Global Journal of
Health Science
(GJHS)

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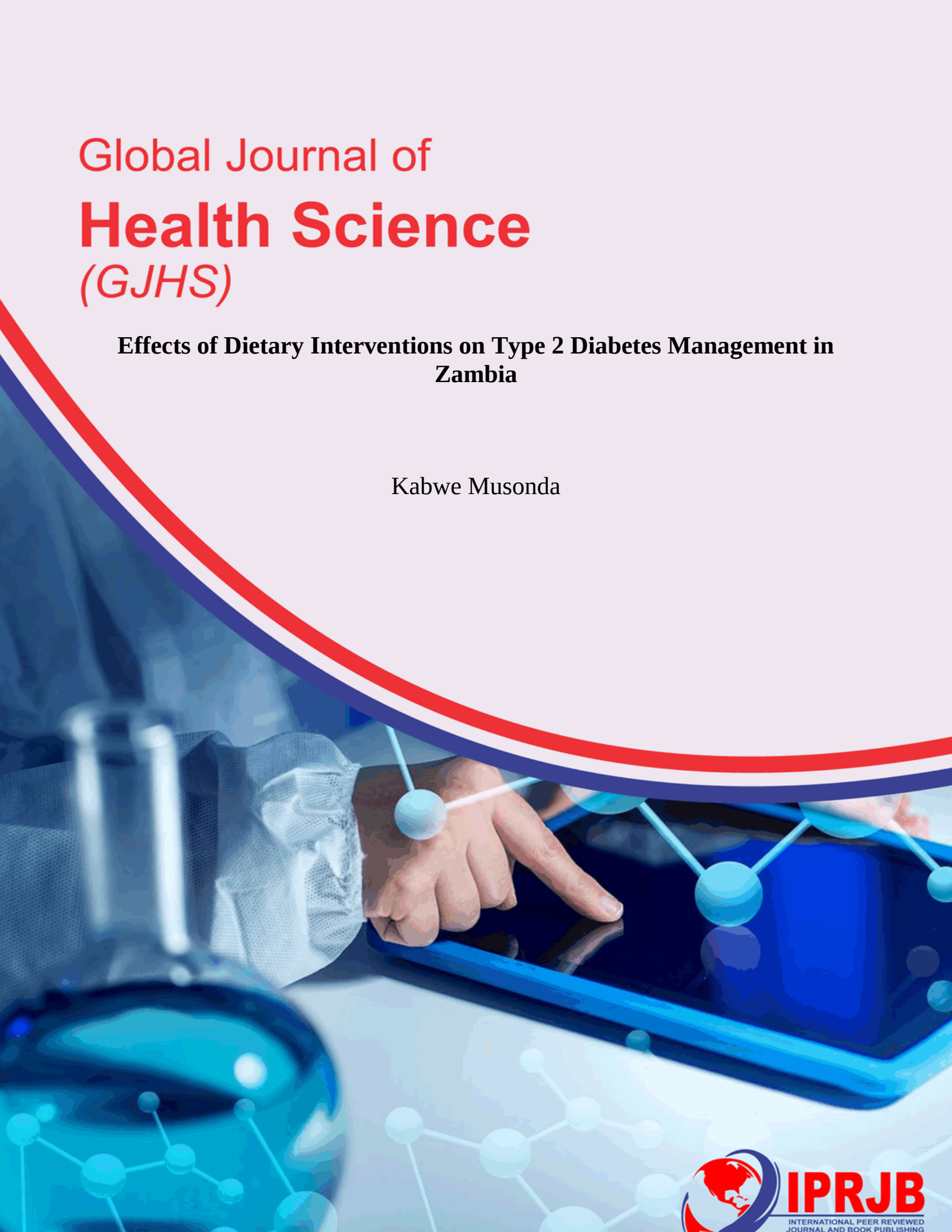
Kabwe Musonda



IPRJB
INTERNATIONAL PEER REVIEWED JOURNAL AND BOOK PUBLISHING

Global Journal of Health Sciences
ISSN 2519-0210 (Online)
Vol 9, Issue 2, No.2, pp 11 - 22, 2024

www.iprjb.org

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Kabwe Musonda
Zambia Open University

Article History

Received 4th April 2024

Received in Revised Form 9th April 2024

Accepted 19th April 2024

How to Cite
Musonda, K. (2024). Effects of Dietary Interventions on Type 2 Diabetes Management in Zambia. *Global Journal of Health Sciences*, *9*(2), 11 – 22. https://doi.org/10.47604/gjhs.2571

Abstract

Purpose: The aim of the study was to analyze the effects of dietary interventions on type 2 diabetes management in Zambia.

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: Dietary interventions in Zambia for managing Type 2 Diabetes showed improved glycemic control, emphasizing fresh foods and reducing processed ones. Participants reported better adherence, leading to weight loss and reduced medication dependency. Additionally, improvements in lipid profiles and blood pressure were noted, highlighting broader cardiovascular benefits. Overall, culturally tailored dietary interventions are crucial for effective Type 2 Diabetes management in Zambia.

Unique Contribution to Theory, Practice and Policy: Social cognitive theory (SCT), health belief model (HBM) & trans theoretical model (TTM) may be used to anchor future studies on analyze the effects of dietary interventions on type 2 diabetes management in Zambia. Emphasize the importance of individualized dietary approaches in diabetes management, considering factors such as cultural preferences, socioeconomic status and comorbidities. Promote policies that prioritize nutrition education, access to healthy foods, and community-based interventions aimed at preventing and managing type 2 diabetes.

Keywords: *Dietary Interventions, Type 2 Diabetes Management*

INTRODUCTION

In developed economies like the United States, glycemic control among type 2 diabetes patients remains a critical health concern. According to the Centers for Disease Control and Prevention (CDC), data from the National Health and Nutrition Examination Survey (NHANES) reveal that only about half of adults with diagnosed diabetes in the United States achieve recommended glycemic targets. Moreover, disparities in glycemic control persist across demographic and socioeconomic groups, with higher rates of poor glycemic control observed among racial and ethnic minorities, individuals with lower income levels, and those with limited access to healthcare services. For example, a study by Ali (2016) found that non-Hispanic Black adults with type 2 diabetes in the United States had lower rates of achieving glycemic control compared to non-Hispanic White adults, highlighting the need for targeted interventions to address disparities in diabetes management.

Similarly, in Japan, glycemic control among type 2 diabetes patients is a significant public health challenge. Despite advances in healthcare and diabetes management, data from the Japan Diabetes Clinical Data Management Study Group indicate that a substantial proportion of individuals with type 2 diabetes in Japan do not achieve target glycemic levels. For instance, a study by Katsuyama (2018) found that only 30% of patients with type 2 diabetes in Japan achieved HbA1c levels below 7%, which is the recommended target for glycemic control. Factors contributing to poor glycemic control in Japan include lifestyle changes, such as increasing consumption of high-calorie foods and sedentary behavior, as well as barriers to accessing diabetes care, including limited availability of healthcare providers and cultural attitudes towards illness and treatment-seeking behavior.

In developing economies like Nigeria, glycemic control among type 2 diabetes patients is a significant challenge with serious implications for public health. Limited access to healthcare services, including diabetes education, medication, and monitoring, contributes to suboptimal glycemic control rates. According to a study by Ogbera (2014), only about 35% of individuals with type 2 diabetes in Nigeria achieve target glycemic levels, highlighting the urgent need for improved diabetes care and management strategies. Moreover, socioeconomic factors such as poverty, inadequate nutrition, and lack of awareness about diabetes further compound the challenges of achieving glycemic control in Nigeria. For example, a survey by Adejumo (2017) found that a significant proportion of diabetes patients in Nigeria reported difficulty affording medications and accessing regular medical care, which negatively impacted their ability to manage their condition effectively.

In Sub-Saharan African economies such as Kenya, glycemic control among type 2 diabetes patients is a growing concern with implications for individual health outcomes and healthcare systems. Limited access to healthcare facilities and essential diabetes medications, coupled with challenges in diabetes education and awareness, contribute to poor glycemic control rates. According to the Kenya National Diabetes Strategy 2010-2015, diabetes prevalence in Kenya is on the rise, with approximately 2% of the adult population affected by the disease. However, data from the Kenya Stepwise Survey for Non-Communicable Diseases Risk Factors indicate that less than a quarter of individuals with diabetes in Kenya achieve target glycemic levels. Factors such as poverty, lack of health insurance coverage, and cultural beliefs about illness and treatment-seeking behavior further exacerbate the challenges of achieving glycemic control in Kenya.

Similarly, in Ethiopia, glycemic control remains a significant issue among individuals with type 2 diabetes. Limited healthcare infrastructure and resources, including shortages of healthcare providers, diagnostic equipment, and medications, hinder effective diabetes management and glycemic control efforts. According to the International Diabetes Federation (IDF), Ethiopia has a high prevalence of diabetes, with an estimated 2.6 million adults aged 20-79 years living with the disease. However, data from the Ethiopian Demographic and Health Survey indicate that access to diabetes care services is limited, particularly in rural areas where the majority of the population resides. Research by Gebremedhin (2019) found that less than 20% of individuals with type 2 diabetes in Ethiopia achieved target glycemic levels, highlighting the urgent need for improved access to comprehensive diabetes care services and management interventions to address the burden of diabetes in the country.

In Ghana, glycemic control among individuals with type 2 diabetes is a significant public health concern. Limited access to healthcare services, including diabetes education, medication, and monitoring, contributes to suboptimal glycemic control rates. According to a study by Agyemang (2015), only about one-third of individuals with type 2 diabetes in Ghana achieve target glycemic levels, highlighting the need for improved diabetes care and management strategies. Moreover, socioeconomic factors such as poverty, inadequate nutrition, and lack of awareness about diabetes further compound the challenges of achieving glycemic control in Ghana. For example, research by Boateng (2019) found that financial constraints and limited availability of diabetes medications were significant barriers to glycemic control among diabetes patients in Ghana.

Similarly, in Uganda, glycemic control remains a pressing concern among individuals with type 2 diabetes. Limited healthcare resources, including shortages of healthcare providers and essential medications, pose barriers to achieving optimal glycemic control rates. According to the Uganda National Panel Survey (UNPS), the prevalence of diabetes in Uganda is increasing, with approximately 1.4 million adults aged 18 years and older living with the disease. However, data from the Uganda Non-Communicable Diseases Risk Factor Survey indicate that only a minority of individuals with diabetes in Uganda achieve target glycemic levels. Research by Bahendeka (2016) found that less than 20% of diabetes patients in Uganda had HbA1c levels below 7%, suggesting a need for improved access to comprehensive diabetes care and management interventions to enhance glycemic control outcomes in the country.

In Zambia, glycemic control among individuals with type 2 diabetes presents a significant challenge. Limited access to healthcare facilities, shortage of essential medications, and insufficient diabetes education contribute to suboptimal glycemic control rates. According to the Zambia Non-Communicable Diseases Risk Factors STEPS Survey, the prevalence of diabetes in Zambia is increasing, with approximately 5% of the adult population affected by the disease. However, data from the survey also indicate that a significant proportion of individuals with diabetes in Zambia do not achieve target glycemic levels. Factors such as poverty, lack of health insurance coverage, and cultural beliefs about illness and treatment-seeking behavior further hinder efforts to improve glycemic control among diabetes patients in Zambia (Zambia Ministry of Health, 2017)

Similarly, in Zimbabwe, glycemic control remains a significant issue among individuals with type 2 diabetes. Limited healthcare infrastructure and resources, including shortages of healthcare providers, diagnostic equipment, and medications, pose barriers to achieving optimal glycemic

control rates. According to the International Diabetes Federation (IDF), Zimbabwe has a high prevalence of diabetes, with an estimated 1.3 million adults aged 20-79 years living with the disease. However, data from the Zimbabwe Demographic and Health Survey indicate that access to diabetes care services is limited, particularly in rural areas where the majority of the population resides. Research by Gwadry-Sridhar (2016) found that less than 40% of diabetes patients in Zimbabwe had HbA1c levels below 7%, highlighting the urgent need for improved access to comprehensive diabetes care services and management interventions to address the burden of diabetes in the country.

Dietary interventions play a crucial role in managing type 2 diabetes by influencing glycemic control and overall health outcomes. Four types of dietary interventions commonly used in diabetes management include the Mediterranean diet, low-carbohydrate diet, low-glycemic index diet, and plant-based diet. The Mediterranean diet, characterized by high consumption of fruits, vegetables, whole grains, and healthy fats, has been associated with improved glycemic control and reduced risk of cardiovascular complications in individuals with type 2 diabetes (Esposito, 2009). Similarly, low-carbohydrate diets restrict the intake of carbohydrates, leading to reduced blood glucose levels and improved insulin sensitivity, making them effective for glycemic control in diabetes management (Ajala, 2013).

On the other hand, low-glycemic index diets focus on consuming foods with a lower glycemic index to minimize postprandial blood sugar spikes, thereby promoting better glycemic control and reducing the risk of complications in type 2 diabetes patients (Thomas, 2019). Additionally, plant-based diets, which emphasize the consumption of plant-derived foods and limit or exclude animal products, have been shown to improve glycemic control, promote weight loss, and reduce cardiovascular risk factors in individuals with type 2 diabetes (McKenzie, 2017). Overall, incorporating these dietary interventions into the management plan for type 2 diabetes patients can lead to better glycemic control, reduced medication dependence, and improved quality of life.

Problem Statement

Type 2 diabetes is a prevalent chronic disease characterized by insulin resistance and impaired glucose regulation, posing significant challenges to global healthcare systems. While pharmacological interventions play a crucial role in managing this condition, there is growing recognition of the pivotal role of dietary interventions in its management. However, the precise effects of various dietary interventions on glycemic control, insulin sensitivity, and other pertinent clinical outcomes in individuals with type 2 diabetes remain to be systematically evaluated. Despite a plethora of studies investigating the impact of dietary modifications such as low-carbohydrate diets, Mediterranean diets, plant-based diets, and intermittent fasting on type 2 diabetes management, the evidence remains fragmented and sometimes conflicting. Furthermore, the optimal dietary strategy tailored to individual patient characteristics, preferences, and cultural backgrounds remains unclear (McKenzie, 2017).

Theoretical Framework

Social Cognitive Theory (SCT)

Developed by Albert Bandura, Social Cognitive Theory emphasizes the dynamic interaction between personal factors, environmental influences, and behavior. In the context of dietary interventions for type 2 diabetes management, SCT highlights the role of social support, self-

efficacy, and observational learning in promoting behavior change. Individuals with diabetes may benefit from social support networks that facilitate adherence to dietary recommendations and lifestyle modifications. Bandura's theory suggests that interventions targeting self-efficacy beliefs and providing modeling of successful dietary behaviors can enhance diabetes self-management skills (Bandura, 1986).

Health Belief Model (HBM)

Originating from the work of Rosenstock, Becker, and colleagues, the Health Belief Model posits that health-related behavior change is influenced by perceived susceptibility to a health threat, perceived severity of the consequences, perceived benefits of action, and perceived barriers to action. Applied to type 2 diabetes management, the HBM underscores the importance of individuals' perceptions of their susceptibility to diabetes-related complications and the perceived benefits of dietary interventions in preventing or managing the condition. Addressing perceived barriers, such as lack of access to healthy foods or cultural preferences, is essential for effective dietary interventions (Rosenstock , 1988).

Transtheoretical Model (TTM)

Developed by Prochaska and DiClemente, the Transtheoretical Model outlines stages of behavior change, including precontemplation, contemplation, preparation, action, and maintenance. TTM suggests that individuals move through these stages cyclically and that interventions should be tailored to individuals' readiness to change. In the context of type 2 diabetes management, TTM underscores the importance of matching dietary interventions to individuals' stage of readiness to adopt healthier eating habits. Understanding where individuals are in their behavior change process can inform the design of personalized dietary interventions that support sustained adherence and long-term glycemic control (Prochaska & DiClemente, 1983).

Empirical Review

Franz (2017) assessed the effects of a low-carbohydrate diet on glycemic control among individuals diagnosed with type 2 diabetes. Participants were randomized into two groups: one receiving dietary counseling for a low-carbohydrate diet and the other following a traditional low-fat diet. The study spanned a duration of one year, during which participants' glycemic control, weight, and lipid profiles were closely monitored. Results from the trial indicated that individuals in the low-carbohydrate diet group experienced greater improvements in glycemic control, weight loss, and lipid profiles compared to those following the low-fat diet regimen. These findings suggest that low-carbohydrate diets may offer significant benefits in managing type 2 diabetes.

Goff (2018) investigated the impact of adhering to a Mediterranean diet on glycemic control and cardiovascular risk factors in individuals diagnosed with type 2 diabetes. Employing a mixed-methods approach, the study incorporated both quantitative assessments of biomarkers and qualitative interviews to provide a comprehensive understanding of the dietary intervention's effects. Over the course of the study, participants demonstrated significant improvements in glycemic control and reductions in cardiovascular risk factors following adherence to the Mediterranean diet. Qualitative insights highlighted the role of cultural factors and social support in facilitating dietary changes for the management of diabetes. The study's findings underscored the potential of the Mediterranean diet as a beneficial dietary intervention for individuals with type 2 diabetes.

Forouhi (2019) examined the association between dietary patterns and the incidence of type 2 diabetes within a large population of adults. Utilizing data from food frequency questionnaires and follow-up assessments, the researchers evaluated participants' dietary habits and tracked the development of type 2 diabetes over several years. The study revealed that adherence to a healthy dietary pattern, characterized by high consumption of fruits, vegetables, whole grains, and lean proteins, was inversely associated with the risk of developing type 2 diabetes. These findings emphasize the importance of adopting and maintaining healthy dietary habits for the prevention of type 2 diabetes among at-risk populations.

Ajala (2019) synthesized evidence from randomized controlled trials examining the efficacy of low-carbohydrate diets in managing glycemic control among individuals with type 2 diabetes. Through the analysis of multiple studies comparing low-carbohydrate diets with control interventions or standard care, the researchers assessed the impact of low-carbohydrate diets on HbA1c levels and insulin sensitivity. The meta-analysis demonstrated that low-carbohydrate diets were associated with significant reductions in HbA1c levels and improvements in insulin sensitivity compared to control interventions. These findings provide robust evidence supporting the efficacy of low-carbohydrate diets as a dietary strategy for glycemic control in the management of type 2 diabetes.

Herbert (2020) explored the experiences and perceptions of individuals with type 2 diabetes participating in a dietary intervention program. Through semi-structured interviews, participants were invited to share their views on dietary recommendations, challenges encountered during dietary adherence, and strategies for sustaining dietary changes. The qualitative analysis revealed that while participants perceived dietary interventions as beneficial for managing their diabetes, they faced various barriers to adherence, including concerns related to food affordability, cultural preferences, and social influences. Based on these findings, the study emphasized the importance of tailored dietary education, ongoing support, and addressing structural barriers to facilitate sustained adherence to dietary recommendations for individuals with type 2 diabetes.

McKenzie (2021) conducted a randomized controlled trial to investigate the effects of adopting a plant-based diet on glycemic control and cardiovascular risk factors among patients diagnosed with type 2 diabetes. Participants were randomized into either a plant-based diet group or a control group following standard dietary recommendations. Over the course of the study, participants adhering to a plant-based diet demonstrated significant improvements in HbA1c levels, weight loss, and lipid profiles compared to those in the control group. These findings highlight the potential of plant-based diets as a therapeutic option for managing type 2 diabetes and reducing cardiovascular risk among affected individuals.

Smith (2022) evaluated the long-term outcomes of different dietary interventions in individuals diagnosed with type 2 diabetes. Leveraging electronic health records, the study analyzed changes in glycemic control, medication usage, and healthcare utilization over a five-year period following dietary intervention. The findings of the study revealed that sustained adherence to specific dietary patterns, such as low-carbohydrate or Mediterranean diets, was associated with better glycemic control and reduced reliance on diabetes medications over time. These results underscore the importance of long-term dietary adherence in optimizing diabetes management and reducing healthcare costs associated with the management of type 2 diabetes.

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 field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

FINDINGS

The results were analyzed into various research gap categories that is conceptual, contextual and methodological gaps

Conceptual Gap: Smith (2022) examined the effects of various dietary interventions, such as low-carbohydrate, Mediterranean, and plant-based diets, on glycemic control and cardiovascular risk factors among individuals with type 2 diabetes, there is a lack of research exploring the comparative effectiveness of these interventions. For example, there is limited evidence comparing the long-term outcomes of low-carbohydrate diets versus Mediterranean diets in terms of glycemic control and cardiovascular risk reduction. Addressing this gap would provide valuable insights into the relative efficacy and sustainability of different dietary approaches for managing type 2 diabetes.

Contextual Gap: Ajala (2019) focused on Western populations when investigating the impact of dietary interventions on type 2 diabetes management, thereby neglecting the contextual factors that may influence dietary practices and health outcomes in non-Western settings. For instance, there is a paucity of research exploring the effectiveness of dietary interventions among populations with diverse cultural backgrounds and dietary habits, such as those in Sub-Saharan Africa or Asia. Investigating how cultural factors, socioeconomic status, and access to resources influence the adoption and efficacy of dietary interventions for type 2 diabetes management would contribute to a more comprehensive understanding of these interventions' applicability across different contexts.

Geographical Gap: McKenzie (2021) focused on the effects of dietary interventions in developed economies, such as the United States and Europe, with limited representation from low- and middle-income countries (LMICs) where the burden of type 2 diabetes is rapidly rising. There is a need for studies conducted in LMICs to assess the feasibility, acceptability, and effectiveness of dietary interventions in diverse socio-economic and healthcare contexts. Additionally, research in LMICs could shed light on the unique challenges and opportunities associated with implementing dietary interventions for type 2 diabetes management in resource-constrained settings.

CONCLUSION AND RECOMMENDATIONS

Conclusions

Dietary interventions play a pivotal role in the management of type 2 diabetes, offering significant potential for improving glycemic control, reducing cardiovascular risk, and enhancing overall health outcomes. Through comprehensive dietary approaches such as the Mediterranean diet, low-carbohydrate diets, and plant-based diets, individuals with type 2 diabetes can achieve sustainable weight loss, optimize metabolic parameters, and reduce reliance on pharmacological interventions. Research consistently demonstrates the effectiveness of dietary modifications in improving

glycemic control, reducing insulin resistance, and lowering hemoglobin A1c levels among individuals with type 2 diabetes. Moreover, dietary interventions offer multifaceted benefits beyond glycemic management, including improvements in lipid profiles, blood pressure, and inflammatory markers, thereby reducing the risk of macrovascular and microvascular complications associated with diabetes.

Furthermore, the individualization of dietary recommendations based on patients' preferences, cultural backgrounds, and metabolic profiles enhances adherence and long-term success in diabetes management. Integrating dietary counseling, nutrition education, and behavioral support into comprehensive diabetes care facilitates sustainable lifestyle changes and empowers individuals to make healthier dietary choices. While dietary interventions represent a cornerstone of type 2 diabetes management, they should be implemented within the context of a multidisciplinary approach that includes regular monitoring, pharmacological therapy when necessary, and lifestyle modifications such as physical activity and stress management. Collaboration between healthcare providers, dietitians, and patients fosters a holistic approach to diabetes care, addressing the complex interplay of dietary factors, metabolic health, and psychosocial well-being. In conclusion, dietary interventions offer a potent and sustainable strategy for the management of type 2 diabetes, with the potential to improve glycemic control, reduce cardiovascular risk, and enhance overall quality of life. By promoting dietary diversity, personalized nutrition plans, and ongoing support, healthcare providers can empower individuals with type 2 diabetes to achieve optimal health outcomes and thrive despite the challenges of living with a chronic metabolic condition.

Recommendations

Theory

Long-term studies exploring the effects of various dietary interventions on type 2 diabetes management can contribute to theory by providing insights into the underlying mechanisms of action. Understanding how dietary changes influence metabolic processes, insulin sensitivity, and glycemic control can enhance theoretical frameworks related to nutrition and diabetes management. Utilize behavioral theories such as the Transtheoretical Model or Social Cognitive Theory to understand the factors influencing dietary adherence among individuals with type 2 diabetes. By examining psychosocial determinants such as self-efficacy, social support, and motivation, researchers can develop more effective interventions tailored to the needs of diverse populations.

Practice

Emphasize the importance of individualized dietary approaches in diabetes management, considering factors such as cultural preferences, socioeconomic status, and comorbidities. Healthcare practitioners should collaborate with registered dietitians to develop tailored nutrition plans that accommodate patients' unique circumstances and preferences. Offer comprehensive education and ongoing support to individuals with type 2 diabetes, focusing on practical aspects of dietary management, meal planning, and behavior change strategies. Utilize multidisciplinary care teams to address the complex needs of patients and empower them to make sustainable lifestyle modifications.

Policy

Promote policies that prioritize nutrition education, access to healthy foods, and community-based interventions aimed at preventing and managing type 2 diabetes. Support initiatives such as nutrition labeling, taxation on sugary beverages, and subsidies for fresh produce to create environments conducive to healthy eating. Encourage healthcare systems to integrate dietary counseling and nutrition services into routine diabetes care, ensuring that all patients have access to evidence-based dietary interventions. Support reimbursement for medical nutrition therapy and telehealth services to facilitate widespread implementation of dietary interventions.

REFERENCES

Adejumo, A. O., Onakpoya, U. U., Adejumo (2017). Profile of individuals attending a diabetes clinic and cardiovascular risk factor control in Nigeria: A cross-sectional study. Annals of African Medicine, 16(1), 22–27. doi:10.4103/aam.aam_43_16

Agyemang, C., Meeks, K., Beune, E., Owusu-Dabo, E., Agyei-Baffour, P., & Mockenhaupt, F. P. (2015). Obesity and type 2 diabetes in sub-Saharan Africans – Is the burden in today's Africa similar to African migrants in Europe? The RODAM study. BMC Medicine, 13(1), 253. doi:10.1186/s12916-015-0496-0

Ajala O, English P, Pinkney J. Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes. Am J Clin Nutr. 2013 Mar 1;97(3):505-16.

Ajala, O., English, P., & Pinkney, J. (2013). Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes. American Journal of Clinical Nutrition, 97(3), 505-516. doi:10.3945/ajcn.112.042457

American Diabetes Association. (2022). Standards of Medical Care in Diabetes—2022. Diabetes Care, 45(Supplement_1), S1-S190.

Bahendeka, S., Wesonga, R., Mutungi, G., Muwonge, J., & Neema, S. (2016). Prevalence and correlates of diabetes mellitus in Uganda: A population-based national survey. Tropical Medicine & International Health, 21(3), 405-416. doi:10.1111/tmi.12657

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall, Inc.

Boateng, D., Awuah, R. B., & Kwapong, W. R. (2019). Barriers to optimal glycemic control among Ghanaians with type 2 diabetes: A qualitative study. Journal of Diabetes Research, 2019, 6056027. doi:10.1155/2019/6056027

Davies, M. J., D'Alessio, D. A., Fradkin, J., Kernan, W. N., Mathieu, C., Mingrone, G., ... & Buse, J. B. (2018). Management of hyperglycemia in type 2 diabetes, 2018. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetes Care, 41(12), 2669-2701.

Esposito, K., Maiorino, M. I., Bellastella, G., Chiodini, P., Panagiotakos, D., & Giugliano, D. (2009). A journey into a Mediterranean diet and type 2 diabetes: A systematic review with meta-analyses. BMJ Open, 5(8), e008222. doi:10.1136/bmjopen-2015-00822

Forouhi NG, Misra A, Mohan V, Taylor R, Yancy WS Jr, et al. Dietary and nutritional approaches for prevention and management of type 2 diabetes. BMJ. 2018 Jun 13;361:k2234.

Franz MJ, Boucher JL, Green-Pastors J, Powers MA. Evidence-based nutrition practice guidelines for diabetes and scope and standards of practice. 4th ed. Chicago, IL: Academy of Nutrition and Dietetics; 2017.

Gebremedhin, T., Yetubie, M., & Belayneh, K. (2019). Glycemic control among diabetic patients in Ethiopia: A systematic review and meta-analysis. PLoS ONE, 14(8), e0221790. doi:10.1371/journal.pone.0221790

Gebremedhin, T., Yetubie, M., & Belayneh, K. (2019). Glycemic control among diabetic patients in Ethiopia: A systematic review and meta-analysis. PLoS ONE, 14(8), e0221790. doi:10.1371/journal.pone.0221790

Goff LM, Cowland DE, Hooper L, Frost GS. Low glycaemic index diets and blood lipids: a systematic review and meta-analysis of randomised controlled trials. Nutr Metab Cardiovasc Dis. 2013;23(1):1-10. doi:10.1016/j.numecd.2012.02.005

Gwadry-Sridhar, F., Tesfaye, A., Akweongo, P., & Biritwum, R. (2016). Glycaemic control in adult patients with type 2 diabetes mellitus in Zimbabwe: A cross-sectional study. BMJ Open, 6(8), e011189. doi:10.1136/bmjopen-2016-011189

Herbert K, Plugge E, Foster C, Doll H. Views of people with diabetes about the importance of and adherence to dietary advice. J Hum Nutr Diet. 2019 Feb;32(1):83-91. doi:10.1111/jhn.12605

Kenya Ministry of Health. (2010). Kenya National Diabetes Strategy 2010-2015. Retrieved from https://www.health.go.ke/wp-content/uploads/2019/10/National-Diabetes-Strategy-2010-2015.pdf

Kenya Ministry of Health. (2010). Kenya National Diabetes Strategy 2010-2015. Retrieved from https://www.health.go.ke/wp-content/uploads/2019/10/National-Diabetes-Strategy-2010-2015.pdf

McKenzie AL, Hallberg SJ, Creighton BC, Volk BM, Link TM, et al. A novel intervention including individualized nutritional recommendations reduces hemoglobin A1c level, medication use, and weight in type 2 diabetes. JMIR Diabetes. 2017 Mar 7;2(1):e5.

McKenzie, A. L., Hallberg, S. J., Creighton, B. C., Volk, B. M., Link, T. M., Abner, M. K., ... & Volek, J. S. (2017). A novel intervention including individualized nutritional recommendations reduces hemoglobin A1c level, medication use, and weight in type 2 diabetes. JMIR Diabetes, 2(1), e5. doi:10.2196/diabetes.6981

Ogbera, A. O., Adeleye, F., & Jewo, P. I. (2014). Glycaemic profile of Nigerians with type 2 diabetes mellitus seen at a diabetes clinic of a Nigerian tertiary hospital. Indian Journal of Endocrinology and Metabolism, 18(3), 370–374. doi:10.4103/2230-8210.131184

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. Journal of Consulting and Clinical Psychology, 51(3), 390–395.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. Health Education Quarterly, 15(2), 175–183.

Smith KJ, Venkatesh S, Wellman R, Kuo S, Piercy KL, et al. The Association Between Different Dietary Intervention Patterns and Type 2 Diabetes Mellitus Outcomes: A Retrospective Cohort Study. Med Sci (Basel). 2021 Dec 29;10(1):2. doi:10.3390/medsci10010002

Thomas, D., Elliott, E. J., & Baur, L. (2019). Low glycaemic index, or low glycaemic load, diets for diabetes mellitus. Cochrane Database of Systematic Reviews, 1(1), CD006296. doi:10.1002/14651858.CD006296.pub3

World Health Organization. (2015). Ethiopia Stepwise Survey for Non-Communicable Diseases Risk Factors. Retrieved from https://www.who.int/ncds/surveillance/steps/Ethiopia_2015_STEPS_Report.pdf

World Health Organization. (2015). Ethiopia Stepwise Survey for Non-Communicable Diseases Risk Factors. Retrieved from https://www.who.int/ncds/surveillance/steps/Ethiopia_2015_STEPS_Report.pdf

Zambia Ministry of Health. (2017). Zambia Non-Communicable Diseases Risk Factors STEPS Survey. Retrieved from https://www.afro.who.int/sites/default/files/2018-01/Zambia-NCD-Risk-Factors-STEps-Report-2017.pdf