

Cardiovascular physiology and hypertension health and social care essay

[Health & Medicine](#), [Disease](#)



High blood pressure is a major contributing hazard factor for cardiovascular diseases and disease responsible for more than any other biomedical hazard factors worldwide. [1] The hazard factors associated with high blood pressure include stroke, coronary artery disease, chronic heart failure, chronic kidney disease and their patterned advance. [1] The hazard is a consequence of the structural harm to the heart, which is holding to work harder as a pump to the demand of the organic structure, big and little blood vessels and the variety of nutrients they supply. [2] Approximately 29 % of the Australian population have high blood pressure. [2] There are many hazard factors that may be attributed to high blood pressure. They include familial factors, household history, race, age, gender, lifestyle and presence of other diseases or unwellness. To accomplish a decrease in blood force per unit area and cardiovascular hazards, a lifestyle alteration that includes regular exercising, weight loss, decrease in intoxicant consumption, cessation of smoking and eating healthier is recommended to patients enduring from high blood pressure. [2] In some instances, antihypertensive drugs are used in combination with lifestyle alterations to assist cut down blood force per unit area. This is due to the presence of blood force per unit area sensitive conditions such as stroke, diabetes or chronic kidney disease. [1]

High blood pressure is classified as holding an elevated force per unit area in the blood's systolic and diastolic degree at remainder. [3] Therefore the blood force per unit area that is pumping in the arterial wall is higher than normal due to emphasize and tension that is applied to the arteries. The blood force per unit area would match with increasing the force per unit area doing the blood force per unit area addition every bit good. Hypertension is

normally diagnosed one time blood systolic force per unit area is above 140mmHg and diastolic force per unit area greater than 90mmHg. For normal patients, blood force per unit area is about 120mmHg for systolic force per unit area and 80mmHg for diastolic force per unit area. [3] With high blood pressure, it could be classified as a soundless slayer as there are no symptoms associated with the disease. [4] So unless high blood pressure is terrible at that place would be no symptoms developing for diagnosing to be detected at a glimpse. [3]

High blood pressure can be classified into primary or indispensable and secondary high blood pressure. Primary high blood pressure is really common imputing to 85-95 % in most instances of high blood pressure. [3] Primary high blood pressure is a multifactorial disease where is no individual caused related to it. [4] Several factors may play a function and with the combined effects contributes to high blood pressure. These could be seen in the mosaic theory in Figure 2 below. As seen there are many factors that may assist lend to primary high blood pressure.

Table 1. Categorization of the different phases of Hypertension. [1]

Calciferol: School WorkYear 3 Sem 1CardioHypertensionComplex of BP. jpg

Figure 1. Page 's Mosaic Theory of Hypertension. [3]

Approximately 30 % of the instances of primary high blood pressure are attributed by familial factors. [4] The incidence of high blood pressure is greater in African Americans than that to Caucasians or Asians. [4] Persons

who have one or two parents with high blood pressure, is twice more likely than the normal population to hold high blood pressure. [4] The bulk of primary high blood pressure patients have abnormalcy to their arterias, hence an increased opposition due to stiffness or miss of snap in the arterias is doing the elevated blood force per unit area. [4] As we age, the snap of the arterias is bit by bit lost and will go stiff. This is why the hazards of high blood pressure is greater in people who are 50 old ages or older. [4] The increased in opposition causes the bosom muscles to work harder to pump the blood through the blood vass, therefore the strain on the bosom lead to abnormalcies in the hypertrophied size of bosom musculuss on the left ventricle. [4]

Secondary high blood pressure contributes 5 % to the overall instances of high blood pressure. [4] They are known every bit secondary as there is basically a specific upset in some peculiar organ or blood vas, such as the kidney, adrenal secretory organ or aortal arteria that is doing the lift in blood force per unit area. [4]

Exercise is an act of the organic structure to exercise itself by physical motion which could include walking, running, swimming, or any sort of endurance and aerophilic preparation. It is recommended that single should undergo visible radiation to chair physical exercising at least one time every twenty-four hours for at least 30 to 45 proceedings. [6] Physical exercising is a good manner to battle high blood pressure. It is implemented in patients with the prescribed antihypertensive drugs so that maybe the opportunity of

decrease in blood force per unit area could cut down or get rid of the demand for antihypertensive drugs. [1]

When the organic structure is undergoing mechanical work such as exercise, the shear or stretch force stimulated will originate the remodelling of the assorted tissues such as the cardiac and skeletal musculuss and blood vass.

[7] Stretching of these musculuss is caused by the force per unit area

overload which cause the bosom to undergo hypertrophy. [7] Therefore

cardiomyocytes will spread out by adding sarcomeres in the skeletal

musculuss which will increase the contractile force of the single cells. [7]

Exercise is a good manner to advance remodelling of the bosom. [7] They

can bring forth hypertrophy and distend the cardiomyocytes in the needful

skeletal musculuss. The bosom will hold to pump harder to run into the O

demand applied by the metabolic work. Therefore the emphasis caused on

the bosom will take to hypertrophy. Normally the force per unit area

overload increases the mechanical emphasis on myocardium which

hypertrophy will seek to cut down this emphasis by increasing the thickness

of the ventricle wall. [7] But due to chronic high blood pressure the natural

remodelling of the bosom may really take to bosom failure. The remodelling

of the bosom caused by high blood pressure will ensue in left ventricular

hypertrophy. Thickening of the left ventricular wall will happen due to

emphasize initiated and cut down the chamber volume by the addition in

growing of cardiomyocytes. [7] As new cardiomyocytes is generated, old 1s

are besides triggered for programmed cell death and may take to fibrosis.

Therefore this will take to an addition in the volume of the bosom Chamberss

which is seen in the increased thickness of the wall and will diminish the contractile force map. The fibrosis caused by high blood pressure reduces the organisation in bosom musculus and increase the stiffness of the myocardium which reduces the filling of the bosom during diastole. [7] Therefore the stiffening and loss of contractility is an inauspicious consequence of exerting in chronic hypertensive patients.

Peripheral opposition is besides reduced during exercising. This is caused by the vasoconstriction in some countries of the organic structure that may non be in usage such as the intestine and visceral parts and diverts the blood off from these countries. [8] Contracting musculuss will do vasodilatation to distend the arteriolas in these musculuss and lessening entire peripheral opposition and allows the bosom to pump more blood. So exercising will do the entire peripheral opposition to cut down and allows the bosom to pump more blood to provide the O demand.

Even though entire peripheral opposition is reduced, exercising will somewhat increase the arterial force per unit area. This is caused by the demand of cardiac end product in the catching musculuss. The demand is still needed to these countries so no count how much vasodilatation is happening to cut down the entire peripheral opposition, cardiac end product is still needed to pump blood to needed countries. This will do the arterial force per unit area to increase in exercising as the demand in undertaking musculuss increases with the strength of the exercising. [8]

The bosom is able to provide a stable flow of blood to the organic structure but under utmost and demand addition in metabolic work, the bosom is able to increase its shot volume and consequence in the addition of the volume of the ventricles. [8] In exercising since the musculuss is being made to work excess hard, it will heighten the venous return which will do an addition in stroke volume. As exercising is continued the bosom rate will besides be increasing which will ensue in addition of cardiac end product due to oxygen demand in the active musculuss during exercising. [8]

Lifestyle alterations are recommended for all patients with high blood pressure regardless of drugs being taken. Changes made in life style are to accomplish a decrease in blood force per unit area in patients. These alterations could include decrease in Na consumption, increasing healthy feeding wonts and nutritionary consumption, a diet consisting of low saturated fat content, keeping a healthy weight scope, surcease of smoke, cut down intoxicant ingestion and most of all, at least some signifier of physical activity.

Salt contains Na and chloride which helps to keep the right volume of blood and tissue fluids in the organic structure. Kidneies are the chief regulators of Na degrees in the organic structure. Therefore sodium consumption will play a function in the fluid keeping as the concentration of sodium addition will increase H₂O loss in the organic structure and increase the blood force per unit area degrees. The extent of decrease is dependent on your age and blood force per unit area. Sodium decrease may non take down blood force

per unit area in younger people with low or normal blood force per unit area.

[5]

An individual's weight is by and large associated with their cholesterol degree. People who are fleshy tend to hold high cholesterol and elevated blood force per unit area. Low-density lipoproteins (LDLs) are able to traverse the endothelial bed and enter the sub-endothelial intima. Therefore the rate of entry of LDLs into the arterial wall is increased and do accretion in the blood vessel. LDLs are modified and promote macrophage to the intima. However, macrophage has receptors that recognize the LDLs and are able to roll up in the macrophage and are converted to foam cells. These cells are the causes of coronary artery disease. Foam cells are able to show growth factors and proteases that lead to cell proliferation and matrix being degraded which will take to tear of the atherosclerotic plaque. [9]

Figure 2. The formation of foam cells via macrophage oxidizing LDLs. [9]

Cigarettes smoke contain many chemicals including nicotine and carbon monoxide. [5] Smoking causes a build-up of plaques which may take to damage in the interior bed of the arteries making a coronary thrombosis. It besides contributes to the development and acceleration of coronary artery disease. Therefore cholesterol is able to come in the artery walls more quickly and would do blood coagulum to happen in the arteries. [5] This will take to become on slaughters as the entire peripheral opposition is increased with coronary artery disease and obstruction of blood vessel in the arteries.

Alcohol ingestion should besides be reduced as it affects the pituitary secretory organ in stamping down the production of anti-diuretic endocrine. This will do failure in the kidneys to resorb equal sum of H₂O and lead to desiccation of the organic structure. This will do lift in blood force per unit area. [10]

In a survey `` Beneficial effects of physical exercising on high blood pressure and cardiovascular inauspicious remodeling of diet-induced corpulent rats '' it is found that the exercising corpulent rats had a major decrease after 4 hebdomads of exerting holding a difference of 25 % lessening at the terminal of the experiment. [11] The corpulent rats showed cardiomyocyte hypertrophy which is reduced after exerting. Exercise had besides eased the loss of left ventricular cardiomyocytes. The wall thickness of the aorta and common carotid arterias was significantly smaller in exercised corpulent rats than the sedentary obese rats which lead to improved peripheral opposition arterias of the corpulent rats. [11] In another survey `` The good consequence of regular endurance exercising preparation on blood force per unit area and quality of life in patients with high blood pressure '' shows the important of exerting in the decrease of blood force per unit area. The survey shows that by exerting you can cut down systolic blood force per unit area by 13. 1mmHg and diastolic blood force per unit area by 6. 3mmHg. [12]

There is clear and evidentiary information sing the decrease of blood force per unit area in mild to chair high blood pressure patients but the conflicting issues arises with patients who are in the class 3 phase of high blood

pressure (SBP & gt ; 180mmHg, DBP & gt ; 110mmHg) known as chronic high blood pressure. Many surveies have proven that by exerting a decrease in blood force per unit area is the consequence. Exercising will originate hypertrophy to heighten the capacity of the bosom to pump to run into the O demand of the organic structure. In this phenomenon the bosom is able to of course cut down the emphasis by increasing the thickness of the ventricle wall. From the survey on the induced corpulent rats, the wall thickness of the aorta and carotid arterias were smaller in the exercised corpulent rats. For patients with chronic high blood pressure, exercising is non recommended as this may originate hypertrophy and may do bosom failure in the patient. As blood force per unit area is well high in chronic patients, the lift in blood force per unit area with exercising may do the bosom to neglect and the O demand will non be met. Therefore the demand for antihypertensive drug is introduced with these patients alternatively. Drugs that could be used include water pills, I?-Blockers, Ca²⁺ Channel Blockers, ACE Inhibitors, Angiotensin II receptor adversary and I±-adrenoceptor adversary.

Exercise is proven to cut down blood force per unit area in hypertensive patients by undergoing hypertrophy which produces cardiovascular versions that will increase work capacity, endurance and vascular map. It can besides increase the strength of musculuss and cut down cardiovascular hazards. The instance surveies have statistically showed the significance of decrease in blood force per unit area by cardiac remodelling of the bosom. Patients with grade 3 high blood pressure will necessitate to be treated with antihypertensive drugs every bit good as undergoing visible radiation

exercising. For the effectual decrease in blood force per unit area, all patients are recommended to alter their life style and include exercising as portion of their day-to-day modus operandi.