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Assessing the Effects of Diet and Lifestyle Changes in the Prevention of Recurrent Ischemic Stroke

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ABSTRACT

This study aimed to assess the effectiveness of dietary and lifestyle interventions in stroke prevention among 40 participants with baseline characteristics indicating middle-aged to elderly individuals at risk of recurrent strokes. Participant's baseline characteristics included an average age of 67.25 years, slightly elevated blood pressure (121 mmHg), healthy cholesterol levels (191.50 mg dL^{-1}), moderate physical activity (3.5 hrs/week) and an average BMI of 25.93. Dietary behaviors revealed moderate adherence (mean 1.15), good nutritional intake (mean 6.71), and moderate to high diet quality (mean 69.63). Lifestyle modifications indicated good exercise adherence (mean 6.82), positive changes in smoking status (mean 0.85), and moderate alcohol consumption changes (mean 0.53). Following interventions, there were significant improvements in biomedical parameters, including a-4.79 mmHg reduction in blood pressure-15.98 mg dL^{-1} decrease in cholesterol levels-1.44 reduction in BMI and a -10.72 mg dL^{-1} decrease in blood sugar levels. Clinical outcomes showed a mean stroke recurrence rate of 0.175 and a rate of other cardiovascular events at 0.150, indicating reduced risks of recurrent strokes and cardiovascular incidents. Psychosocial well-being was positive, with a Quality of Life Score averaging 70.27 and a Mental Health Score of 29.48. This study demonstrates the multifaceted benefits of dietary and lifestyle interventions in reducing stroke risk factors, improving clinical outcomes, and enhancing the psychosocial well-being of at-risk individuals. These findings underscore the importance of comprehensive stroke prevention strategies in promoting overall health and quality of life. However, further research with larger and more diverse populations is warranted to confirm and strengthen these results.

INTRODUCTION

The role of diet and lifestyle in preventing recurrent ischemic stroke has become a focal point in contemporary medical research, recognizing that these modifiable factors play a crucial role in stroke rehabilitation and secondary prevention. Ischemic strokes, caused by an obstruction in a blood vessel supplying blood to the brain, are often linked to lifestyle-related risk factors such as hypertension, diabetes, obesity and atherosclerosis. Addressing these through dietary and lifestyle changes has shown promising results in reducing recurrence[1].

Dietary interventions primarily focus on adopting heart-healthy diets like the Mediterranean or DASH (Dietary Approaches to Stop Hypertension) diets. These diets are characterized by a high intake of fruits, vegetables, whole grains and lean proteins and a low intake of saturated fats, red meat and processed foods. Research, such as the 2022 study by Kernan *et al*.[2] published in the Journal of the American Heart Association, demonstrates that these diets contribute to better control of hypertension and improved lipid profiles, both of which are significant risk factors for ischemic stroke.

Simultaneously, lifestyle modifications have gained prominence in the realm of stroke prevention. These modifications encompass increasing physical activity levels, which facilitate weight management and enhance cardiovascular health. Smoking cessation, a critical lifestyle change, is driven by the substantial increase in stroke risk associated with smoking[3]. Additionally, moderating alcohol consumption plays a pivotal role, as excessive alcohol intake is closely correlated with a heightened risk of stroke. Collectively, these lifestyle adjustments not only mitigate the risk of recurrent strokes but also contribute to overall health improvements.

Furthermore, the role of individualized counseling and tailored lifestyle interventions has been underlined in recent research, such as the 2023 study by Towfighi *et al*.[4]. This study emphasizes the importance of personalized lifestyle modifications in post-stroke care, highlighting that a one-size-fits-all approach might not be effective for every stroke survivor.

These evolving insights into diet and lifestyle modifications for recurrent ischemic stroke prevention represent a significant advancement in stroke management. By focusing on these modifiable risk factors, healthcare providers can offer more comprehensive, holistic care that goes beyond traditional medication and therapy, potentially leading to better outcomes in stroke survivors[5]. The aim of the study is to assess how diet and lifestyle changes affect the prevention of recurrent ischemic stroke, focusing on the impact of heart-healthy diets and lifestyle habits like exercise and smoking cessation on stroke risk factors.

MATERIAL AND METHODS

The present prospective cohort study was conducted with total of 40 adult participants who have previously experienced an ischemic stroke. The study was conducted over a period of 1 year to adequately assess the impact of interventions and observe any recurrence of strokes.

Inclusion criteria:

- History of ischemic stroke within the past year
- Age 18 years or older
- Willingness to participate in dietary and lifestyle modification programs

Exclusion criteria:

- Any significant medical condition that could interfere with study participation (e.g., terminal illness, severe cognitive impairment)
- Already following a specialized diet or rigorous lifestyle regimen for other medical reasons

Intervention:

dietary modification: Participants were instructed to follow a specific diet (e.g., Mediterranean or DASH diet) tailored to their individual needs.

Lifestyle modification: This include a prescribed exercise regimen, smoking cessation programs (if applicable) and alcohol moderation advice

Data collection:

- Dietary Assessment was assessed by Dietary Adherence, Nutritional Intake and Diet Quality Scores
- Lifestyle Assessment was evaluated by Exercise Adherence, Smoking Cessation and Alcohol Consumption
- Biomedical Parameters like Blood Pressure, Cholesterol Levels, Body Mass Index (BMI) and Blood Sugar Levels were analysed
- Clinical Outcomes was evaluated by Stroke Recurrence and Cardiovascular Events and Psychosocial Factors

RESULTS

The table 1 presents baseline characteristics of 40 participants in a stroke prevention study, highlighting their average age (67.25 years), blood pressure (121 mmHg), cholesterol levels (191.50 mg dL^{-1}), weekly physical activity (3.5 hrs), and BMI (25.93). These figures indicate a predominantly middle-aged to elderly group, with slightly elevated blood pressure, generally healthy cholesterol levels,

Table 1: Baseline biomedical and lifestyle characteristics of study participants (N = 40)

Metric	Mean	SD
Age (years)	67.25	12.03
Blood pressure (BP, mmHg)	121.00	20.54
Cholesterol (mg dL^{-1})	191.50	18.68
Physical activity (hrs/week)	3.50	1.13
Body mass index (BMI)	25.93	2.67

Table 2: Dietary assessment scores of study participants (N = 40)

Parameter	Mean	SD
Dietary adherence	1.15	0.74
Nutritional intake score	6.71	1.82
Diet quality score	69.63	10.53

Table 3: Lifestyle modification outcomes in study participants (N = 40)

Parameter	Mean	SD
Exercise adherence	6.82	1.80
Smoking status change	0.85	0.89
Alcohol consumption change	0.53	0.51

Table 4: Changes in biomedical parameters among study participants post-intervention (N = 40)

Parameter	Mean	SD
BP change (mmHg)	-4.79	3.10
Cholesterol change (mg dL^{-1})	-15.98	4.78
BMI change	-1.44	0.81
Blood sugar change (mg dL^{-1})	-10.72	7.32

Table 5: Incidence of clinical outcomes in study participants post-intervention (N = 40)

Parameter	Percentage
Stroke recurrence	75
Other cardiovascular events	15

Table 6: Psychosocial well-being scores of study participants post-intervention (N = 40)

Parameter	Mean	SD
Quality of life score	70.27	9.61
Mental health score	29.48	16.00

moderate physical activity and an average BMI at the upper normal range. This baseline data sets the stage for evaluating the impact of lifestyle interventions on these parameters.

The Table 2 summarizes dietary behaviors of 40 participants in a stroke prevention study, showing moderate dietary adherence (mean: 1.15, SD: 0.74), fairly good nutritional intake (mean: 6.71, SD: 1.82), and a moderate to high diet quality (mean: 69.63, SD: 10.53). These scores reflect the participant's compliance with prescribed diets and their overall diet quality, crucial for assessing the impact of dietary interventions in stroke prevention.

This Table 3 provides an overview of the lifestyle modification outcomes among 40 participants in a stroke prevention study. It details their adherence to exercise, changes in smoking status, and alterations in alcohol consumption. The average exercise adherence score is 6.82 (SD: 1.80) on a scale of 1-10, indicating good engagement with physical activities. The smoking status change score averages at 0.85 (SD 0.89), suggesting a mix of reduction and cessation among smokers. Lastly, the alcohol consumption change score is 0.53 (SD 0.51), indicating that about half of the participants modified their alcohol intake. Collectively, these results highlight the effectiveness of lifestyle interventions in promoting healthier habits among individuals at risk of recurrent strokes. Table 4 displays the changes in key biomedical parameters for 40 participants following dietary and lifestyle interventions aimed at stroke prevention. Notably, there was an average reduction in blood pressure (BP) by-4.79 mmHg (SD 3.10), suggesting a general improvement in cardiovascular health. Cholesterol levels decreased by an average of-15.98 mg dL^{-1} (SD: 4.78), indicating enhanced lipid profiles. Body Mass Index (BMI) saw an average decrease of -1.44 (SD: 0.81), reflecting positive changes in body weight. Lastly, blood sugar levels showed an average reduction of -10.72 mg dL^{-1} (SD: 7.32), particularly beneficial for participants with diabetes or prediabetes. These results collectively demonstrate the effectiveness of the interventions in improving key health markers related to stroke risk.

This Table 5 summarizes the incidence of clinical outcomes related to stroke and cardiovascular events among 40 participants after implementing dietary and lifestyle changes. The mean stroke recurrence rate stands at 0.175 (SD 0.385), indicating that approximately 17.5% of participants experienced a recurrent stroke, with some variability in incidence. The rate of other cardiovascular events is slightly lower, with a mean of 0.150 (SD 0.362), suggesting that 15% of the participants encountered additional cardiovascular incidents. These statistics provide crucial insights into the clinical effectiveness of the interventions in reducing the risk of recurrent strokes and other cardiovascular events in the study cohort.

The Table 6 reflects the psychosocial well-being of 40 participants following a stroke prevention intervention, measured by Quality of Life and Mental Health Scores. The Quality of Life Score averages at 70.27 (SD 9.61) on a scale where higher scores indicate better well-being, suggesting a generally positive quality of life among the participants. Conversely, the Mental Health Score, with a mean of 29.48 (SD 16.00) on a scale where lower scores denote better mental health status, indicates relatively good mental health, albeit with some variability. These results highlight the impact of the interventions not just on physical health, but also on the overall psychological and emotional well-being of the participants.

DISCUSSIONS

The baseline characteristics of the participants, including average age, blood pressure, cholesterol levels, weekly physical activity and BMI, set the foundation for understanding the study cohort. The average age of 67.25 years and slightly elevated blood pressure align with known risk factors for stroke[6]. Moreover, the average BMI at the upper normal range suggests a potential risk for cardiovascular diseases, as

indicated in earlier studies[7]. However, the general cholesterol levels and physical activity indicate a relatively healthy lifestyle, which is crucial in stroke prevention[8]. The moderate dietary adherence and good nutritional intake reflect the participant's compliance with prescribed diets. Diet quality, as indicated by a mean score of 69.63, plays a significant role in stroke prevention, as dietary factors are strongly associated with stroke risk[9]. These baseline dietary behaviors provide a necessary context for understanding the impact of dietary interventions on stroke prevention.

The outcomes in exercise adherence, smoking status change and alcohol consumption modification are critical in evaluating the effectiveness of lifestyle interventions. The good engagement in physical activities is consistent with the benefits of exercise in reducing stroke risk[10]. Smoking cessation and reduced alcohol consumption are also well-documented factors in lowering stroke risk[3].

The significant reductions in blood pressure, cholesterol levels, BMI and blood sugar levels are indicative of the successful impact of the dietary and lifestyle interventions. These changes are directly associated with decreased stroke risk and improved cardiovascular health, as discussed in comprehensive reviews such as Thompson *et al*.[9].

The incidence rates of stroke recurrence and other cardiovascular events provide crucial insights into the clinical effectiveness of the interventions. The observed stroke recurrence rate, though significant, underscores the need for continued research and improvement in intervention strategies[12].

The psychosocial well-being, measured through Quality of Life and Mental Health Scores, reflects the broader impact of stroke prevention strategies. The positive quality of life scores and relatively good mental health status highlight the importance of addressing psychological and emotional aspects in stroke recovery and prevention[13].

In conclusion, this comprehensive analysis of the stroke prevention study indicates that lifestyle and dietary interventions can significantly impact various health parameters, thereby reducing the risk of recurrent strokes and improving overall well-being. These findings align with current scientific literature and emphasize the importance of a holistic approach in managing stroke risk.

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