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The Role of Antioxidants in the Aging Process: A Clinical Case control Study in urban Kanpur (U.P)

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Abstract

Aging is associated with physiological changes that affect blood pressure. This study investigates the role of antioxidants in mitigating these effects by analysing their impact on blood pressure. A case-control study was conducted with individuals classified into antioxidant users (cases) and non-users (controls). The results indicate significant improvements in blood pressure among antioxidant users

Key words: Aging, Antioxidants

1. Introduction

Aging is a complex biological process influenced by oxidative stress, which contributes to cardiovascular disease, renal impairment, and metabolic disorders. Antioxidants, including vitamins C and E, flavonoids, and polyphenols, have been shown to neutralize free radicals and reduce oxidative damage. This study aims to assess their impact on key health markers associated with aging. [1]

Objectives:

1. To measure the effect of antioxidants on blood pressure in the aging process.

2. Materials and Methods

Study Design: A case-control study was conducted involving male and female participants aged 50 years and above. Cases included individuals with regular antioxidant intake, (at least three months) while controls did not consume antioxidant supplements.

Sampling and sample size: A 400 subjects were selected from an urban area of Kanpur Nagar by purposive sampling (200 with equal number of male and female participants)

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Cases with regular antioxidant intake, while equal number of controls (200 similarly) who did not consume antioxidant supplements.

Variables Measured:

- **Blood Pressure (BP):** Systolic, diastolic, and mean BP

Statistical Analysis: Data were analysed using mean ± standard deviation (SD) and p-values. A p-value < 0.05 was considered statistically significant.

2. Results

Table.1 Effect of Antioxidants on Blood Pressure

Variable	Sex	Case (Mean ± SD)	Control (Mean ± SD)	p-Value
Systolic BP	M	124.34 ± 6.34	124.80 ± 3.31	>0.05
	F	122.16 ± 8.15	124.46 ± 3.35	0.016
Diastolic BP	M	74.62 ± 4.67	76.36 ± 3.53	<0.001
	F	74.38 ± 5.28	75.88 ± 3.60	<0.001
Mean BP	M	91.14 ± 4.65	92.51 ± 2.68	<0.001
	F	90.27 ± 5.82	92.11 ± 3.08	

This table presents the impact of antioxidants on blood pressure (BP), comparing a case group (who received antioxidants) to a control group (who did not). The results are divided by sex and include mean ± standard deviation (SD) values for systolic, diastolic, and mean BP.

Systolic Blood Pressure (SBP) Males: No significant difference between the case (124.34 ± 6.34 mmHg) and control (124.80 ± 3.31 mmHg) groups. Females: A small but statistically significant decrease in SBP in the case group (122.16 ± 8.15 mmHg) compared to the control group (124.46 ± 3.35 mmHg) **(**$p = 0.016$**).** Antioxidants may have a mild effect on reducing systolic BP in females but not in males.

Diastolic Blood Pressure (DBP) Males: The case group (74.62 ± 4.67 mmHg) had significantly lower DBP than the control group (76.36 ± 3.53 mmHg) **(**$p < 0.001$**).** Females: Similar trend—case group (74.38 ± 5.28 mmHg) vs. control (75.88 ± 3.60 mmHg), also statistically significant **(**$p < 0.001$**).**Interpretation: Antioxidants significantly lower diastolic BP in both males and females.

Mean Blood Pressure (MBP) Males: The case group (91.14 ± 4.65 mmHg) had significantly lower MBP than the control group (92.51 ± 2.68 mmHg) **(**$p < 0.001$**).**Females: A similar significant reduction in MBP for the case group (90.27 ± 5.82 mmHg) vs. the control (92.11 ± 3.08 mmHg) **(**$p < 0.001$**)**

Antioxidants appear to consistently reduce mean BP in both males and females. Antioxidants significantly reduce diastolic and mean BP in both sexes **(**$p < 0.001$**),** suggesting a beneficial effect on overall cardiovascular health. The effect on systolic BP is only significant in females **(**$p = 0.016$**),** implying a potential sex-specific response.

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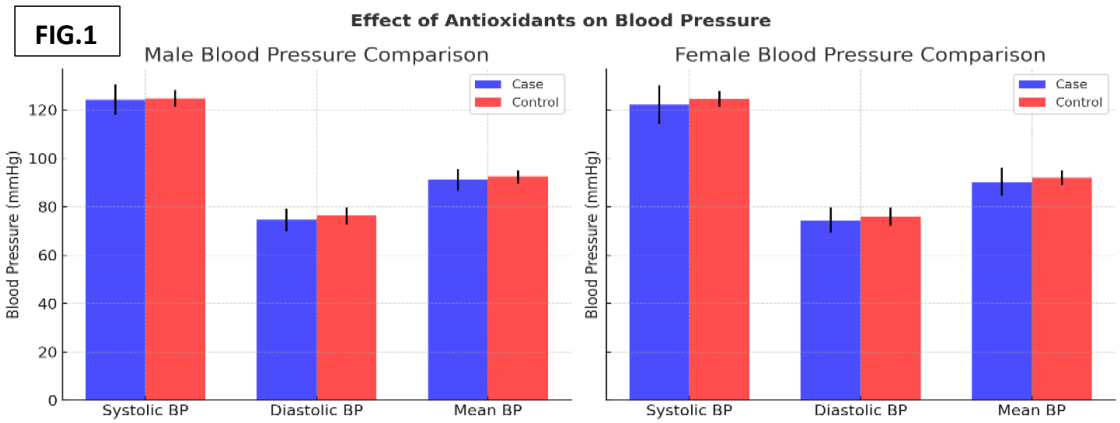
Antioxidants seem to have a statistically significant impact on diastolic and mean blood pressure ($p < 0.001$ for both males and females).Systolic BP is significantly different in females ($p = 0.016$), indicating a potential effect. [Table.1, FIG.1]

FIG.1



4. Discussion

The results demonstrate that antioxidants significantly reduce blood pressure, improve in aging individuals. These findings align with previous research suggesting that antioxidants reduce oxidative stress, which contributes to hypertension.

Potential Mechanisms:

- Reduction of oxidative damage in vascular endothelial cells
- Inhibition of lipid peroxidation, leading to better cholesterol regulation
- Protection of renal cells from oxidative injury

5. Conclusion

Antioxidants play a significant role in neutralizing oxidative stress, which is a key contributor to the development of hypertension. While some antioxidants, such as vitamin C have shown potential in reducing blood pressure, the evidence is mixed regarding the effectiveness of antioxidant supplementation.

further studies are necessary to understand the precise mechanisms and clinical applications of antioxidants in blood pressure regulation

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