Sztandera Paulina. Non-pharmacological treatment in high blood pressure. Journal of Education, Health and Sport. 2018;8(8):61-68. eISNN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.1297611
http://ojs.ukw.edu.pl/index.php/johs/article/view/5600

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 01.06.2018. Revised: 08.06.2018. Accepted: 25.06.2018.

Non-pharmacological treatment in high blood pressure

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Introduction and purpose of the work. High blood pressure causes an early death of people all over the world. It develops circulatory system diseases such as: heart attack, stroke, heart failure, peripheral artery disease, and also kidney failures. The following factors could have an influence on high blood pressure: age, sex, physical activity, stress, force contracting the heart, circulated blood, and resistance of blood vessels. The purpose of the study was to analyze the literature of non-pharmacological treatment of high blood pressure.
Brief description of the state of the art. Non-pharmacological treatment consists mainly in changing the lifestyle, i.e. quitting smoking, reducing the weight, decreasing alcohol consumption, reducing salt consumption, increasing physical activity level, consuming fruit and vegetables, decreasing consumption of saturated fat and the total fat intake.
Summary (conclusions). Non-pharmacological treatment should be abided by each patient with high blood pressure. That kind of non-pharmacological treatment brings a lot of advantages, such as decreased blood pressure, better clinical observations and decreased therapeutic dose of hypertensive drugs.

Key words: high blood pressure, circulatory system diseases, non-pharmacological treatment.

Introduction and purpose of work.

High blood pressure causes an early death of people all over the world. It develops circulatory system diseases such as: heart attack, stroke, heart failure, peripheral artery disease, and also kidney failures. According to NATPOL 2011 study, high blood pressure in people aged 18-79 increased within 10 years from 30 to 32%. About 1 billion people over 80 years old should be added to this number. According to EHIS study, the most frequent chronic disease includes low back pain, however, high blood pressure is the fourth detected disease. The tendency to develop higher blood pressure increases with age. [1, 2]
The purpose of the study was to analyze the literature of non-pharmacological treatment of high blood pressure

The following factors could have an influence on high blood pressure: age, sex, physical activity, stress, force contracting the heart, circulated blood, and resistance of blood vessels. According to the WHO, high blood pressure is diagnosed when it achieves the level of 140/90 mm Hg or exceeds it. Two types of this disease are distinguished: primary and secondary. The latter one with its unknown causes is the most common. The provoking factors include: genetic inheritance, environmental influence, different types of stress, also kidney mechanisms, overweight and obesity, functional lability of the sympathetic system. The common reasons of secondary high blood pressure are: kidney diseases, hyperthyroidism, and renal artery stenosis. [3]
High blood pressure is confirmed if:

- mean values of the blood pressure are ≥ 140 mm Hg for systolic blood pressure and/or 90 mm Hg for diastolic blood pressure (≥ 2 measurements during ≥ 2 different medical visits), or
- mean values of the blood pressure are ≥ 180 mm Hg for systolic blood pressure and/or 110 mm Hg for diastolic blood pressure, if adverse factors like pain, fear, or alcohol consumption, are reduced, or
- the patient provided reliable data, such asa blood pressure diary or hypertensivemedicine.

Non-pharmacological treatment consists mainly in changing the lifestyle, i.e. quitting smoking, reducing the weight, decreasing alcohol consumption, reducing salt consumption, increasingphysical activity level, consuming fruit and vegetables, decreasing consumption of saturated fat and the total fat intake. These types of treatment should be abided by each patient with high blood pressure. That kind of non-pharmacological treatment brings a lot of advantages, such asdecreased blood pressure, better clinical observations and decreased therapeutic dose of hypertensivedrugs. [4]

Primary prevention of high pressure is mainly connected with changing the lifestyle, decreasing theobesity level, and increasing thephysical activity level. Primary prevention is divided intopopulationprevention and targeted prevention regarding people who are at risk of developing high blood pressure more likely than others. Targeted prevention should be especially concentrated on the following groups of people: patients with positive family history of cardiovascular diseases – women under 65 years old, and men under 55 years old, people with diabetes or with co-existing kidney disease, patients withat least two classic risk factors ofcardio-vascular diseases, people with high normal blood pressure≥ 130/85 mm Hg, people with White Coat Hypertension.[1]

Early secondary prevention is focused on increasingthe level of recognizing an early stage of high blood pressure, without or with a limited organ damage. Late secondary prevention involvesconducting therapeutic actions among people with a recognized disease the aim of which is todecrease negative results of the disease in a human body or to limit them. Public knowledge about the influence of high blood pressure on health is still limited, however, it is gradually improving. NATPOL 2011study showed that there is adecreasing tendency of people with high blood pressure who did notundergohypertensive treatment (from18% to13%). An increased tendency of controlling the blood pressure in people with high blood pressuredemonstrates a positive fact (from 12% to 26%). [1]

The nutritious habits of high blood pressure patients are inappropriate. Bronkowska et al. [5] claimed that patients during the day had their meals arranged in a wrong way, they ate not enough cereal products, especially whole meal products instead ofmeals of animal origin. The respondentsdid not eat sufficient fruit and vegetables, and they ate also too many dishes containing fat and sodium chloride. [5]

Based on the article by Wojciechowska et al.[6], the patients knew a lot of high blood pressure, but this knowledge was not sufficient. The patients did not demonstrate knowledge about the disease and prophylactics, itsunderstandingis selective and not systematic. Even if patients roughly knew what to do, the application if this knowledge in their everyday life is very poor and inadequate to the stadium of the disease, and the prescriptions and recommendations of the doctor. Factors which influence that situation include: improper eating habits, lack of willingness to exercise, being used to the symptoms, and reluctance [5].

Description of knowledge

Dietary recommendations for people with high blood pressure:

- Reduction of the diet to 1700 – 2000kcal (7113-8368kJ) in order to attain the best results of decreasing high blood pressure; consuming less sodium, and saturated fat (to 25% of a daily energetic consumption);
- Providing the amount of protein at the level of 1g/kg of body weight;
- Rich carbonate diet;
- High consumption of vitamins, especially vitamin C;
- Preparing easily digestible food, boiled, stewed, without fat, baked in foil or parchment paper;
- Eating salty food, processed food or fast food is not recommended;
- Consuming more raw vegetables, fruit, wheat and oat bran and walnuts [6]

Barriers which impeded modification of the diet

According to the American Heart Association, one might distinguish some obstacles in our everyday life which could make modification of the diet difficult, such as: less frequentconsumption of meals shared with family, eating out, especially fast food, bad influence of media, which show incorrect nutritious behaviors, lack of clearly defined general rules of consumption according to age, sex, workplace, big portion of meals served in restaurants, too many salted products sold in markets, lack of healthy diet products which could be sold in schools and at work, high prices of low-calorie products and reduced sodium food. There are additional difficulties such as peers and environmental pressure, mass media suggestions, and individual habits [8].

Sodium vs. high blood pressure

The most effective method in non-pharmacological treatment is reducing consumption of sodium. High consumption of salt could result in resistanceof high blood pressure treatment. Reducing sodium consumption to 75-100 mmol/daily (4,35-5,8 g) could reduce the blood pressure by about 2-8 mm Hg, as well as doses of hypertensive medicine. Bad habits of salt consumption are created in an early life period, therefore,it is of great importance to develophealthy eatinghabits already from the childhood. The Polish norms of salt consumption are: for adults – 3-8 g NaCl/daily (1200-13000 mg of sodium), and for children - 2,8-6,8 g NaCl (1120-2720 mg of sodium).The Instituteof Mother and Child does not recommend using salt for preparing dishes for infants and young children. The general rules for salt consumption impose reducing it to 5 g NaCl/daily (85 mmol Na). [1, 3]

General consumption of sodium consist of: sodium content as a mineral ingredient of food, sodium added to prepare food in the industry, salt added individually to dishes. There are two groups of products (meat and bread) and four groups of meals (soups, potatoes, pasta, groats and meat meals) which constitute almost 90% of the daily sodium consumption. Taking the above into account, we should reduce salt especially in those dishes. On the market there is diet salt available with the reduced content of sodium – by almost 30% in comparison to standard salt, which could help to reduce sodium consumption. While preparing meals,patients could use some flavouring and acidifying products such as: tomato and lemon juice, garlic, chives, onions, natural fruit and vegetable juices, or herbs. It is important to resign fromready-madeseasoning which consists of monosodium glutamate, ready-made sauces and powdered soups. Worth reducing as well is consumption of: sausage and offal products, bakery bread with the addition of baking powder or baking soda, salted herrings, smoked fish, canned fish, silage, salted carbonated water. It is not recommend to eat crisps, salted sticks and nuts, processed and ripened cheese. The diet while treating high blood pressure should contain properly prepared dishes with a right amount of energy and mineral products, which are tasty and varied. [3, 6, 7]

Potassium consumption in high blood pressure treatment

The lack of potassium amount in ahigh blood pressure diet could have a similar influence on health as higher sodium consumption. Among healthy people, the reduction of blood pressure after an increasedconsumption of potassium is low, while it is higher in high blood pressure patients, especially when they have eaten too large amount of sodium. Therefore,it is recommended to eat proper amount of potassium, especially from natural sources such as fruit, vegetables, potatoes, wheat seeds, meat, fish, or legume seeds. Products with high contentof potassium contain as welldifferent minerals such as magnesium and calcium, which are important in reducing high blood pressure.Moreover, vegetables, especially spinach, broccoli, onion, cabbage, celery, lettuce, tomatoes, and fruit (blackcurrant, citrus fruits, plums, cherries, apples) contain flavonoidswhich are important in reducing high blood pressure and also influence the concentration of lipid fractions and neutralization of free radicals. An appropriate fruit- and vegetable-rich diet includes a good proportion of vitamin C and vitamins B, oils added to meals give additional portion of vitamins E and unsaturated fatty acids. These ingredients are important in associated doses of diuretics. [3, 8].

It is essential to eat an additional amount of vitamin C– 150-200 mg, which might be covered by 2 kiwis and one orange or 100 g of blackcurrant or guava. Whilepreparing meals, to prevent losing potassium patients should remember to: boil fruit and vegetables in hot water,

not to soak peeled vegetables and fruits in water, use natural herbs whilepreparing dishes, prepare raw salads right before serving them, use vegetable stock(left after boiling vegetables and potatoes) for preparing soups and sauces. However, the stock left after boiling old potatoes in the spring time and young potatoes should be poured out due to the presence of solanine. [3]

Calcium in a high blood pressure diet

It is important to provide a proper amount of calcium in a high blood pressure diet, however, additional supplementation is not recommended. Among healthy adults only 20-25% of calcium contained in products is absorbed, while the remaining part is excreted. The norms of calcium demand are difficult to be established due to the existence of a mechanism regulating the absorption of this element in the mucous membrane of the small intestine. According to the standards in force in Poland, the recommended daily intake of calcium for people of all ages and physiological conditions is: for children aged 1-3 and adults over25 years old – 900 mg/daily, for children aged 4-9 – 800 mg/daily, for the youth, pregnant and breast-feedingwomen – 1200 mg/daily.[3]

To achieve the best absorption of calcium, it is important to choose products with high bioavailability, which depends on the total amount of calcium in products, and ingredients which could increase or decrease absorption of calcium.Oxalates which are present in large quantities in some vegetables, such as: spinach, sorrel, rhubarb, and phytates which exist in some vegetables could lead tolower absorption of calcium.Food products of animal origin, due to low content of calcium and simultaneously, high level of phosphorusdoes not constitute a good source of calcium for humans.The calcium and phosphorus ratio in food products is a measure of its assimilability and should not be lower than 1:1. An excess of phosphorus could be the reason of lower absorption of calcium too, as products of animal origin are not a good source of calcium. Because of roughage content, some vegetables, such as broccoli, cabbage, beets, celery, even with a high amount of calcium, have a reduced bioavailability.Oilseeds have agreat amount of calcium, but their high energetic level is the reason why they are not recommended. A high amount of calcium is included in poppy seeds, but they are rich in roughage too, which is the reason of their lower absorption. The best source of calcium is milk and its dairy products. The amount of calcium in milk is 120mg/100g, it is similar to fermented milk beverages like kefir (sourish yoghurt) 2% fat – 103mg/100g, natural yoghurt 2% fat – 170mg/100g. Some products such as puddings, fruit juices and drinks, bread and milk puddings for childrencontaincalcium lactate. To providebetter calcium supplementation, non-fat milk might be added to soups and sauces instead of sour cream. Wheywhich is a product formed during the process of making cheese could be givento water with boiled potatoes or to vegetable stock. In the cases when milk is inadvisable or should be limited, soy products or products with casein hydrolysateas well aswheyand its products might be consumed instead. In the caseof lactose intolerance, products with low-content of lactose like ferment milk or cheese, or milk without lactose should be eaten. [3]

Magnesium in a high pressure diet

Diuretic drugs lead to a lower level of magnesium, and therefore, one should control it to deliver a proper amount of that mineral. For adults a daily intake should be of 300-350 mg, and a normal diet should cover 2/3 of that mineral. During supplementation of magnesium, it is important to keep aproper balance of magnesium and calcium – one unitof magnesium –

two unitsof calcium. Good magnesium sources are: soy, nuts, groats, especially buckwheat, white beans, wheat bran, poppyseed, sunflower and pumpkin seeds, wholemeal bread, fruits: 100 g of almonds contains 270 mg of magnesium, the same number of figs - 80 mg, and bananas - 30 mg.Chocolate is a good source of magnesium, but because of the amount of fat and energy which is deliveredthereby, it is not recommended. Another supplement of magnesium could be as well magnesium-calcium mineral water, whichshould contain75-150 mg of Mg 2=/dm3 water, and 150-250 of Ca2+/dm3 of water. [3]

N-3 unsaturated fatty acids

It is proved that unsaturated fatty acids cause lower level of total cholesterol, LDL cholesterol, VLDL and triglycerides, while increasing HDL cholesterol. Unsaturated fatty acids demonstrateadditionally, especially in people with high risk of cardiovascular diseases, beneficial influence on inflammatory and hemostatic parameters, and because of that, they delay clinical occurrence of the atherosclerosis. A good source of N-3 unsaturated fatty AIDS are: fatty sea fish - herring, salmon, mackerel, sardines, halibut, cod, flounder and tuna, sea fruits, walnuts, green vegetables and oils, especially sunflower, soy, and linseed. It is recommended to supplement those acids by consuming 200-400 of fatty fish on a weekly basis. [8]

Roughage

The meta-analysisof the research conducted by Grabowska et al. [8] showed that roughage consumption had no special influence onthe blood pressure, also systolic and diastolic blood pressure, but hypertensive effect was more significantin cases of high blood pressure when roughage was consumed in greater amounts within8 weeks. It was found that roughage consumption gave additional benefits, and thus, it is recommend [8].

Alcohol

Higher consumption of alcohol is not generally recommended for people, especially with high blood pressure, as it impairseffectiveness of hypertensivedrugs. If completereduction of alcohol is impossible, it should be reduced to 20-30 g of ethanol for men, and 10-20 g for women daily. Weekly consumption of alcohol should be: 140 g of ethanol for men and 80 g for women. 10 g of purealcohol is in 250 ml beer, 100 ml of wine, 25 g of vodka [4, 8].

Smoking

Every smoked cigarette increases the blood pressure and heart arrhythmic which can last formore than 15 minutes. Passive smoking is dangerous as well.Globally, smoking causes cardio-vasculardiseases, especially in people with high blood pressure. During every visitdoctors should ask their patients, especially those with high blood pressure,about smoking and inform themabout the risk related thereto. As far as smokers are concerned, pharmacological treatment should be recommendedwhich could help tostop smoking. If a patient cannot stop smoking, addiction treatment at the clinic should be introduced[4,8].

DASH diet

This diet consists in consuming mostly vegetables and fruits- at least 4-5 portions daily (from 400-500g/day to 800-1000g/day). After introducing this kind of diet, the blood pressure could

decrease by about 7/3 mm Hg.Flavonoids which are found in such vegetables like spinach, onion, broccoli, celery, lettuce, cabbage, tomatoes, and fruits like blackcurrant, plums, apples, cherries, or citrus fruits are responsible for decreasingthe blood pressure. They have a beneficial influence on the lipid profile and neutralize free radicals Ona DASH diet patients should consume 4-5 portions of nuts, seeds and almonds per week. Grains which includedin wholegrain bread, oatmeal should be consumed 7-8 times per day, low fat milk products 2-3 times per day. Meat, mainly poultry and fish should be consumed 2 times per day, fat and oil like soft margarines; vegetable oil, i.e. corn, rapeseed and safflower oil 2-3 daily, sweets – maximum 5 times weekly. [8, 9]

Physical activity

Proper physical activity decreases the blood pressure by about 4-9 mm Hg. It should be an important element of non-pharmacological treatment. For patients with high blood pressure it is recommended to exercise for at least 30 minutes 5-7 days in a week, providinga moderately intensive dynamic aerobic activity. [1, 4] The American Heart Association recommendsat least 90 to 150 minutes of aerobic and/or dynamic resistance exercises per week and/or three sessions of isometric resistance exercises per week. If someone wants to get equivalent benefits of activity, he/she should exercise more - at least 150 minutes per week, performing physical activityof moderate-intensity. Duration of physical activity episodes should last at least 10 minutes and should be spread throughout the week. The exercises should contain muscle-strengthening activities at least two days per week and flexibility and stretching activities [1, 4, 10].

Summary.

Non-pharmacological treatment should be abided by each patient with high blood pressure. That kind of non-pharmacological treatment brings a lot of advantages, such as decreased blood pressure, better clinical observations and decreased therapeutic dose of hypertensive drugs.

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