

Analyzing the Impacts of Different Dietary Interventions on Well-Being of Older Adults

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ABSTRAK

Penelitian ini menyelidiki pengaruh Diet Mediterania, Diet Berbasis Nabati, dan Diet Rendah Karbohidrat terhadap kesejahteraan lansia pada 92 orang dewasa lanjut usia, dibandingkan dengan kelompok Kontrol tanpa intervensi, dengan hipotesis bahwa ketiga kelompok diet akan menunjukkan kinerja yang lebih baik dibandingkan kelompok Kontrol dan kelompok Mediterania akan menunjukkan hasil yang unggul. Kesejahteraan menyeluruh diukur dengan skala 0-100, dan analisis varians (ANOVA) satu arah antar-subjek menunjukkan perbedaan yang signifikan antar kelompok, $F(3, 88) = 16,56$, $p < 0,001$, $\eta^2 = 0,361$. Kontras a-priori mengonfirmasi bahwa ketiga kelompok intervensi secara bersama-sama melaporkan kesejahteraan yang secara signifikan lebih tinggi dibandingkan kelompok Kontrol ($t(88) = 5,278$, $p < 0,001$). Meskipun kelompok Mediterania melaporkan skor rata-rata tertinggi ($M = 72,74$), perbedaan dengan kelompok Berbasis Nabati ($M = 69,48$) tidak signifikan ($t(88) = 0,735$, $p = 0,464$); namun, kelompok Mediterania melaporkan kesejahteraan yang secara signifikan lebih tinggi dibandingkan kelompok Rendah Karbohidrat ($M = 53,39$; $t(88) = 4,362$, $p < 0,001$). Temuan ini menunjukkan bahwa intervensi diet terstruktur dapat meningkatkan kesejahteraan pada orang dewasa lanjut usia, dengan Diet Mediterania dan Diet Berbasis Nabati menawarkan manfaat yang sebanding, meskipun durasi penelitian yang singkat dan keragaman sampel yang terbatas menggarisbawahi perlunya penelitian longitudinal di masa depan dengan populasi yang lebih beragam.

Kata kunci: *diet mediterania; diet berbasis nabati; diet rendah karbohidrat; orang dewasa lanjut usia; kesejahteraan*

ABSTRACT

This study investigated the impact of Mediterranean, Plant-Based, and Low-Carb Diets on the overall well-being of 92 older adults, compared to a no-intervention Control group, hypothesizing that all dietary groups would outperform the Control and that the Mediterranean group would show superior results. Overall well-being was measured on a 0-100 scale, and a One-Way Between-Groups ANOVA revealed a significant difference across groups, $F(3, 88) = 16.56$, $p < .001$, $\eta^2 = .361$. A-priori contrasts confirmed that the three intervention groups combined reported significantly higher well-being than the Control group ($t(88) = 5.278$, $p < .001$). While the Mediterranean group reported the highest mean score ($M = 72.74$), the difference from the Plant-Based group ($M = 69.48$) was not significant ($t(88) = .735$, $p = .464$); however, it did report significantly higher well-being than the Low-Carb group ($M = 53.39$; $t(88) =$

4.362, $p < .001$). These findings suggest that structured dietary interventions can enhance well-being in older adults, with both Mediterranean and Plant-Based diets offering comparable benefits, though the study's short duration and limited sample diversity underscore the need for future longitudinal research with broader populations.

Keywords: *mediterranean diet; plant-based diet; low-carb diet; older adults; well-being*

INTRODUCTION

The global population is undergoing a profound demographic shift, with the number of individuals aged 60 years and older projected to reach 2.1 billion by 2050. This transition presents significant challenges for public health systems, as extending lifespan has not necessarily been accompanied by an equivalent extension of "healthspan", referring to the period of life spent in good health. Consequently, there is an urgent need to identify modifiable lifestyle factors that can promote healthy aging and sustain overall well-being in later years. Nutrition has emerged as one of the most critical determinants of health outcomes in older adults, with extensive research establishing that dietary patterns play a fundamental role in preventing age-related chronic conditions such as cardiovascular disease, cognitive decline, and frailty (Franceschi et al., 2018; Dominguez & Barbagallo, 2018).

Beyond the absence of disease, the concept of "overall well-being" contains a broader framework that includes physical health, psychological functioning, emotional regulation, social engagement, and subjective life satisfaction (Ryan & Deci, 2001; Diener et al., 2018). In older adults, well-being is a particularly salient outcome, as it has been associated with reduced mortality, better functional status, and lower healthcare utilization (Steptoe et al., 2015). Despite the wealth of research examining the physiological effects of various dietary patterns, comparatively less attention has been given to understanding how these interventions influence subjective well-being, which is a central tenet of positive psychology and gerontological research (Ryff, 1989, 2014).

Several dietary approaches have garnered substantial empirical support for their potential to enhance health outcomes, yet their comparative effects on overall well-being remain unclear. The Mediterranean Diet, characterized by high consumption of fruits, vegetables, whole grains, and olive oil, has been consistently associated with improved cardiovascular and cognitive health (Estruch et al., 2018). Plant-Based Diets, which emphasize minimally processed plant foods, have been linked to lower rates of obesity and all-cause mortality (Kahleova et al., 2018), while Low-Carbohydrate Diets have gained popularity for their efficacy in weight management and glycemic control (Mansoor et al., 2016). However, evidence regarding their relative impact on psychological and holistic well-being remains fragmented, with some studies suggesting superior benefits from Mediterranean and Plant-Based patterns, while others report mixed outcomes for Low-Carb approaches due to potential negative effects on mood and energy (El Ghoch et al., 2016; Adjibade et al., 2019).

Given these theoretical and empirical gaps, this study was designed to systematically evaluate the effectiveness of three prominent dietary approaches; the Mediterranean Diet, Plant-Based Diet, and Low-Carb Diet, against a Control group without specific intervention. The findings are expected to contribute to the broader discourse on nutritional gerontology, inform clinical and public health recommendations, and assist older adults in making informed dietary choices that support not only physical health but also holistic well-being.

METHOD

Research Design

This study employed a quantitative, between-groups experimental design. Participants were randomly assigned to one of four independent groups: Mediterranean Diet Group, Plant-Based Diet Group, Low-Carb Diet Group, or Control Group (no specific intervention). The independent variable was the type of dietary intervention, with four levels (Mediterranean, Plant-Based, Low-Carb, and Control). The dependent variable was overall well-being, measured on a continuous scale from 0 to 100, with higher scores indicating better well-being. This design allowed for the direct comparison of mean well-being scores across the four groups and enabled the testing of specific a-priori hypotheses regarding group differences.

Participants

Participants were 92 older adults recruited from a single health spa facility. The sample size was determined based on power analysis considerations to detect medium-to-large effect sizes, with a total of 23 participants assigned to each of the four conditions (N = 23 per group). Inclusion criteria for participation included: (a) aged 60 years or older, (b) willing to adhere to the assigned dietary intervention for the duration of the study, and (c) able to provide informed consent. Exclusion criteria included: (a) pre-existing medical conditions that contraindicated participation in any of the dietary interventions, (b) current participation in another dietary or lifestyle intervention study, and (c) inability to comply with the study requirements. Participants were recruited through flyers and announcements at the health spa, and all provided written informed consent prior to enrollment.

Apparatus and Procedure

Participants assigned to the intervention groups received structured dietary plans tailored to each condition. The Mediterranean Diet group followed a plan emphasizing high consumption of fruits, vegetables, whole grains, legumes, nuts, and olive oil, with moderate fish and poultry intake and limited red meat. The Plant-Based Diet group followed a plan emphasizing minimally processed plant foods, including fruits, vegetables, whole grains, legumes, nuts, and seeds, while limiting or excluding animal products. The Low-Carb Diet group followed a plan with significantly reduced carbohydrate intake, replaced by increased protein and fat. The Control group continued with their regular dietary habits without any specific intervention or dietary guidance. All dietary plans were developed by qualified nutritionists and provided to participants through written materials and regular counseling sessions.

Overall well-being was measured using a validated self-report instrument designed to assess the multidimensional nature of well-being, encompassing physical, psychological, and social dimensions. Participants rated their well-being on a scale from 0 to 100, with higher scores indicating better overall well-being. The instrument has demonstrated acceptable psychometric properties in previous research with older adult populations, including good internal consistency and test-retest reliability. The measure was administered at the conclusion of the

8-week intervention period.

Data Analysis

Prior to conducting the main analyses, key assumptions for the One-Way Between-Groups Analysis of Variance (ANOVA) were investigated. Normality was assessed through skewness and kurtosis statistics for each dietary group, with non-significant values indicating that the assumption of normality was met. Homogeneity of variance was assessed using Levene's Test, with non-significant results confirming that the assumption was satisfied. Descriptive statistics, including means, standard deviations, and 95% confidence intervals, were calculated for each group to summarize the well-being scores.

A One-Way Between-Groups ANOVA was conducted to determine whether there were significant mean differences in overall well-being scores across the four dietary intervention groups. A significance level of $\alpha = .05$ was set for the analysis. Effect size was estimated using eta-squared (η^2), with values interpreted according to conventional guidelines (small = .01, medium = .06, large = .14). The ANOVA was followed by a series of three a-priori contrasts to test the specific hypotheses of the study. The first contrast compared the Control group against the combined mean of the three intervention groups. The second contrast compared the Mediterranean Diet group against the Plant-Based Diet group. The third contrast compared the Mediterranean Diet group against the Low-Carb Diet group.

RESULTS

A between groups analysis was performed using the data provided, with the descriptive statistics results displayed in Table 1, where overall well-being was measured on a scale from 0 to 100, with higher scores indicating better well-being. The results indicated that overall well-being performances varied with the different dietary interventions, with the Mediterranean group reporting the highest well-being performance on average ($M = 72.74$, $SD = 10.89$), followed by the Plant-Based group ($M = 69.48$, $SD = 14.50$), the Low-Carb group ($M = 53.39$, $SD = 17.02$) and finally the Control group ($M = 46.09$, $SD = 16.92$). In addition, the difference was most notable between the Mediterranean diet group and the Control group as indicated in Figure 1.

Table 1

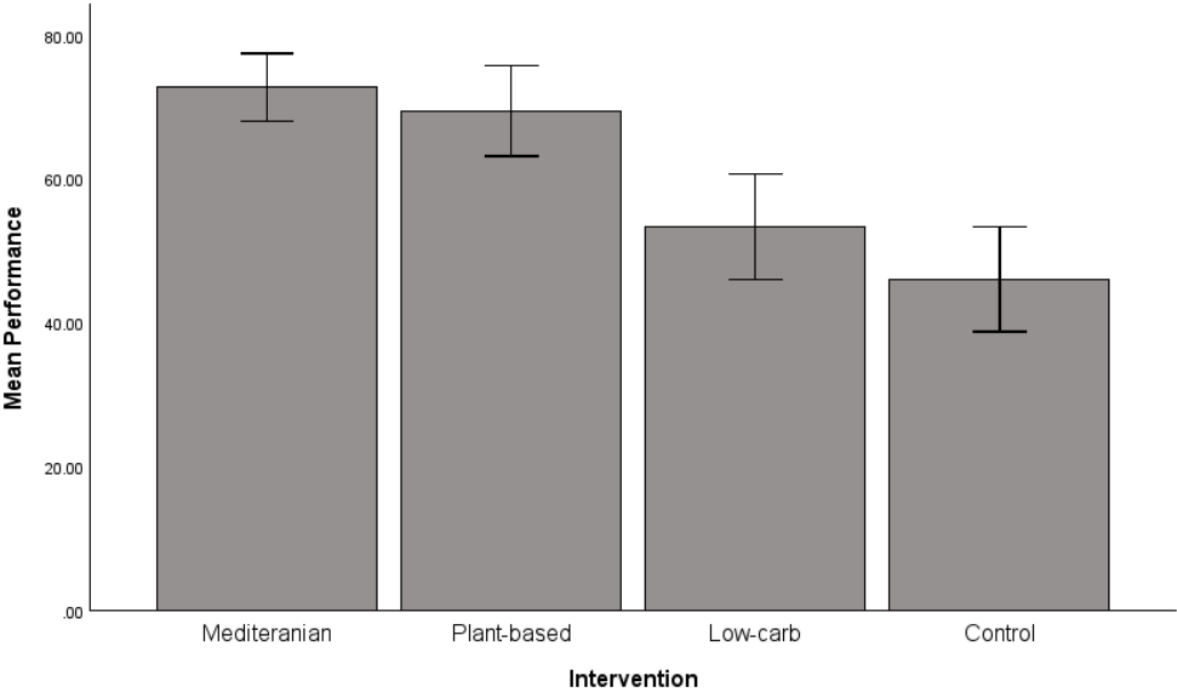
Mean Overall Well-Being Performance across Dietary Intervention Group

Dietary Intervention Groups	<i>M (SD)</i>	95% CI
Mediterranean	72.74 (10.89)	[68.03, 77.44]
Plant-Based	69.48 (14.50)	[63.21, 75.75]
Low-Carb	53.39 (17.02)	[46.03, 60.75]

Control	46.09 (16.92)	[38.77, 53.40]
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Note. *M* = mean; *SD* = standard deviation; *CI* = confidence intervals; *N* = 23 in each condition

Figure 1
Difference in Overall Well-Being Performance across Dietary Intervention Groups



Note. Error bars represent 95% Confidence Intervals around the mean.

DISCUSSION

Prior research proposed that there may be a relationship between overall well-being and the type of dietary interventions in older adults. The present study examined whether different dietary interventions influenced overall well-being among older adults. Results from the One-Way ANOVA demonstrated significant differences between dietary groups, suggesting that dietary patterns play an important role in well-being outcomes. To assess this theory , researchers assigned 92 older adults into one of four groups where they undertook either a Mediterranean, Plant- Based, or a Low-Carb Diet dietary plan and a Control group where participants continued with their regular dietary habits without any specific interventions. It was hypothesized that significant differences would be observed in overall well-being of participants in the first three dietary groups. Furthermore, it was hypothesized that higher overall well-being will be observed in the Mediterranean, Plant-Based and Low-Carb dietary intervention groups compared to the Control group.

After conducting a One-Way Between Groups ANOVA, results suggested a significant mean difference across the different dietary intervention

groups, $F(3, 88) = 16.56, p < .001, \eta^2 = .361$. The eta-squared (η^2) effect size of .361 indicates that the dietary intervention condition explained approximately 36.1% of the variability in overall well-being scores among participants. Overall, it can be observed that the type of diet assigned to each participant played a substantial role in influencing well-being among participants.

Three a-priori contrasts were performed to gain further insight into specific conditions. Overall, the Mediterranean, Plant-Based and Low-Carb groups reported better well-being outcomes compared to the Control group, supporting the first hypothesis. The Mediterranean group reported the highest overall well-being, but the second contrast performed found the difference between it and the Plant-Based group to be statistically insignificant, which means it does not support the second hypothesis. This could suggest that both diets offer comparable psychological or physiological benefits. In addition, as the study measures overall well-being, it is difficult to assess whether one dietary group would impact psychological or physiological well-being more as compared to the other. Conversely, the Mediterranean group reported a significantly higher well-being than the Low-Carb group, supporting the third hypothesis.

Broadly speaking, the results highlight the potential role of differing nutritional interventions in improving both psychological and physical well-being in older adults. The findings reinforce the idea that diet is a crucial lifestyle factor and developing a structured, health-conscious eating habit, particularly those rich in whole foods such as fruits and vegetables and healthy fats like the Mediterranean diet may positively affect well-being. However, the non-significant difference between the Mediterranean and Plant-Based Diet groups indicates that multiple healthful dietary patterns may be comparably effective, with individual suitability and adherence likely playing a critical role in determining intervention success.

Despite the positive results, several limitations should be considered. Firstly, this study uses a between-groups design with participants recruited from a single health spa, limiting the generalizability of its findings to broader population groups. Secondly, the study had a relatively short intervention period of 8 weeks, leaving the long-term effects of these dietary patterns on well-being unknown. Future research could extend the duration of the dietary interventions, include more diverse participant groups and consider adding additional outcome measures such as long-term behavioural adherence. These recommendations could help further clarify the role of diet in overall well-being of older adults in the long-term.

CONCLUSION

In conclusion, this study provides compelling evidence that structured dietary interventions can significantly enhance overall well-being in older adults. The Mediterranean Diet demonstrated the highest well-being scores, though its comparable effectiveness with the Plant-Based Diet suggests that

diverse healthful dietary patterns may offer equivalent benefits. The Low-Carb Diet, while superior to no intervention, was less effective than the Mediterranean approach, highlighting the importance of considering not only physiological outcomes but also the psychological and social dimensions of dietary change.

These findings contribute to the theoretical understanding of nutrition's role in promoting holistic well-being in later life and offer practical guidance for healthcare professionals and older adults seeking evidence-based dietary recommendations. However, the study's limitations, including its short duration, limited sample diversity, and global well-being measure, underscore the need for future longitudinal and multi-faceted research.

Ultimately, this research reinforces the idea that diet is a crucial lifestyle factor in healthy aging, and that empowering older adults with flexible, evidence-based, and personally meaningful dietary choices may be key to promoting not just physical health, but a fulfilling later life.

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DECLARATION OF POTENTIAL CONFLICTS OF INTEREST

“Avecienna Shifa Firdana and Valina Khiarin Nisa declare that they do not work for, consult for, own shares in, or receive funding from any company or organization that could benefit from the publication of this article.”

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