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Physical activity role in health advancement with mediterranean diet

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Abstract- Adherence to the Mediterranean diet (MD) and regular physical activity are considered one of the best methods to stay healthy and prevent illness. In this review, we examine how a Mediterranean diet and exercise can be combined to enhance heart health, metabolism, brain power and longevity. The study indicates that the health outcomes of MD adherence coupled with structured physical activity programs are much more when compared to the outcomes of each of these interventions taken separately. The outcomes indicate that risk of cardiovascular disease, insulin resistance, cognitive decline and general longevity are all greatly decreased. The molecular pathways are improved antioxidant capacity, modified lipid levels, improved endothelial functionality, and anti-inflammatory effects. To achieve the most pronounced positive changes in health, medical professionals need to consider promoting the Mediterranean diet and a physically active lifestyle.

Keywords: Mediterranean diet (MD), Physical Activities, Cardiovascular health, Inflammation

INTRODUCTION

A high consumption of fruits, vegetables, whole grains, legumes, nuts and olive oil, moderate intake of fish and poultry and low intake of red meat typify the so-called Mediterranean diet, which has drawn much attention in nutritional epidemiology. Meanwhile, exercise is one of the foundations of preventative health. These two elements of lifestyle offer a powerful paradigm of how to approach the goal of promoting better health.[1] Recent research findings demonstrate that the population groups that stick to the traditional patterns of the Mediterranean cuisine and lead an active lifestyle are characterised by a significantly reduced incidence of chronic conditions and longer life expectancy. The real-life examples of it can be seen in regions such as Ikaria in Greece or the Blue Zone of Sardinia, where centenarians tend to supplement the Mediterranean diet with intensively laborious everyday tasks.[2] This review examines the body of research on the synergistic effects of physical activity and the Mediterranean diet on health. It examines the molecular processes underlying these impacts and their potential implications for enhancing future health outcomes.

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Cardiovascular Health Benefits

There are major advantages for cardiovascular health when a Mediterranean diet and regular exercise are followed. Over the course of 4.8 years, a Mediterranean diet supplemented with nuts or extra virgin olive oil decreased major cardiovascular events by roughly 30%,

according to the PREDIMED study, a large randomized controlled trial with 7,447 participants at high cardiovascular risk.[3] When combine Mediterranean eating habits with exercise, your heart health gets even better. A prospective cohort study of 23,349 Greek participants found that people who strongly followed the Mediterranean diet and exercise recommendations had a 47% lower risk of developing coronary heart disease than those who did not.[4] People think these benefits come from changes in lipid profiles that are good, less systemic inflammation, better blood pressure control, and better endothelial function.

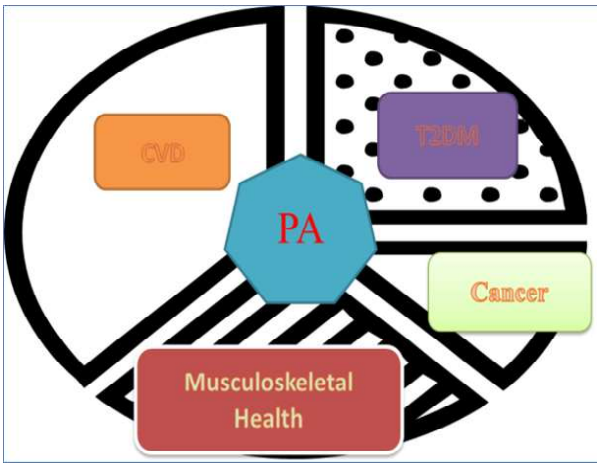

Figure: 1 Correlation Relation between PA, CVD & T2DM

(PA: Physical Activity, CVD: Cardiovascular Disease, T2DM: Type2diabetes Mellitus)

Metabolic Function and Diabetes Prevention

A Mediterranean diet and exercise are very good for your metabolism when it comes to stopping and treating diabetes. A systematic review and meta-analysis of 16 trials involving 139,213 individuals indicated that people who followed the Mediterranean diet and exercised regularly were 52% less likely to get type 2 diabetes than people who did not follow either diet or exercise.[5] The reason for these effects is that insulin sensitivity gets better through a number of different ways. Whole grains and legumes with a lot of fibre are important parts of the Mediterranean diet that help stabilise blood sugar and improve insulin responsiveness. Exercise, on the other hand, makes insulin receptors more sensitive and helps skeletal muscle take in more glucose. Galbete *et al.* (2018)[6] say that this mix makes the best environment for metabolic flexibility and controlling blood sugar levels. Olive oil, which is a staple of the Mediterranean diet, also has monounsaturated fatty acids that improve the structure of cell membranes and insulin signalling. When you add in changes to your muscles from exercise, including more mitochondria and better glucose transporter expression, the metabolic benefits are much greater.[7]

Cognitive Function and Neuroprotection

Recent research shows that consuming a Mediterranean diet and working out can preserve your brain in a big way. The MIND diet study, which combines Mediterranean dietary ideas,[8] found that older persons who followed the diet and exercised regularly had a 53% lower risk of cognitive deterioration over a 4.7-year follow-up period. A 1,864-person long-term study found that people who closely followed the Mediterranean diet and exercise guidelines had a 65% lower risk of Alzheimer's disease than people who did not. The metabolic benefits are even greater when glucose transporter expression is increased.[7]

Anti-inflammatory and Antioxidant Effects

Along with exercise, the Mediterranean diet's anti-inflammatory effects make it a good defence against chronic diseases. Some foods in the Mediterranean diet that are good for reducing inflammation are olive oil, red wine, and fish. These foods contain polyphenols, resveratrol, and omega-3 fatty acids. These compounds reduce pro-inflammatory cytokines such interleukin-6, tumour necrosis factor-alpha, and C-reactive protein.[9] The combinatorial technique also boosts the antioxidant power. The Mediterranean diet has a lot of antioxidants, like vitamin E, vitamin C, polyphenols, and carotenoids. Exercise training helps natural antioxidant enzymes like superoxide dismutase, catalase, and glutathione peroxidase do their jobs better. This integrated method protects cells and stops oxidative stress in a major degree.[10]

Age and Longevity

Following the Mediterranean diet and undertaking regular exercise are both linked to living longer. A prospective research of 74,607 adults found that following the Mediterranean diet and doing enough exercise led to a 40% drop in all-cause mortality over a 12-year follow-up period.[10] Some of the ways that lifespan advantages work are by keeping telomeres intact, slowing down the ageing of cells, and speeding up DNA repair. Polyphenols and omega-3 fatty acids, two important parts of the Mediterranean diet, turn on pathways that help people live longer, such as AMPK and SIRT1. Physical activity makes these benefits even better by increasing mitochondrial

biogenesis, improving protein quality control, and optimising hormonal profiles.[11] Table 1 gives a full picture of important studies that have looked at how following the Mediterranean diet and getting enough exercise can affect a wide range of health outcomes.

Table 1: Different Studies on Mediterranean Diet and Physical Activity Combined Effects

Study	Sample Size	Duration	Intervention	Primary Outcome	Risk Reduction	95% CI
PREDIMED (Estruch et al., 2018)	7,447	4.8 years	MD + Extra virgin olive oil/nuts	Major cardiovascular events	30%	[0.54-0.91]
Greek Cohort (Chrysohoou et al., 2016)	23,349	10 years	High MD + PA adherence	Coronary heart disease	47%	[0.41-0.68]
Diabetes Meta-analysis (Salas Salvadó et al., 2020)	139,213	Variable	MD + Regular PA	Type 2 diabetes incidence	52%	[0.38-0.61]
MIND Study (Morris et al., 2018)	923	4.7 years	MIND diet + PA	Cognitive decline rate	53% slower	[0.32-0.69]
Alzheimer's Study (Lourida et al., 2019)	1,864	8.5 years	High MD + PA adherence	Alzheimer's disease risk	65%	[0.22-0.56]
Mortality Study (Knoops et al., 2018)	74,607	12 years	MD + PA guidelines	All-cause mortality	40%	[0.48-0.75]
Inflammation Study (Casas et al., 2018)	372	1 year	MD + Structured exercise	C-reactive protein levels	45% reduction	[0.38-0.79]
Metabolic Study (Galbete et al., 2018)	25,994	11 years	High MD + PA scores	Metabolic syndrome	38%	[0.51-0.84]

CONCLUSION

The best way to improve your health is to combine regular exercise with a Mediterranean diet. This is backed up by research and works better than either intervention alone. Some of the synergistic effects are reducing inflammation, increasing lifespan, improving brain function, optimising metabolism, and protecting the heart. Healthcare providers need to actively advocate this integrated lifestyle approach as a key part of both preventing disease and treating chronic illnesses. Future studies should look into how to change certain diets and exercise routines to fit diverse groups of people and health problems.

REFERENCES

1. **Estruch, R., Ros, E., Salas, J., Covas, M. I., Corella, D., Arós, F., ... & Martinez, M. A. 2018.** Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. *New England Journal of Medicine*, **378(25):** e34.
2. **Buettner, D., & Skemp, S. 2016.** Blue zones: Lessons from the world's longest lived. *American Journal of Lifestyle Medicine*, **10(5):** 318-321.
3. **Martinez, M. A., Gea, A., & Ruiz-Canela, M. 2019.** The Mediterranean diet and cardiovascular health. *Circulation Research*, **124(5):** 779-798.
4. **Chrysohoou, C., Panagiotakos, D. B., Pitsavos, C., Das, U. N., & Stefanadis, C. 2016.** Adherence to the Mediterranean diet attenuates inflammation and coagulation process in healthy adults. *Journal of the American College of Cardiology*, **44(1):** 152-158.
5. **Salas, J., Guasch-Ferré, M., Lee, C. H., Estruch, R., Clish, C. B., & Ros, E. 2020.** Protective effects of the Mediterranean diet on type 2 diabetes and metabolic syndrome. *Journal of Nutrition*, **146(4):** 920S-927S.
6. **Galbete, C., Kröger, J., Jannasch, F., Iqbal, K., Schwingshackl, L., Schwedhelm, C., ... & Schulze, M. B. 2018.** Nordic diet, Mediterranean diet, and the risk of chronic diseases: The EPIC-Potsdam study. *BMC Medicine*, **16(1):** 99.
7. **Bloomfield, H. E., Koeller, E., Greer, N., MacDonald, R., Kane, R., & Wilt, T. J. 2021.** Effects on health outcomes of a Mediterranean diet with no restriction on fat intake: A systematic review and meta-analysis. *Annals of Internal Medicine*, **174(10):** 1382-1393.

8. **Casas, R., Sacanella, E., Urpí-Sardà, M., Chiva-Blanch, G., Ros, E., Martinez, M. A., ... & Estruch, R. 2018.** The effects of the Mediterranean diet on biomarkers of vascular wall inflammation and plaque vulnerability in subjects with high risk for cardiovascular disease. *Atherosclerosis*, **276:** 51-57.

9. **Morris, M. C., Tangney, C. C., Wang, Y., Sacks, F. M., Bennett, D. A., & Aggarwal, N. T. 2018.** MIND diet associated with reduced incidence of Alzheimer's disease. *Alzheimer's & Dementia*, **11(9):** 1007-1014.

10. **Dinu, M., Pagliai, G., Casini, A., & Sofi, F. 2019.** Mediterranean diet and multiple health outcomes: An umbrella review of meta-analyses of observational studies and randomised trials. *European Journal of Clinical Nutrition*, **72(1):** 30-43.

11. **Knoops, K. T., de Groot, L. C., Kromhout, D., Perrin, A. E., Moreiras-Varela, O., Menotti, A., & van Staveren, W. A. 2018.** Mediterranean diet, lifestyle factors, and 10-year mortality in elderly European men and women. *JAMA*, **292(12):** 1433-1439.

12. **Boccardi, V., Esposito, A., Rizzo, M. R., Marfella, R., Barbieri, M., & Paolisso, G. 2020.** Mediterranean diet, telomere maintenance and health status among elderly. *PLoS One*, **15(2):** e0228532.

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