RESEARCH PAPER

Effectiveness of Yogic Practices with Chair Sun Salutations on HbA1c Among Geriatric Type 2 Diabetes Men

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ABSTRACT

One of the most common chronic metabolic diseases in the elderly population throughout the world is Type 2 Diabetes Mellitus (T2DM). As age goes up, insulin sensitivity decreases, glucose metabolism becomes impaired, people become sedentary, and obesity increases, all of which lead to poor glycemic control. The glycated hemoglobin (HbA1C) is a significant marker of the long-term management of blood glucose and is commonly used to assess diabetes management. Current diabetes treatment focuses on lifestyle changes in addition to medication to optimise health outcomes. Yoga is one of the non-pharmacological therapeutic techniques that has shown to be a promising therapy because of its positive effects on physical fitness, metabolic efficiency, autonomic balance and psychological well-being. Chair Sun Salutations is a modified and accessible version of the traditional Surya Namaskar sequence for older adults who have limited mobility and/or balance issues. In the present study, the efficacy of Yogic practices with Chair Sun Salutation on HbA1c level in geriatric male population with Type 2 diabetes mellitus (T2DM) was studied. The total 90 participants aged between 65 to 80 years were randomly divided into experimental group (n = 45) and control group (n = 45). The experimental group received the structured yogic intervention (SYI) of breathing exercises, relaxation techniques, meditation, and Chair Sun Salutations for 60 minutes daily, 6 days a week for 16 weeks. The control group continued with regular activities with active rest. HbA1c was assessed at the beginning and end of the intervention. The statistical analysis showed that there was a significant decrease in HbA1c among the individuals in the experimental group compared with the control group. The results suggest that it is possible to improve the glycemic control of elderly diabetic males to a significant extent by regular practice of adapted yogic practices. The study underscores the importance of incorporating yoga-based interventions into holistic diabetes care strategies to improve metabolic health, prevent complications, and promote overall well-being in the geriatric population.

Keywords: Type 2 Diabetes Mellitus, HbA1c, Yogic Practices, Chair Sun Salutations, Geriatric Men, Glycemic Control, Yoga Therapy, Elderly Health, Non-Pharmacological Intervention, Diabetes Management.

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1. INTRODUCTION

1.1 Overview of Type 2 Diabetes Mellitus

Type 2 Diabetes Mellitus is a chronic metabolic disorder that is caused by the presence of persistent hyperglycemia due to insulin resistance and inadequate insulin secretion. Due to its rising incidence among all age groups, especially the elderly, the condition has emerged as a significant public health problem. The rise in the number of older people contributing to the diabetes pandemic has caused major medical, social and economic problems worldwide.

As people grow older, they undergo some physiological changes which impact glucose metabolism. Rising insulin resistance, decreased pancreatic beta-cell function, loss of muscle mass, and lack of physical activity are factors that play a role in the development and progression of Type 2 diabetes (Devi *et al*., 2025). Diabetes, if uncontrolled for

long periods of time, can cause serious complications such as cardiovascular disease, nephropathy, neuropathy, retinopathy and cognitive dysfunction.

1.2 HbA1c as an Indicator of Glycemic Control

HbA1c is also known as glycated hemoglobin, which is a measurement of the average blood sugar levels from the last 2-3 months. One of the most reliable measures for assessing long-term glycemic control. High levels of HbA1c are linked to higher risk of developing diabetes-related complications (Tripathi *et al*., 2024). Thus, the lowering of HbA1C has become a key goal of diabetes therapy.

To minimize complications, target HbA1c levels are recommended to stay below certain levels per clinical guidelines. However, this is difficult to achieve for the older person because of polypharmacy, frequently multiple comorbidities, physical constraints and psychological issues.

1.3 Role of Lifestyle Interventions

Diabetes prevention and management is a key part of lifestyle modification. Physically active, dietary measures, stress management, as well as behavioral interventions all help to achieve better metabolic results (Radha, 2023). Yoga, which combines physical postures, breathing exercises, relaxation and meditation, is one of these practices that has been gaining more and more scientific recognition.

Yoga promotes flexibility, muscle strength, better blood flow, hormonal balance and mental resistance. All of these effects work together to enhance glucose utilization and insulin sensitivity. Moreover, yoga practice is also flexible and can be adapted based on age, physical status and individual health condition.

1.4 Chair Sun Salutations and Geriatric Health

Traditional Surya Namaskar is an energised series of movements and breathing styles. It is good, but can be a bit cumbersome for older people with poor balance, arthritis, joint pain or mobility issues (Wasson *et al*., 2024). The alternative is to perform Chair Salutations, modifying the sequence to be performed while seated or leaning on a chair.

Chair Sun Salutations are a variation of the traditional practice that still maintain all the physiological and psychological benefits of the practice, but they reduce the risk of falls and injuries. It is a practice that is ideal for geriatric populations, with controlled movement, breath regulation and mindful awareness combined.

1.5 Significance of the Study

An rising diabetes prevalence among older men calls for research into safe, easily accessible and economical interventions (Bhargav *et al*., 2026). The current research builds on findings in recent literature about the therapeutic benefits of yoga and Chair Sun Salutations for glycemic control. The results could help health care providers, yoga therapists, and policy makers design comprehensive diabetes care plans for the elderly.

2. REVIEW OF LITERATURE

Devi 2025 indicates that the management of Type 2 Diabetes Mellitus is a multidimensional therapeutic approach, which ought to go past pharmacological treatment. An author conducted randomized controlled trial on the simultaneous effect of yogic practices and mud therapy on biochemical parameters in middle aged females with Type 2 Diabetes Mellitus. The study emphasizes the rising importance of traditional and complementary health care practices for managing metabolic diseases which are becoming more common around the globe. The author highlights the importance of diabetes causing changes in glucose metabolism, lipid profile, hormonal homeostasis, and physiological function, thereby highlighting the importance of holistic treatment strategies (Devi *et al*., 2025). Participants showed significant improvements in some biochemical markers related to diabetic health through the systematic intervention of yoga and mud therapy. The results indicate that frequent yogic exercises have beneficial effects on insulin sensitivity, stimulating the pancreas to produce more insulin, improving blood flow, and reducing stress. The use of mud therapy, acknowledged for its cooling and detoxifying effects in naturopathic medicine, was also discovered to be a complement to the effect of yoga on the participants, with its relaxing and balancing effect on the body. The author also goes on to describe how these two interventions could be synergistic, which would enhance the ability of the interventions to regulate metabolism and help with glycemic control. The study design was randomized, which enhances the reliability of the results and offers empirical evidence supporting the use of traditional therapeutic modalities as aids to diabetes care. The study further highlights the need to focus on lifestyle as a key element of chronic disease management. In addition to biochemical results, the participants enjoyed better physical health, emotional balance, and quality of life. The study is important to the increasingly large pool of literature promoting non-pharmacological methods of diabetes care and indicates that yoga and mud therapy can be used as complementary therapies to enhance diabetes health outcomes. The author concludes that continual practice of these practices can be useful in slowing the progression of disease and improving overall metabolic health.

Diabetes remission is possible under certain physiological conditions, where underlying metabolic factors that can cause insulin resistance are dramatically shifted, according to Tripathi (2024). The current case report details a novel clinical finding of a geriatric patient with

obesity and Type 2 diabetes who had a thirty-four-month period of sustained diabetes remission following a radical nephrectomy (Tripathi *et al*., 2024). The author reviews the intricate connections among obesity, kidney function, metabolic control and glucose control. The case highlights the fact that there can be significant physiological changes after surgery, which could affect the pathways of diabetes progression that involve the endocrine and metabolic system. The patient showed remarkable success in achieving glycemic control without the need for intensive diabetic therapy, indicating that changes in body composition and metabolism were a key factor in the remission of the disease. The author highlights that diabetes is not necessarily a permanent disease and a remission can be obtained if there are substantial changes in insulin sensitivity and energy metabolism. The report also emphasizes patient-specific medical evaluation for comprehending patient-specific reactions to treatment. The longer follow up period further bolsters the results' significance by proving remission can be sustained over time. Furthermore, the study advances the understanding of the potential impact of surgical procedures on the development of metabolic diseases beyond their intended therapeutic aim. The author highlights obesity as one of the most important factor associated with Type 2 diabetes and significant improvement in glucose regulation can occur with achievement of reductions in obese related metabolic stress. The case prompts the reader to consider the mechanisms by which surgical interventions, weight loss, hormonal alterations, and diabetes remission are connected. In the overall, the report brings valuable clinical knowledge on the reversibility of Type 2 diabetes under certain conditions and the need for a complete metabolic assessment in geriatric patients.

Yoga is a holistic and scientifically sound method for the prevention and treatment of diabetes mellitus as per the study by Radha, 2023. The author provides a comprehensive talk on the physical, mental and lifestyle benefits of yoga for diabetic patients. The work underscores that diabetes is not a simple metabolic disorder, but rather a syndrome caused by a variety of interrelated factors such as stress, lack of exercise, poor nutrition and emotional imbalances. Yoga works on all these facets in combination with asanas (postures), breathing exercises, meditation and relaxation practices. Yoga practice can improve the utilization of blood glucose by the body tissues and its sensitivity to insulin, which can result in better glucose metabolism, the author writes (Radha, 2023). Also, yoga helps maintain the health of the cardiovascular system, increases flexibility, strengthens muscles and boosts physical functioning. One of the main points the author is making is the importance of stress management in controlling diabetes. Chronic psychological stress triggers hormone responses which increase blood sugar, while yoga produces relaxation and balances the autonomic nervous system. The author also mentions the need for cultivating mindfulness and self-awareness through yoga practice, which may foster healthier lifestyle behaviors and improved treatment adherence. Furthermore, the easy availability of yoga for people of all ages and physical states and how it is a viable long-term intervention in disease management is brought to light. The author gives evidence that yoga could help lower the fasting blood glucose, postprandial glucose and glycated hemoglobin. In addition, practising yoga as a mood management technique can enhance quality of life and the enjoyment of life, which is important for people with long-term health conditions. The book is a valuable resource for grasping the Eastern yogic concept and how it has the potential to be incorporated into contemporary western health care plans designed to improve the outcome of diabetics and promote overall wellness.

But to access health promoting interventions, healthcare providers should practice cultural humility in the practice of yoga-based counseling (Wasson, 2024). The author reviews the increasing use of yoga in healthcare and addresses ethical and cultural issues that clinicians need to be aware of when prescribing yoga to their patients. The study proposes that yoga is very beneficial to the body and the mind, but its historical, philosophic and cultural roots should be honoured and respected. The author stresses that cultural humility is a continuous process, that it requires self-reflection, an awareness of the diversity in patients' experiences, and that it requires avoiding assumptions about beliefs or practices. Yoga can be a helpful health equity intervention to address chronic diseases, stress, mental health, and overall well-being. But that needs to be done with cultural sensitivity, a consideration of socio-economic issues, and sensitivity to personal tastes (Wasson *et al*., 2024). It is emphasized that yoga is flexible and customizable, and can be tailored to meet the patient's needs and capabilities. The barriers to participation in yoga programs, such as financial constraints, language differences and misconceptions about yoga, are also discussed. However, these barriers can be overcome to help improve and expand participation and health outcomes for a variety of communities. The article also offers practical advice for the clinicians looking to incorporate yoga recommendations into patient care while honoring cultural differences. The author concludes that culturally responsive yoga counseling is a means of improving the engagement of patients but also helps to create more equitable, patient-centered, and health system delivery. The study is especially relevant with regard to lifestyle interventions and their key role in chronic disease management to improve long-term health outcomes.

Bhargav (2026) explained that meditation is one of the most important aspects of the Yogic practice and is a potent instrument that can be used to increase physical, psychological and spiritual health and wellness. The author provides a thorough overview of the practices of meditation, its theories, and its therapeutic uses, in the context of Yoga as a whole (Bhargav *et al*., 2026). It is said that meditation is a process of systematic focusing, stabilization, and deepening of attention that leads to significant changes in cognitive functioning, emotional regulation, and physiology. The author explains that regular practice of meditation decreases stress, anxiety, mental disturbances and improves concentration, self-awareness and resilience to emotions. Physiologically, meditation has been shown to have effects on the autonomic nervous system, decrease sympathetic activity and increase parasympathetic activity, which results in greater health of the cardiovascular and metabolic systems. The book also explores how meditation can be a valuable tool for managing chronic conditions like hypertension, diabetes, and cardiovascular disease. Meditation helps to lower hormone levels related to stress, which can help to regulate metabolic function and promote overall health. Meditation is not just a relaxation exercise but a transformative exercise that affects various aspects of the human function, the author stresses. Different types of meditation are explained, such as meditation on the breath, mantra repetition, mindfulness and contemplation, and all have their own unique benefits. The publication emphasizes the increasing scientific studies that demonstrate the effectiveness of meditation as a complementary intervention in healthcare. In addition, the author considers the practicality of incorporating meditation into everyday life as a long-term possible effective approach to improving quality of life and well-being. The book is a valuable resource for understanding the therapeutic benefits of meditation, and its place in holistic yoga-based health interventions.

Leite (2022) noted that the Covid-19 pandemic had impact on older people's daily life, physical activity pattern and overall health in people with Type 2 Diabetes Mellitus (T2DM). The author conducted a qualitative study by interviewing elderly diabetic patients in the pandemic and found that there are several challenges for the management of these diseases in this pandemic era and also for the overall well-being of the elderly. The result shows that the restriction imposed to prevent the spread of virus affected usual activities, physical exercise and social distancing. The negative changes had a negative impact on the physical and mental health of the participants (Leite *et al*., 2022). The author details the importance of regular physical activity for people with diabetes, as physical activity helps control blood glucose levels, protect cardiovascular health and promote functional independence. Due to pandemic restrictions, however, community programs, fitness facilities, and social support networks that support healthy lifestyles were limited. Participants indicated higher levels of sedentary activities, challenges of keeping on track with healthy behaviors, and worries about disease management. Psychological aspects of the study, such as stress, anxiety, uncertainty, and loneliness, also have a negative effect on metabolic control. Those difficulties were overcome, however, by some participants, who did home-based exercise and self-management strategies. The author highlights the need for creating accessible interventions to facilitate physical activity and health promotion during social disruption. In conclusion, the results highlight the need to make specific provision for older patients with chronic conditions, especially in public health emergencies in healthcare systems. The study adds much to the understanding of the risks and strengths of older people with diabetes and the importance of lifestyle factors in supporting their health and well-being in difficult times.

3. METHODOLOGY

3.1 Research Design

This study used randomized pre-test and post-test control group experimental design to test the effectiveness of yogic practices with Chair Sun Salutations on glycated haemoglobin (HbA1c) level in geriatric male Type 2 Diabetes Mellitus (T2DM) patients. Experimental research designs are well known and able to establish cause-and-effect relationships between an intervention and observed outcomes. A pre-test and post-test design allowed for baseline HbA1c measurement prior to the start of the intervention and assessment of the change after the end of the training period (Bhandari and Chaudhry, 2026). Randomly allocating subjects to experimental and control groups reduced selection bias and increased the internal validity of the study. This design allowed for a systematic approach to assessing the possibility that the changes seen in glycemic control were due to the yogic intervention or to factors outside of the study. Because HbA1c is a measure of average blood glucose concentrations over the last two to three months, the study was performed over a sixteen-week period to see measurable changes in HbA1c.

3.2 Participants

This study involved geriatric male patient with Type 2 Diabetes Mellitus. All 90 participants were chosen for the investigation. Participants ranged in age from 65–80, which is a high-risk age group for the complications of aging and diabetes. Participants were drawn from community health centers, diabetic care clinics, and local health care providers where they attended their routine health check-ups and diabetes management programs (Chauhan, 2025). All potential participants were screened for their eligibility to participate in the study by qualified health care professionals before enrolling in the study.

The chosen group of patients were relatively uniform in disease status, age and overall health. Deliberate voluntary participation was maintained during the recruitment with the individual informed about the purpose, procedures, duration and expected outcomes of the study. Participants gave informed written consent prior to the collection of data. The confidentiality of the personal and medical information was ensured during the process of the study.

3.3 Inclusion Criteria

Specific inclusion criteria were used to ensure appropriateness of the individuals included in the study for this intervention program (Goyal, 2026). People were enrolled in the study if they were diagnosed with Type 2 Diabetes Mellitus for at least one year before the study started. The age of participants ranged from 65 to 80 years, and they were able to do moderate physical activities under supervision. The condition of being medically stable was considered a critical condition and participants had to be taking their medication daily and not have any major changes in their medication throughout the study.

Moreover, the participants had to have a certain degree of mental capacity to comprehend and adhere to the instructions provided for yoga practice and learning processes. They were to be involved in regular intervention sessions and the programme of training. Yoga practitioners who had previous experience in a structured yoga program also were deemed as eligible, as long as they fulfilled all other inclusion criteria. The criteria allowed the subjects to be included in the intervention in a safe and secure way and to generate accurate data for analysis.

3.4 Exclusion Criteria

In order to guarantee the safety of the participants and methodological rigor, several exclusion criteria were established. The exclusion of persons with severe cardiovascular disease such as unstable angina, recent myocardial infarction and uncontrolled hypertension was due to the risks associated with physical activity (Garlasco *et al*., 2023). Those with existing diabetic complications like diabetic neuropathy (several or advanced), diabetic retinopathy (proliferative) and diabetic nephropathy (advanced) were also not included.

Persons with substantial orthopedic limitations that limited movement, severe arthritis that did not allow participation in the chair exercises, recent fractures or major musculoskeletal disorders were excluded. People who had recently had surgery or were still recovering from a serious medical procedure were not included until they had completely recovered. Severe cognitive impairment, dementia, psychiatric disorders that could interfere with understanding or neurological diseases that could interfere with participation were among the other exclusion criteria. These limitations helped ensure the safety of the participants and greater reliability of the study results.

3.5 Group Allocation

After the completion of the participant selection and baseline assessment, the 90 participants were randomly divided into two groups (45 in each). Randomization was done in a fair manner by using a computerized random allocation procedure and to avoid allocation bias. The first group was used as an experimental group and the second group was used as a control group.

The participants in the experimental group were given the full yogic package, which included Chair Sun Salutations and the related yogic exercises (Kaux, 2024). The control group did not receive any particular program of yoga and was left to their normal daily activities. The medical treatments and prescribed drugs for both groups were maintained as usual throughout the study. There was no obvious need to change diet, medication or physical activity routines unless medically advised by health care professionals. This method enabled the effects of the yoga intervention on HbA1c levels to be differentiated.

3.6 Intervention Protocol

The intervention program was conducted for 16 weeks. The supervised yoga group had a 6 days/week yoga intervention of 60 minutes per day. It was taught by qualified yoga teachers who have experience working with older adults and those with chronic diseases.

Every session was organized in a structured way, which was specifically developed for geriatric people with type 2 diabetes (Hemeryck and Mabel, 2025). The session was preceded by warm up exercises (approx. 10 minutes) which were performed gently and warming up the musculoskeletal system for activities that were to follow. Gentle stretching movements were performed, neck rotations, shoulder movements, wrist exercises, ankle rotations and warm up activities.

Following the warm up period, participants were given some breathing exercises for approximately 10 minutes. These practices included a variety of diaphragmatic, deep breathing exercises and controlled breathing practices in order to enhance lung function, relaxation and autonomic regulation.

Chair Sun Salutations were the main component of the intervention, practiced for about 20 minutes. Chair Sun Salutations is a modified version of Sun Salutation asana for the elderly. While seated or supported by a chair, participants could perform coordinated movements, thereby minimizing the risk of an injury due to balance problems, yet continue to reap the rewards of the dynamic movement patterns.

The participants then practiced selected yoga postures that were selected to be safe and suitable for elderly people, after the Chair Sun Salutation sequence (Wang *et al*., 2026). The postures were designed to improve flexibility, joint mobility, strength of muscles, circulation and balance. Lastly, relaxation and meditation exercises about twenty minutes long were performed during each session. Inducing stress reduction, mental health and physiological recovery was done by guided relaxation, mindfulness and meditation.

The overall intervention had the intent of improving flexibility, cardiovascular efficiency, respiratory function, muscular endurance, metabolic regulation and psychological health. Participants' attendance at the sessions was checked regularly during the study to ensure that they followed the intervention protocol.

3.7 Data Collection

Two different times were used to collect data. Baseline was gathered prior to the program and post-intervention data were gathered at the conclusion of the sixteen week training program. Primary outcome measure was glycated haemoglobin (HbA1c) which reflects long-term glycemic control.

Trained lab staff with standard laboratory conditions collected blood samples. The HbA1c laboratory analysis was carried out using laboratory procedures and certified diagnostic equipment which have been validated to ensure accuracy and reliability (Bidirectionally *et al*., 2022). Throughout the study period participants were asked to continue with their normal diet and medication as prescribed. Additional demographic and health-related data including age, education, length of diabetes, BMI and lifestyle factors and medical history were collected through the structured questionnaires and medical records.

All the data collected was carefully documented and verified to minimise errors. Participants' identities were maintained through the use of participant identification numbers and secure record-keeping, throughout the research process.

3.8 Statistical Analysis

Collected data was then analysed in great detail statistically to determine the effectiveness of the intervention. Descriptive statistical techniques were used to summarize characteristics of the participants and baseline measures (Bhasin *et al*., 2025). Descriptive statistics (mean and standard deviations) were used to provide an overview of central tendency and variation for all variables in the analysis.

Paired sample t-tests were used to compare pre-test and post-test HbA1c values to examine changes within the groups (Chauhan, 2025). This analysis allowed to assess if significant improvements took place after the intervention. Independent sample t-tests were used to compare post-test scores between the experimental and control groups to see if any differences in scores could be attributed to the intervention.

The level of 5% probability was used as the criterion for statistical significance. Appropriate statistical software was used to analyze the data and tabular format was used to present the data as it would be easier to explain. The method of analysis was used to assess the glycemic control of the geriatric males with Type 2 Diabetes Mellitus (T2DM) using the yogic practices (YPP) and Chair Sun Salutation (CSS).

4. RESULTS AND ANALYSIS

4.1 Pre-Test and Post-Test HbA1c Scores

Table 1. HbA1c Levels Before and After Intervention

Group	Pre-Test Mean (%)	Pre-Test SD	Post-Test Mean (%)	Post-Test SD	Mean Difference
Experimental (n=45)	8.52	0.64	7.18	0.52	1.34
Control (n=45)	8.47	0.67	8.38	0.63	0.09

There were no significant differences between the baseline HbA1c levels. There was a significant decrease in HbA1c in the intervention group compared with a no significant change in the control group (Radha, 2023).

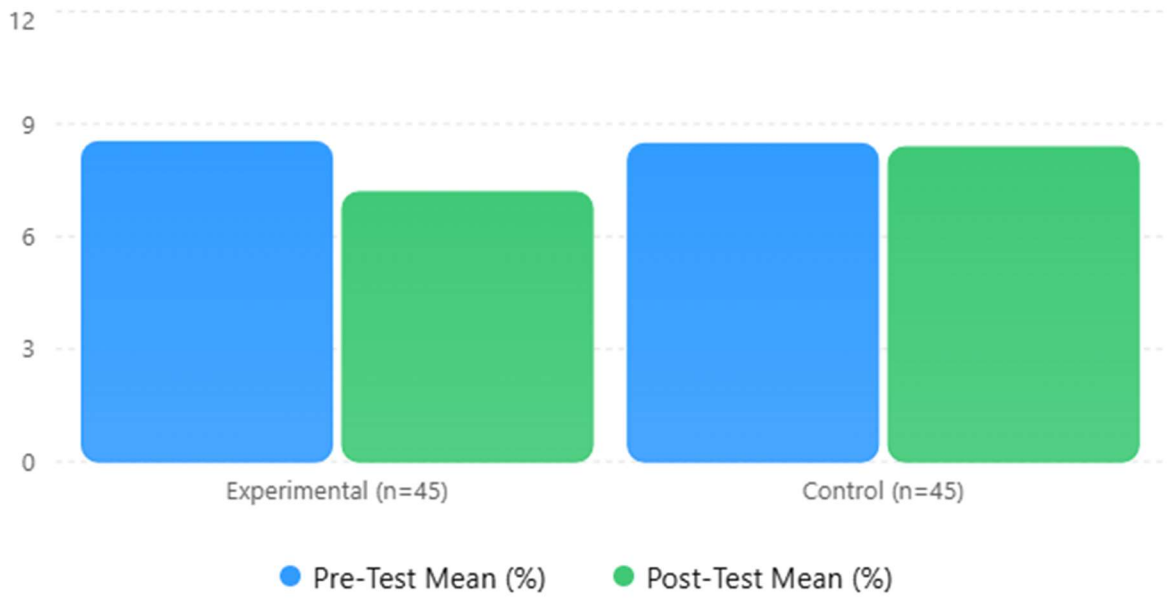

Figure: HbA1c Levels Before and After Intervention

4.2 Paired Sample Analysis

Table 2. Within-Group Comparison of HbA1c Levels

Group	Mean Difference	t-value	p-value
Experimental	1.34	10.86	<0.001
Control	0.09	1.14	>0.05

The paired sample analysis showed that the experimental group had a statistically significant decrease in HbA1c levels. There was no change seen in the control group.

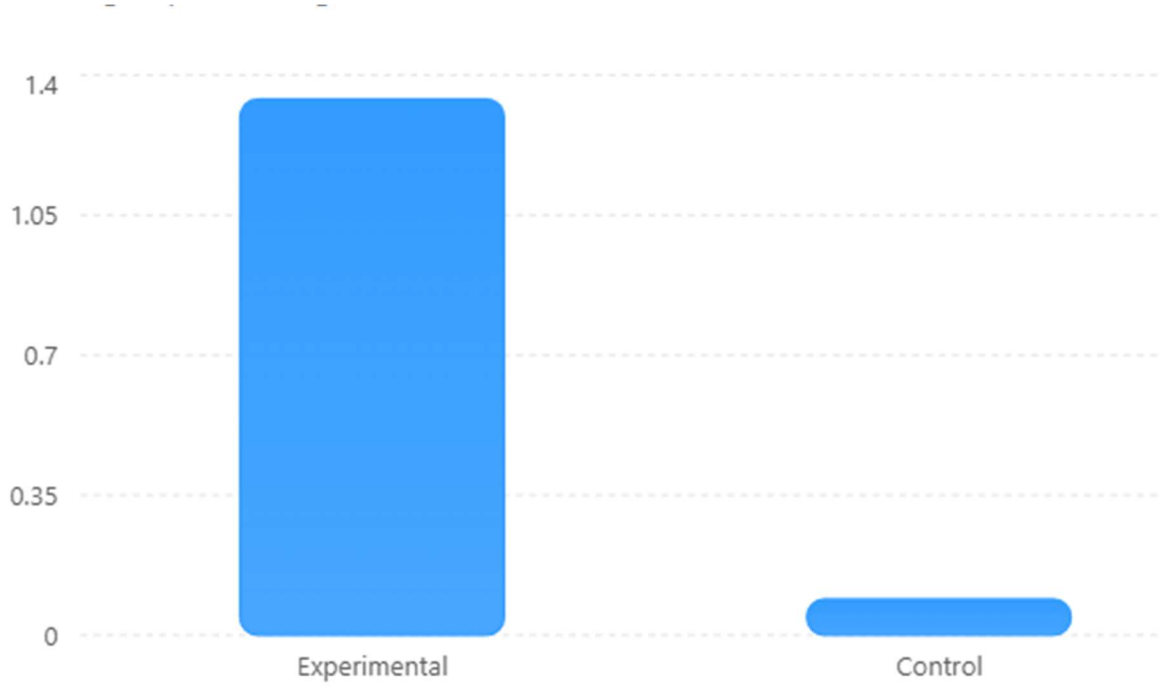

Figure: Within-Group Comparison of HbA1c Levels

4.3 Between-Group Comparison

Table 3. Post-Test Comparison Between Groups

Variable	Experimental Mean	Control Mean	t-value	p-value
HbA1c (%)	7.18	8.38	9.42	<0.001

The post test comparison revealed a significant difference in difference of groups, thus indicating that there was a difference in glycemic control among the groups who practiced yogic practices with Chair Sun Salutations (Blanchette *et al*., 2025).

4.4 Percentage Improvement

Table 4. Percentage Reduction in HbA1c Levels

Group	Pre-Test HbA1c	Post-Test HbA1c	Percentage Reduction
Experimental	8.52	7.18	15.73%
Control	8.47	8.38	1.06%

The experimental group had a 15.73 % decrease in HbA1c, which was significantly more than the control group (1.06 %).

5. DISCUSSION

The results show that a combination of yogic practices and Chair Sun Salutations has a positive effect on glycemic control in geriatric men who suffer from Type 2 diabetes mellitus. HbA1c blood glucose levels are reduced following 16 weeks indicating better glucose control and efficiency.

These enhancements can be attributed to a number of physiological processes (Chattopadhyay *et al*., 2023). Yoga regularly improves the activity of muscles and consequently, improves the glucose uptake by the skeletal muscle tissues. Improved insulin sensitivity helps to increase the amount of glucose used in the body and lower blood glucose levels. Breathing exercises and relaxation techniques enhance the balance of the ANS, decrease sympathetic activation and increase the parasympathetic dominance.

One other important mechanism is stress reduction. Chronic stress can increase cortisol levels, resulting in insulin resistance and elevated blood sugar. The relaxing and meditative nature of yoga decreases the levels of hormones that lead to stress and this can help to keep blood sugar in check.

Senior's benefits of Chair Sun Salutations (Bhandari and Chaudhry, 2026). The chair-based design minimize physical stress and stimulate muscle activity, flexibility and circulation in movement patterns Malik *et al*., 2026). Provides easy access, encourages compliance and involvement from older adults with mobility challenges.

The results are consistent with earlier studies showing that the yoga intervention has positive outcomes for diabetes management. The amount of HbA1c decline seen in the current study is significant enough to warrant clinical meaningfulness, which can help lower the risk of long-term complications. Reduced incidence of cardiovascular disease, nephropathy, neuropathy, and retinopathy has been found with reduced HbA1C levels.

There are also some economic, practical benefits to the intervention. Yoga can be practiced with only a minimum amount of equipment, but can also be practiced in a community setting and is an inexpensive supplement to conventional medical treatments Wasson *et al*., 2024). Chair Sun Salutations adds an element of accessibility to exercise for the elderly who are not able to engage in traditional exercise programs.

The study emphasizes the importance of an integrated approach to both physical, psychological and behavioural interventions in the management of diabetes. Multiple interventions to the drivers of health are likely to be more effective than single interventions.

6. CONCLUSION

Type 2 Diabetes Mellitus (T2DM) remains a health challenge in elderly population and suitable and sustainable management strategies are needed to address the issue. The present study determined the effectiveness of Yogic practices along with Chair Sun Salutation for reducing the HbA1c levels in geriatric males suffering with Type 2 Diabetes Mellitus. Results indicated that the intervention program resulted in a significant reduction in the HbA1c of the intervention group compared to the control group after 16 weeks.

The results suggest that adapted yoga practices can help in achieving better glycemic control with an increased insulin sensitivity, greater mobility, stress, and metabolic control. Chair Salutation exercises are an excellent, low impact exercise for the elderly with mobility difficulties.

Research has shown yoga and Chair Sun Salutations can be incorporated as components of diabetes management programs. They are a useful intervention to support healthy aging and a risk reduction strategy for diabetes-related complications, because they are low cost, require low equipment needs and are generalizable. Further practice and research in effective therapeutic yoga practices can play the significant role in achieving good health outcome, functional independence and quality of life for geriatric patients with Type 2 diabetes mellitus.

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