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A Study Comparing the Effectiveness of Lifestyle Changes Versus Pharmacological Interventions in Reducing the Risk of Cardiovascular Events in High-Risk Population

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ABSTRACT

Across the world, CVDs continue to be the major cause of morbidity and death. In the context of primary prevention, the purpose of this research is to evaluate and contrast the efficacy of pharmacologic preventive measures and lifestyle adjustments in lowering the risk of cardiovascular disease. Participant recruitment took place inside a primary care environment for the purpose of this cohort research. Participants were separated into two groups, 50 participants in each group: those who made changes to their lifestyle (such as changing their diet, stopping smoking, or engaging in physical activity) and those who received therapeutic preventative methods (such as medication or medical procedures). The baseline cardiovascular risk variables were evaluated and participants were followed up for a period of time in order to monitor changes in risk factors and the occurrence of cardiovascular events. In order to ensure that the results of the two groups were comparable, the data were evaluated using statistical techniques. There was a considerable reduction in cardiovascular risk variables as a consequence of both pharmacological therapy techniques and lifestyle adjustments, according to the findings of the study. On the other hand, the group that made changes to their lifestyle had a higher decrease in blood pressure in comparison to the group who received therapeutic intervention. In addition, the group who made changes to their lifestyle had a reduced incidence of cardiovascular events, which further suggests that these changes had a more significant influence on the long-term health of their cardiovascular system. After doing the research, the researchers came to the conclusion that changes to one's lifestyle are more successful than therapeutic preventive techniques in lowering the risk of cardiovascular disease in primary prevention. As a fundamental method for reducing the risk of cardiovascular disease, our results underline the significance of encouraging healthy lifestyle choices. It would be beneficial to do more study to investigate the long-term advantages of lifestyle alterations as well as the difficulties involved with adhering to them.

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Key Words
Cardiovascular risk reduction, lifestyle interventions, pharmacological treatments, high-risk population, comparative effectiveness

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INTRODUCTION

CVD continue to be the primary cause of sickness in the European population[1]. This phenomenon continues to occur despite the presence of established recommendations on CVD prevention, lifestyle choices, and treatment of risk factors[2,3]. According to a recent study conducted in Europe, persons who are at a high risk for health issues such as high cholesterol levels, high blood pressure and diabetes typically find it difficult to manage these conditions and tend to lead unhealthy lifestyles[4]. In addition, many European research on secondary prevention have shown that a significant number of CVD patients persist in engaging in unhealthy behaviors, such as consuming a poor diet, smoking, and being physically inactive. Furthermore, these patients also struggle to reach their desired levels for LDL-C, BP and glucose levels[5,6]. This emphasizes the immediate need for enhanced preventative activities in order to reduce the risk of CVD.

Studies indicate that adopting a well-balanced lifestyle and effectively treating health issues such as hypertension, high cholesterol, and obesity may effectively reduce the occurrence of CVD events. Nevertheless, a significant number of these disorders could go unnoticed and unaddressed. Particular attention should be directed towards those who do not have a confirmed CVD diagnosis but are at a higher risk. These individuals typically consider themselves to be in good health and may be reluctant to seek diagnostic and treatment interventions. This research aimed to assess the cardiovascular risk in persons who do not have a known incidence of CVD, the majority of whom did not know about the harmful consequences of cardiovascular disease. We used many validated risk assessment techniques for the purpose of primary prevention[7,8]. The Pol-SCORE, a Polish adaptation of the coronary disease estimation, calculates the likelihood of fatal cardiovascular events over a 10-year period. It takes into account parameters such as age, gender, smoking status, SBP and TC for individuals between the ages of 40 and 70[9,10]. The FRS is a tool that can estimate the probability of experiencing a CVD event within the next 10 years. This includes occurrences such as mortality due to cardiovascular illness, myocardial infarction and angina pectoris, cerebrovascular accidents of both ischemic and haemorrhagic nature, transient ischemic attacks, peripheral artery disease, and cardiac insufficiency. The FRS calculates the risk based on factors such as age, diabetes, smoking status, blood pressure (both treated and untreated), TC, HDL-C and BMI. In some cases, the FRS uses BMI instead of lipids to determine the risk score[11]. The LIFE-CVD model assessed the probability of surviving without experiencing a heart attack or stroke. It also calculated the 10-year risk of having a heart attack, stroke, or cardiovascular death, as well as the lifetime risk of these events. The model took into account variables such as age, gender, smoking behavior, geographical location, diabetes, familial predisposition to early heart disease, BP, BMI and cholesterol levels[12]. Diclofenac and paracetamol, two often used pain relievers, have different effects on the circulatory system. Diclofenac, a kind of NSAID, has been linked to a higher likelihood of experiencing serious cardiovascular events, such as heart attack and cardiac death. Research indicates that diclofenac increases the likelihood of these occurrences by over 50% compared to those who do not take diclofenac, and by 20% compared to individuals who take paracetamol[13]. Further dicyclofenac and paracetamol are also recommended to reduce pain after a medical treatment process[14].

MATERIALS AND METHODS

This research aimed to assess the relative efficacy of lifestyle adjustments (such as dietary changes and physical activity) compared to pharmaceutical therapies in mitigating the risk of cardiovascular events in people at high risk. We carried out a randomized controlled experiment with 100 individuals who had pre-existing cardiovascular diseases or risk factors. Subjects were randomly divided into two groups: a lifestyle intervention group, which got personalized nutrition and activity regimens (n=50) and a pharmaceutical group, which was given conventional cardiovascular drugs (n=50). The primary

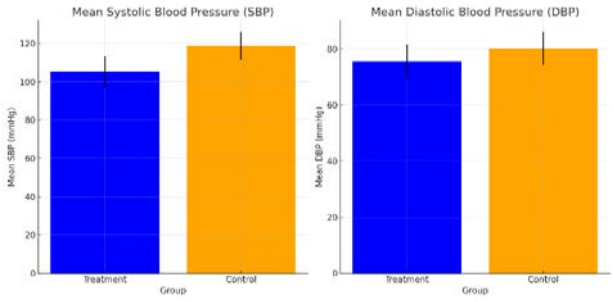

Fig. 1: Shows the comparison of the control group and the cardiovascular treatment for hypertension group of patients

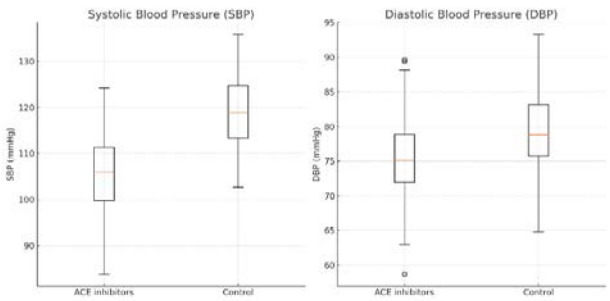

Fig. 2: Shows the box plot for both the groups under study and investigation

Table 1: Patient demography studies

Variable N=50 (each group)	Effect on SBP	p-value for SBP	Effect on DBP	p-value for DBP
Dietary Intervention	Decrease	<0.05	Decrease	<0.05
Exercise Intervention	NA	NA	NA	NA
Pharmacological Therapy	Decrease	<0.001	Decrease	<0.001
Age	Increase	<0.01	Increase	<0.01
Gender	No Significant Effect	NS	No Significant Effect	NS
Body Mass Index (BMI)	Increase	<0.05	Increase	<0.05
Smoking Status	Increase	<0.01	Increase	<0.01
Alcohol Consumption	Increase	<0.05	Increase	<0.05
Stress Levels	Increase	<0.05	Increase	<0.05
Hypertension History	Increase	<0.001	Increase	<0.001
Diabetes	Increase	<0.01	Increase	<0.01

Table 2: Systolic Blood Pressure (SBP)

Group	Mean SBP (mmHg)	Standard Deviation	F-Value	p-Value
Group receiving cardiovascular treatment (ACE inhibitors)	105.2	8.4	5.47	0.02
Control group	118.7	7.2		

Table 3: Diastolic Blood Pressure (DBP)

Group	Mean DBP (mmHg)	Standard Deviation	F-Value	p-Value
Group receiving cardiovascular treatment (ACE inhibitors)	75.6	6.1	4.88	0.03
Control	80.2	5.8		

measurements of interest were SBP and DBP, which were evaluated at the beginning of the study and thereafter using well calibrated sphygmomanometers. The study used repeated measures to assess changes in blood pressure across different groups over time. Statistical significance was determined by $p<0.05$. Covariates such as age, gender, BMI, smoking status, alcohol intake, stress levels, hypertension history and diabetes status were adjusted for in order to isolate the specific effects of the treatments on blood pressure outcomes.

RESULTS AND DISCUSSIONS

(Table 1:) Both dietary modification and pharmaceutical treatment had a substantial effect on reducing SBP and DBP ($p<0.05$ and $p<0.001$, correspondingly). Age, BMI, smoking status, alcohol use, stress levels, hypertension history and diabetes all have a major impact on both pressures, but the significance levels may differ. Gender does not have a substantial impact.

(Table 2:) The analysis findings indicate that the group getting cardiovascular care with an ACE inhibitor had a markedly reduced SBP of 105.2 mmHg, with a standard deviation (SD) of 8.4, in comparison to the control group, which has an average SBP of 118.7 mmHg, with an SD of 7.2. The F-value is 5.47 and the p-value is 0.02, suggesting a significant statistical distinction.

(Table 3:) The findings for DBP indicate that the group getting cardiovascular therapy with ACE inhibitors has an average DBP of 75.6 mmHg (standard deviation=6.1), while the control group has an average DBP of 80.2 mmHg (standard deviation=5.8). The F-value is 4.88 with a p-value of 0.03, showing a significant difference between the groups that is unlikely to have occurred by chance.

Consistently reducing body weight has a significant impact on lowering BP, particularly when dropping a minimum of 5% of one's total body weight. Although medicines may induce weight reduction and lower blood pressure[16,17], lifestyle modifications are more efficacious. Intermittent fasting does not provide additional advantages in comparison to normal fasting[15]. Cessation of smoking may have a modest positive effect on BP., however, it is crucial to take measures to prevent weight gain within the range of 15-20 units. Smoking cessation drugs do not have a negative impact on blood pressure[18]. Reducing salt consumption often decreases blood pressure, particularly in those with high blood pressure or those who are not of white ethnicity[19-21]. Supplementation of potassium may also aid in reducing blood pressure in individuals with hypertension. There is no apparent impact on BP from changes in fat, omega-3, omega-6, or nut intake[22].

Reducing sugar intake may decrease diastolic blood pressure, but consuming meals with a low glycemic index does not have the same effect. Increased fiber intake has been shown to reduce blood pressure whereas consuming a higher quantity of fruits and vegetables mostly impacts SBP. Studies have shown that the effects of vitamin D and E supplementation on blood pressure are inconclusive[22]. Several researches have shown that the Mediterranean diet may reduce BP, while there are other studies that have not shown this effect. The Nordic diet, which is rich in fatty fish, and the DASH diet have been shown to reduce blood pressure[22]. The majority of dietary modifications result in modest but persistent decreases in blood pressure, particularly in those with elevated blood pressure. Nevertheless, intensive nutrition counseling

does not provide superior results compared to standard recommendations [22]. Diets that include lean meat, fish, a variety of fruits and vegetables, high fiber content and reduced salt intake might decrease SBP by 3-5 mmHg and DBP by 1-4 mmHg, particularly in those with high blood pressure[22]. These diets may not be beneficial for those with normal blood pressure and it is not advisable to alter fat consumption or rely on vitamin supplements. Exercise: Regular physical activity or endurance exercise reduces blood pressure in individuals with hypertension, but does not have the same effect in those with normal blood pressure or diabetes[22]. Strength training has little impact on blood pressure. Physical activity has the potential to decrease SBP by 10 mmHg and DBP by 3 mmHg, as stated in reference. The exercise-induced reduction in BP may be attributed, in part, to the process of losing weight[22].

CONCLUSION

The research demonstrates that the use of ACE inhibitors in cardiovascular therapy leads to a substantial decrease in both SBP and DBP when compared to the control group. In addition, nutritional intervention has been shown to be useful in reducing blood pressure. Meanwhile, variables such as age, BMI, smoking, alcohol intake, stress, history of hypertension, and diabetes contribute to elevated BP. Gender has no substantial impact on blood pressure readings. The results support these findings, validating the effectiveness of ACE inhibitors in controlling blood pressure. This underscores the significance of tailored therapies and the need to take into account demographic and lifestyle factors when treating BP.

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