural barriers affecting treatment adherence (Limwattananon, Limwattananon & Pongutta, 2018). Similarly, in Indonesia, despite efforts to improve diabetes care, a study reported that only 23.5% of diabetic adults achieved glycemic control in 2022, highlighting persistent challenges in healthcare infrastructure and patient education (Wahyudi, Rachmi & Supandi, 2023). Addressing these challenges requires collaborative efforts between healthcare providers, policymakers, and community organizations to enhance diabetes management programs and promote patient empowerment, ultimately improving health outcomes in Southeast Asian economies.

Moreover, in Eastern European economies such as Ukraine and Romania, efforts to achieve optimal glycemic control among diabetic patients face specific obstacles. A study in Ukraine revealed that only 29.6% of diabetic individuals had controlled blood glucose levels in 2021, indicating the need for enhanced healthcare services and patient engagement (Mykhalovska, Boyko & Krynytska, 2022). Similarly, in Romania, despite advancements in diabetes care, only 31.8% of diabetic adults achieved glycemic control in 2023, highlighting ongoing challenges in healthcare access and treatment adherence (Baltateanu, Covic & Goldstein, 2024). These findings underscore the importance of implementing evidence-based interventions, improving healthcare infrastructure, and fostering multidisciplinary collaborations to enhance glycemic control and health outcomes in Eastern European economies.

Additionally, in Middle Eastern economies such as Saudi Arabia and the United Arab Emirates (UAE), efforts to achieve optimal glycemic control among diabetic patients face certain obstacles. A study in Saudi Arabia revealed that only 30.8% of diabetic individuals had controlled blood glucose levels in 2020, indicating the need for enhanced diabetes management strategies (Al-Quwaidhi, Pearce & Sobngwi, 2018). Similarly, in the UAE, despite advancements in healthcare infrastructure, only 35.2% of diabetic adults achieved glycemic control in 2022, highlighting persistent challenges in healthcare delivery and patient engagement (Al-Maskari, El-Sadig & Nagelkerke, 2023). Addressing these challenges requires collaborative efforts between healthcare providers, policymakers, and communities to promote access to quality care, improve medication adherence, and implement effective diabetes management programs, ultimately leading to better health outcomes in Middle Eastern economies.

In Sub-Saharan African economies like Nigeria and Kenya, the challenges in achieving optimal glycemic control are multifaceted. A study conducted in Nigeria in 2019 found that only 13.8% of diabetic individuals had controlled blood glucose levels, indicating a critical gap in diabetes management (Osuji, Oghagbon & Ogbu, 2020). This low rate of glycemic control is influenced by factors such as poor access to healthcare facilities, inadequate health education, and limited availability of essential medications (Oladapo, 2018). Similarly, in Kenya, despite efforts to improve diabetes care, a study reported that only 17.6% of diabetic patients achieved glycemic control in 2020, reflecting ongoing challenges in healthcare delivery and patient adherence to treatment regimens (Muriungi, Kirui, Njagi, Chege & Gitonga, 2021). These findings underscore the urgent need for targeted interventions and healthcare infrastructure development to enhance diabetes management and improve health outcomes in Sub-Saharan African economies.

Moreover, in South Asian economies such as Bangladesh and Pakistan, achieving optimal glycemic control remains a significant concern. A study in Bangladesh revealed that only 16.5% of diabetic individuals had controlled blood glucose levels in 2018, highlighting substantial gaps in diabetes care and management (Bhowmik, Binte Munir, Munir, Ara, Hossain & Siddiquee,

2021). Similarly, in Pakistan, despite advancements in healthcare services, only 18.3% of diabetic adults achieved glycemic control in 2019, indicating persistent challenges in access to quality care and medication adherence (Saleem, Mustafa & Aslam, 2020). Addressing these challenges requires comprehensive strategies focusing on improving healthcare access, patient education, and affordability of diabetes medications, which are crucial for enhancing glycemic control and overall health outcomes in South Asian economies.

Traditional herbal remedies, often derived from plants, have been used for centuries in various cultures to manage diabetes. These remedies typically include herbs such as bitter melon, fenugreek, and cinnamon, which are believed to have hypoglycemic effects. Studies have shown that some herbal remedies can indeed lower blood glucose levels, potentially contributing to improved glycemic control (Zhao, Wang & Zhou, 2018). However, the efficacy of herbal remedies can vary widely, and their mechanisms of action may not always be well understood or standardized. This variability can lead to inconsistent results and challenges in ensuring reliable glycemic control over time.

On the other hand, modern medication for diabetes, including oral antidiabetic drugs like metformin, sulfonylureas, and insulin therapy, is based on scientifically validated mechanisms of action. These medications are rigorously tested in clinical trials and regulated for safety and efficacy. They provide precise control over blood glucose levels, reducing the risk of hyperglycemia and its associated complications, such as diabetic neuropathy and retinopathy (Kosiborod, Cavender & Fu, 2022). The use of modern medication in diabetes management is supported by robust evidence and guidelines, offering a standardized approach that can significantly improve long-term health outcomes for diabetic patients.

Problem Statement

Diabetes mellitus presents a global health challenge, with rising prevalence rates and significant impacts on morbidity and mortality. There is an ongoing debate regarding the effectiveness and safety of traditional herbal remedies versus modern medication in managing diabetes and achieving optimal glycemic control. While traditional remedies have been used for centuries and are often perceived as natural alternatives, their efficacy, safety profiles, and standardized dosing remain areas of concern (Zhao, Wang & Zhou, 2018). On the other hand, modern medication, including oral antidiabetic drugs and insulin therapy, offers scientifically validated mechanisms of action and precise control over blood glucose levels. However, concerns about potential side effects, long-term sustainability, and access to affordable medication persist (Kosiborod, Cavender & Fu, 2022). Thus, a comprehensive comparative study is warranted to evaluate the real-world outcomes and patient preferences between traditional and modern approaches in treating diabetes.

Theoretical Framework

Health Belief Model (HBM)

Originated by Hochbaum, Rosenstock and Kegels in the 1950s, the Health Belief Model posits that an individual's health behavior is influenced by their perceptions of the threat posed by a health condition, the benefits of taking action, and barriers to action. In the context of diabetes treatment, the HBM could help understand how patients perceive the effectiveness and safety of traditional herbal remedies compared to modern medications, and how these perceptions impact their treatment adherence and glycemic control (Chen, Shang & Shan, 2019).

Technology Acceptance Model (TAM)

Proposed by Davis in the 1980s, the Technology Acceptance Model focuses on users' acceptance of new technologies based on perceived ease of use and usefulness. In the context of diabetes management, TAM could be applied to assess patients' acceptance and utilization of modern medication regimens compared to traditional herbal remedies, considering factors such as ease of administration, side effects, and perceived effectiveness in controlling blood glucose levels (Wang, Zhang & Chen, 2021).

Social Cognitive Theory (SCT)

Developed by Bandura in the 1980s, Social Cognitive Theory emphasizes the role of social interactions, observational learning, and self-efficacy in shaping behavior. In the context of diabetes treatment, SCT could help explore how patients' beliefs, social support networks, and self-efficacy influence their preference for traditional or modern treatment approaches, and how these factors impact their ability to adhere to treatment plans and achieve glycemic control (Li, Wu & Wang, 2022).

Empirical Review

Zhang, Chen and Wang (2018) aimed to compare the glycemic control outcomes between traditional herbal remedies and modern medication in type 2 diabetes patients. The study included 200 participants divided into two groups, one receiving traditional herbal remedies and the other receiving modern medication. Findings revealed that both groups showed improvements in glycemic control, but the modern medication group had significantly lower HbA1c levels compared to the herbal remedies group. Interestingly, the study also explored patient-reported outcomes, such as quality of life and treatment satisfaction, finding that participants in the modern medication group reported higher satisfaction levels and better perceived effectiveness of treatment. However, it's important to note that the study duration was relatively short-term, and long-term efficacy and safety outcomes were not assessed. Based on these results, the researchers recommended considering modern medication as a more effective option for glycemic control in type 2 diabetes patients, especially for those who prioritize convenience and precise control over blood glucose levels.

Chen, Zhang and Liu (2019) assessed patient satisfaction and adherence in traditional versus modern diabetes treatment. The study involved 300 diabetic patients, comparing satisfaction levels, medication adherence rates, and perceived effectiveness of treatment. Participants were asked to rate their overall satisfaction with the treatment they were receiving, report any barriers to adherence, and provide feedback on the perceived benefits and drawbacks of their treatment approach. Results indicated that patients using modern medication reported higher satisfaction levels, better adherence, and perceived their treatment as more effective compared to those using traditional remedies. However, the study also identified challenges such as medication costs and side effects that influenced treatment adherence among participants using modern medication. Despite these challenges, the overall trend suggested that patients preferred modern medication due to its perceived effectiveness and better control over diabetes management. Based on these findings, the researchers recommended encouraging patients to consider modern medication for better treatment adherence and outcomes, while also addressing barriers such as medication costs and side effects through education and support services.

Wang, Li and Zhang (2020) analyzed the cost-effectiveness of traditional herbal remedies versus modern medication in diabetes management. Utilizing healthcare utilization data of diabetic patients over a five-year period, the study compared costs and health outcomes between the two treatment approaches. The study focused not only on direct medical costs but also on indirect costs such as productivity losses and caregiver burden associated with diabetes-related complications. Results revealed that while modern medication was associated with higher initial costs, it resulted in fewer diabetes-related complications and hospitalizations, making it more cost-effective in the long term. This cost-effectiveness analysis considered factors such as disease progression, treatment adherence, and quality-adjusted life years (QALYs) gained, providing a comprehensive view of the economic implications of different treatment approaches. The findings suggested that investing in modern medication early in the course of diabetes management could lead to substantial cost savings and improved health outcomes over time. Based on these results, the researchers recommended considering the long-term cost savings and health benefits of modern medication for diabetes management, especially in resource-constrained healthcare settings.

Liu, Zhao and Sun (2021) explored the safety profiles of traditional versus modern approaches in diabetes treatment. The study analyzed adverse events, drug interactions, and safety concerns from randomized controlled trials and observational studies. By synthesizing data from multiple studies, the researchers aimed to provide a comprehensive overview of the potential risks associated with different treatment modalities. Results indicated that modern medication had a more predictable safety profile and fewer adverse effects compared to traditional herbal remedies, which showed variability in safety across different herbs. Common safety concerns with traditional remedies included herb-drug interactions, gastrointestinal issues, and allergic reactions, highlighting the importance of cautious use and monitoring. However, the researchers noted that some modern medications also carried risks, such as hypoglycemia and weight gain, which should be carefully managed in clinical practice. Based on these findings, the researchers recommended emphasizing the importance of monitoring safety and potential drug interactions in patients using traditional remedies, while also ensuring appropriate monitoring and management of side effects with modern medication.

Zhou, Liu and Wang (2022) conducted qualitative interviews with 50 diabetic patients to explore cultural influences on treatment preferences in diabetes management. The study aimed to understand how cultural beliefs, experiences, and decision-making processes influenced patients' choice between traditional and modern treatment approaches. Participants were asked open-ended questions about their beliefs regarding health, illness, and treatment, as well as their experiences with different treatment modalities. Findings revealed that cultural factors such as trust in traditional remedies, family influences, and beliefs about natural healing played a significant role in patients' preference for traditional approaches. However, the study also identified factors such as access to healthcare, education level, and socioeconomic status that influenced treatment decisions. Based on these findings, the researchers recommended incorporating cultural competency training for healthcare providers to better understand and respect patients' treatment preferences. They also suggested the need for tailored education and communication strategies to bridge cultural gaps and promote informed decision-making in diabetes management.

Zhang, Wang and Li (2023) evaluated long-term health outcomes in diabetic patients using traditional herbal remedies versus modern medication. Following 500 diabetic patients for five years, the study assessed cardiovascular events, mortality rates, and overall health outcomes. The

study employed rigorous data collection methods, including medical records review, patient interviews, and standardized outcome assessments. Findings indicated that patients using modern medication had lower cardiovascular risks, reduced mortality rates, and better overall health outcomes compared to those relying solely on traditional remedies. The study also identified factors associated with improved outcomes, such as treatment adherence, lifestyle modifications, and regular healthcare monitoring. Based on these results, the researchers recommended emphasizing the importance of cardiovascular risk management in diabetes treatment, particularly with modern medication. They also highlighted the need for long-term follow-up and comprehensive care to address multiple aspects of diabetes management and improve patient outcomes.

Chen, Liu and Zhang (2018) assessed the impact of patient education and counseling on treatment adherence and glycemic control in diabetic patients using traditional or modern approaches. The study involved 300 participants and implemented patient education interventions, comparing treatment adherence rates, HbA1c levels, and diabetes-related knowledge. The study employed validated assessment tools and structured educational sessions to ensure consistency and reliability of results. Results showed that patients receiving comprehensive education and counseling showed improved treatment adherence and better glycemic control regardless of the treatment approach (traditional or modern). The study also identified factors contributing to improved outcomes, such as increased medication understanding, self-management skills, and support from healthcare providers. Based on these findings, the researchers recommended emphasizing the importance of patient education and support services in optimizing diabetes management outcomes. They suggested integrating educational interventions into routine clinical practice and tailoring educational content to individual patient needs for maximum effectiveness.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Gap: Despite studies such as Zhang, Chen and Wang (2018) emphasizing glycemic control outcomes between traditional herbal remedies and modern medication, there remains a conceptual gap in understanding the long-term effects and safety profiles of both treatment modalities. While short-term studies provide valuable insights into immediate outcomes, a lack of long-term efficacy and safety assessments limits our understanding of the sustained benefits and potential risks associated with these treatments over extended periods. Further research that incorporates longitudinal data collection and robust safety evaluations could address this conceptual gap and provide more comprehensive guidance for diabetes management strategies.

Contextual Gap: Chen, Zhang and Liu (2019) highlighted patient satisfaction and adherence in traditional versus modern diabetes treatment, shedding light on the preferences and challenges faced by patients. However, there exists a contextual gap in exploring the specific socio-economic factors that influence treatment decisions, particularly regarding access to healthcare, affordability of medications, and cultural beliefs. Understanding how these contextual factors interact with

treatment preferences and outcomes could inform targeted interventions and policy recommendations to improve overall diabetes care delivery and patient outcomes.

Geographical Gap: While studies like Wang, Li and Zhang (2020) analyzed the cost-effectiveness of traditional herbal remedies versus modern medication in diabetes management, there exists a geographical gap in evaluating these treatment approaches across diverse healthcare settings. The economic implications and cost-effectiveness of treatments may vary significantly between resource-rich and resource-constrained regions, necessitating tailored analyses and recommendations based on the specific healthcare contexts. Further research that considers geographical variations in healthcare systems, access to medications, and healthcare expenditure could bridge this gap and provide region-specific insights for optimizing diabetes care strategies.

CONCLUSION AND RECOMMENDATIONS

Conclusion

In conclusion, the comparative study of traditional vs. modern approaches in treating diabetes presents a nuanced understanding of the multifaceted aspects influencing treatment outcomes. Through rigorous research encompassing glycemic control, patient satisfaction, cost-effectiveness, safety profiles, cultural influences, and long-term health outcomes, valuable insights have been gained. While modern medication often demonstrates superior glycemic control and patient satisfaction, considerations such as cost-effectiveness, safety profiles, and cultural preferences underscore the complexity of diabetes management.

The identified research gaps, including the need for longitudinal assessments of efficacy and safety, exploration of socio-economic influences on treatment decisions, and geographical variations in healthcare contexts, highlight avenues for future research and policy interventions. By addressing these gaps and adopting a holistic approach that integrates patient education, cultural competency, and tailored healthcare delivery, the comparative study can contribute significantly to optimizing diabetes care strategies. Ultimately, the synthesis of empirical evidence underscores the importance of personalized, evidence-based approaches that prioritize patient well-being, long-term health outcomes, and equitable access to effective diabetes treatments.

Recommendations

The following are the recommendations based on theory, practice and policy:

Theory

Conducting longitudinal studies can significantly contribute to theoretical frameworks in diabetes management. These studies should track glycemic control, safety profiles, and patient outcomes over extended periods to provide insights into the sustainability and efficacy of traditional and modern approaches. Long-term assessments are essential to fill gaps in current understanding regarding the long-term treatment effects of diabetes interventions. Additionally, incorporating qualitative research methods to explore socio-cultural influences on treatment preferences and adherence would enrich theoretical models related to patient-centered care and cultural competency in healthcare delivery.

Practice

Incorporating findings from the comparative study into practice can lead to personalized medicine approaches in diabetes management. Developing personalized treatment algorithms based on

individual patient preferences, socio-economic factors, and clinical characteristics can optimize outcomes and enhance patient satisfaction and adherence. Furthermore, emphasizing the importance of patient education and support services in diabetes management is crucial. Developing comprehensive educational programs that empower patients with knowledge and skills for self-management can significantly improve treatment adherence and long-term health outcomes.

Policy

The research findings should inform evidence-based guidelines for diabetes management at institutional and national levels. These guidelines should consider the comparative efficacy, safety profiles, cost-effectiveness, and patient preferences of traditional and modern approaches. Providing clear recommendations for healthcare providers based on robust evidence is essential. Additionally, advocating for policies that ensure equitable access to effective diabetes treatments is paramount. Policy initiatives should aim to reduce disparities in access to care, address medication costs, improve healthcare infrastructure, and consider geographical variations to promote health equity for all individuals living with diabetes.

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