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The Effects of Omega-3 plus Vitamin E and Zinc Plus Vitamin Supplementation on Cardiovascular Risk Markers in Postmenopausal Women with Type 2 Diabetes

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Abstract

A randomised, double-blind, placebo-controlled research examined cardiovascular risk variables in postmenopausal women with type 2 diabetes after supplementing with Omega-3 and Vitamin E and Zinc and Vitamin C. We found that Omega-3 and Vitamin E treatment dramatically lowers total and LDL cholesterol, CRP, and IL-6. Using all four supplements reduced fasting glucose and HbA1c, improving glycaemic management. These findings imply that focused dietary supplementation can improve cardiovascular and metabolic health in this group with little side effects. Dietary supplements may help postmenopausal women manage diabetes and cardiovascular disease, according to studies.

Keywords: Omega-3, Vitamin E, Cardiovascular Risk, Type 2 Diabetes

Introduction

Postmenopausal women, especially those with type 2 diabetes, die most from cardiovascular disease (CVD) [1]. In addition to metabolic problems caused by diabetes, hormonal changes during menopause increase cardiovascular risk [2,3]. Current clinical research aims to produce unique and effective risk mitigation approaches. Eating nutritional supplements can help manage cardiovascular health [4,5]. Omega-3 fatty acids and Vitamin E may reduce inflammation and oxidative stress, which are connected to cardiovascular disease [6,7]. Zinc and Vitamin C boost immunity and improve endothelial function [8]. The combined effect of

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these supplements on cardiovascular risk factors in postmenopausal women with type 2 diabetes is poorly studied [9,10].

The aim of this study is to rectify this insufficiency by evaluating the impact of combining Omega-3 with Vitamin E and Zinc with Vitamin C on various biological indicators of cardiovascular risk in this particular group. By methodically assessing changes in lipid profiles, inflammatory markers, and glycaemic control, this study intends to elucidate the potential combined effects of these micronutrients and provide a basis for nutritional recommendations in the treatment of diabetic postmenopausal patients.

Methodology

Study Design and Participants

RCT, double-blind, placebo-controlled. We recruited from endocrinology and gynaecology outpatient clinics. Women 50–70 with five years of type 2 diabetes and natural menopause qualified. Patients with severe diabetes, smokers, and hormone replacement therapy or nutritional supplement users were excluded.

Intervention

Omega-3 plus Vitamin E, Zinc plus Vitamin C, all four supplements, or placebo were randomly assigned. Omega-3 group received 1000 mg fish oil (300 mg EPA, 200 mg DHA) and 400 IU Vitamin E daily. Zinc+Vitamin C received 30 mg Zinc and 500 mg Vitamin C daily. Combine and placebo groups got active or placebo supplements.

Data Collection

Baseline data included medical histories, diets, and physicals. After a 12-hour fast, lipids, inflammatory markers (CRP, IL-6), and HbA1c and fasting glucose were assessed. Follow-up tests and samples were taken at three and six months.

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Statistical Analysis

Data were analysed with SPSS. Repeated measures ANOVA was used to compare cardiovascular risk markers between groups. Multiple comparisons were adjusted using Bonferroni. A p-value under 0.05 was significant.

Results

The trial had 120 participants, 30 from each of the four groups. All groups had similar baseline data, including age, diabetes duration, BMI, and cardiovascular risk factors. A significant decrease in total and LDL cholesterol levels was seen in the Omega-3 plus Vitamin E group after six months ($p < 0.05$). Although less so, the combo group also reduced these markers. The Zinc + Vitamin C and placebo groups had no significant lipid profile changes.

A significant decrease in CRP and IL-6 levels was seen in both the Omega-3 supplemented with Vitamin E and the combination group ($p < 0.01$). After ingesting Zinc and Vitamin C, IL-6 levels decreased slightly, but not significantly, compared to the placebo group. The combo group showed significant differences in fasting glucose and HbA1c levels at six months compared to initial measures ($p < 0.05$). Omega-3 and Vitamin E supplementation increased HbA1c but did not modify fasting glucose. Zinc plus Vitamin C and placebo groups did not vary statistically. No significant detrimental effects were observed in experimental groups. Small stomach discomfort was the most common side effect of Omega-3 plus Vitamin E. Postmenopausal women with type 2 diabetes who received Omega-3 and Vitamin E had improved lipid profiles and inflammatory markers. Combination vitamins also improved blood sugar management.

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Group	Total Cholesterol Change	LDL Change	CRP Levels Change	IL-6 Levels Change	Fasting Glucose Change	HbA1c Change
Omega-3 + Vit E	Decreased ($p < 0.05$)	Decreased	Significantly decreased ($p < 0.01$)	Significantly decreased	Minor change	Improved
Zinc + Vit C	No significant change	No change	No significant change	Minor decrease	No change	No change
Combination	Decreased	Decreased	Significantly decreased	Significantly decreased	Improved	Significantly improved ($p < 0.05$)
Placebo	No significant change	No change	No significant change	No significant change	No change	No change

This table provides a clear and concise overview of the outcomes related to lipid profiles, inflammatory markers, and glycemic control across different supplementation groups.

Discussion

Targeted dietary supplements may help postmenopausal women with type 2 diabetes manage cardiovascular risk factors [12]. The group receiving Omega-3 plus Vitamin E had significant improvements in lipid profiles and inflammatory markers, supporting prior evidence showing Omega-3 fatty acids can lower triglycerides and improve endothelial function [13]. Vitamin E also reduces oxidative stress and inflammation, which have a major impact on cardiovascular risk [14]. Omega-3 plus Vitamin E, Zinc, and C improved glycaemic management more than solo treatment or a placebo. Evidence of synergy warrants additional study [15]. This is significant given the intricate relationship between high blood sugar and cardiovascular disease in diabetics [16]. Zinc and Vitamin C alone showed modest effects, suggesting they may work better with other supplements [17].

No significant changes in lipid and glycaemic profiles in Zinc plus Vitamin C and placebo groups underlines the specificity of some treatments in altering cardiovascular and metabolic

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parameters. The low occurrence of side effects shows that these supplements are safe at recommended doses [12,18]. This study adds to the evidence supporting the use of various dietary supplements in type 2 diabetes management for postmenopausal women [19]. Further research should evaluate these supplements' long-term effects and potential combinations with diabetic treatment to improve patient outcomes [11,20].

Conclusion

Research suggests that postmenopausal women with type 2 diabetes who take Omega-3 and Vitamin E supplements may reduce their risk of cardiovascular disease by improving their lipid profiles and inflammatory indicators. Using Omega-3, Vitamin E, Zinc, and Vitamin C together also improved glycaemic control, suggesting a synergistic effect that may affect this population. We found that certain nutritional supplements may improve health outcomes in postmenopausal individuals with type 2 diabetes by enhancing common diabetic and cardiovascular treatments. Therefore, longer-term studies are needed to fully assess these medicines in clinical practice.

References

1. Harris WS, Poston WC, Haddock CK. Tissue n-3 and n-6 fatty acids and risk for coronary heart disease events. Atherosclerosis. 2007;193(1):1-10.

2. Stampfer MJ, Hu FB, Manson JE, Rimm EB, Willett WC. Primary prevention of coronary heart disease in women through diet and lifestyle. N Engl J Med. 2000;343(1):16-22.

3. Kris-Etherton PM, Harris WS, Appel LJ. Fish consumption, fish oil, omega-3 fatty acids, and cardiovascular disease. Circulation. 2002;106(21):2747-57.

4. Brown BG, Zhao XQ, Chait A, Fisher LD, Cheung MC. Simvastatin and niacin, antioxidant vitamins, or the combination for the prevention of coronary disease. N Engl J Med. 2001;345(22):1583-92.

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 5, 2024

5. Rimm EB, Appel LJ, Chiuve SE, Djoussé L, Engler MB, Kris-Etherton PM. Seafood long-chain n-3 polyunsaturated fatty acids and cardiovascular disease: A science advisory from the American Heart Association. Circulation. 2018;138(1):e35-e47.

6. Lee IM, Cook NR, Gaziano JM, Gordon D, Ridker PM, Manson JE. Vitamin E in the primary prevention of cardiovascular disease and cancer: the Women's Health Study: a randomized controlled trial. JAMA. 2005;294(1):56-65.

7. Sesso HD, Buring JE, Christen WG, Kurth T, Belanger C, MacFadyen J, Bubes V, Manson JE, Glynn RJ, Gaziano JM. Vitamins E and C in the prevention of cardiovascular disease in men: the Physicians' Health Study II randomized controlled trial. JAMA. 2008;300(18):2123-33.

8. Frei B, England L, Ames BN. Ascorbate is an outstanding antioxidant in human blood plasma. Proc Natl Acad Sci U S A. 1989;86(16):6377-81.

9. Singh U, Devaraj S, Jialal I. Vitamin E, oxidative stress, and inflammation. Annu Rev Nutr. 2005;25:151-74.

10. Malpuech-Brugère C, Nowacki W, Daveau M, Gueux E, Linard C, Rock E, Lebreton JP, Mazur A, Rayssiguier Y. Inflammatory response following acute magnesium deficiency in the rat. Biochim Biophys Acta. 2000;1501(2-3):91-8.

11. Caulfield LE, Zavaleta N, Shankar AH, Merialdi M. Potential contribution of maternal zinc supplementation during pregnancy to maternal and child survival. Am J Clin Nutr. 1998;68(2 Suppl):499S-508S.

12. Shankar AH, Prasad AS. Zinc and immune function: the biological basis of altered resistance to infection. Am J Clin Nutr. 1998;68(2 Suppl):447S-463S.

13. Haase H, Rink L. The immune system and the impact of zinc during aging. Immunity & Ageing. 2009;6:9.

14. Institute of Medicine (US) Panel on Dietary Antioxidants and Related Compounds. Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids. Washington (DC): National Academies Press (US); 2000.

ISSN: 0975-3583, 0976-2833 VOL 15, ISSUE 5, 2024

15. Lee DH, Folsom AR, Harnack L, Halliwell B, Jacobs DR Jr. Does supplemental vitamin C increase cardiovascular disease risk in women with diabetes? Am J Clin Nutr. 2004;80(5):1194-200.

16. Griendling KK, FitzGerald GA. Oxidative stress and cardiovascular injury: Part II: animal and human studies. Circulation. 2003;108(17):2034-40.

17. Esposito K, Marfella R, Ciotola M, Di Palo C, Giugliano F, Giugliano G, D'Armiento M, D'Andrea F, Giugliano D. Effect of a Mediterranean-style diet on endothelial dysfunction and markers of vascular inflammation in the metabolic syndrome: a randomized trial. JAMA. 2004;292(12):1440-6.

18. Montori VM, Farmer A, Wollan PC, Dinneen SF. Fish oil supplementation in type 2 diabetes: a quantitative systematic review. Diabetes Care. 2000;23(9):1407-15.

19. Ford ES, Ajani UA, Croft JB, Critchley JA, Labarthe DR, Kottke TE, Giles WH, Capewell S. Explaining the decrease in U.S. deaths from coronary disease, 1980-2000. N Engl J Med. 2007;356(23):2388-98.

20. Cao G, Sofic E, Prior RL. Antioxidant capacity of tea and common vegetables. J Agric Food Chem. 1996;44(11):3426-31.