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The DASH diet - beneficial impacts on cardiovascular system and even more

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Abstract

Introduction and objective: Hypertension is the main preventable risk factor for both cardiovascular disease and premature death globally. Estimates suggest that almost one in three adults suffered from hypertension in 2010. This clinical entity can lead to different severe complications such as heart failure or stroke. Data shows that blood pressure(BP) reduction below currently recommended leads to a significant decrease of the risk of cardiovascular disease. The aim of the study is to review recent knowledge and beneficial impacts of Dietary Approaches to Stop Hypertension(DASH) diet, which is considered to decrease blood pressure. The information used in the presented analysis was obtained by searching academic research databases: Google Scholar and PubMed.

An abbreviated description of the state of knowledge: The DASH diet is one of well known dietary patterns. It is rich in fruits, whole grain and low-fat diary products. Basing on the data, it can significantly decrease BP, what leads to a reduction of cardiovascular disease risk. Furthermore, high adherence to the DASH diet is associated with a lower risk of mortality from all cancer types and lower risk of colon cancer development, as well as with a lower risk of type 2 diabetes development.

Summary: The DASH diet is a commonly prescribed dietary pattern, which is known of its effectiveness in BP reduction. Additional research confirms its several different health benefits including decrease of the cardiovascular risk. Finally, the research give the recommendation, that the DASH diet should be pursued to increase the antihypertensive drug treatment effectiveness, but also to delay hypertension onset.

Key words: Hypertension, DASH diet, blood pressure, cardiovascular disease

Introduction and aim of the review

Hypertension remains the main preventable risk factor for cardiovascular disease (CVD) as well as premature death globally. According to the research that involved close to 1 million people from 90 countries, in 2010 an estimated 31.1% of adults (1.39 billion) worldwide suffered from hypertension. It is defined as systolic blood pressure (BP) ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg. Despite the fact that antihypertensive medications become worldwide, the prevalence of hypertension has soared up significantly, particularly in low and middle-income countries. However, in high-income countries in the past 20 years, a small decrease in hypertension prevalence is described [1]. Hypertension becomes noticeably more frequent with advancing age, with a prevalence of >60% in people aged >60 years [2]. Systemic arterial hypertension is a well-known disorder, but less than a half of those with hypertension are fully aware of their condition. Furthermore numerous patients are aware, but are not successfully treated or do not receive any treatment[3]. Basing on a study which involved a multinational population, only 32.5% of treated patients with hypertension control their BP [2]. By 2025 it is estimated that the number of people suffering from hypertension will soar up by 15-25%, and will reach close to 1.5 bilion people worldwide [4]. Hypertension is a multifactorial disease involving not only genetic predisposition and pathophysiological factors but also environmental factors. To the latter includes excessive sodium consumption, unhealthy diet, lack of physical activity, poor sleep quality or alcohol intake [1,2]. Data shows that systolic BP reduction below currently recommended leads to a significant decrease of the risk of CVD and all-cause mortality [5]. Targeting for the reduction of hypertension global burden and BP control, the current hypertension management guidelines recommend as an integral part of the treatment the adoption of lifestyle modifications, including a healthy diet [6]. According to the data not only individual nutrients, such as sodium and potassium, but also various dietary patterns such as the Dietary Approaches to Stop Hypertension (DASH) diet, are directly associated with BP reduction, which was confirmed in several different studies [7,8,9]. The aim of the study is to review recent knowledge and beneficial impacts of the DASH diet. The information used in the presented analysis was obtained by searching academic research databases: Google Scholar and PubMed.

Hypertension as a risk factor

Moreover this clinical entity can lead to many severe complications. The first target for arterial hypertension as an end-organ damage is left ventricle. Markers of hypertension include concentric remodelling, eccentric or concentric left ventricular hypertrophy(LVH). They are the main risk factors for CVD morbidity and mortality. Moreover these geometrical changes of left ventricle are considered to constitute the major reason for all-cause mortality and neurological pathologies [10]. On the other hand hypertension can lead to heart failure. Numerous of patients with heart failure have a history of hypertension. Furthermore longstanding hypertension ultimately cause heart failure [11]. Basing on the cohort study which involved over 5000 patients, in 91% of all newly diagnosed heart failure, hypertension antedated its development [12]. Hypertension also constitutes a significant modifiable risk factor for kidney failure or stroke. Chronic kidney disease can not only develop due to uncontrolled hypertension, but also chronic kidney disease is a common cause of hypertension [13]. Progressive renal failure which gives rise to cardiorenal syndrome are another possible complications of longstanding hypertension [11]. Another meta-analysis study [14] was undertaken to estimate association between diabetic nephropathy and hypertension in diabetics. The study revealed that diabetic nephropathy complication is considerably higher in patients suffering from hypertension.

The DASH diet

Diet can constitute an important modifiable risk factor (that increase risk) for the development of hypertension [1]. Dietary Approaches to Stop Hypertension(DASH) diet is one of well known dietary patterns that can lead to decrease the BP. The original DASH diet has it roots in the United States [15,16], and several studies were conducted all over the world which allowed to confirm its effectiveness in BP reduction [17,18]. It is commonly prescribed dietary pattern for lowering also CVD risk. The DASH diet is rich in vegetables, fruit, whole grains, fibre, low-fat diary foods, lean meat and fish, while saturated fatty acids and refined sugar are limited. Moreover in the DASH diet minerals play an important role. Sodium intake because of its well-known impact on CVD risk is restricted. On the other hand it is high in nutrients such as potassium, calcium and magnesium level, which are considered to be advantageous for BP [17,19]. Nevertheless basing on current guidelines for the management of arterial hypertension by the European Society of Cardiology and the European Society of Hypertension, healthy diet which is included in lifestyle modifications, are recommended as an integral part of ongoing treatment of hypertension and independently of the underlying antihypertensive drug treatment. Hypertensive patients should be encouraged to eat balanced, healthy diet containing fresh fruit, vegetables, low-fat diary products, fish, wholegrains and unsaturated fatty acids(olive oil) [6]. Over 450 adults was enrolled into the clinical trial study, where subjects were randomly assigned to receive for 8 weeks the control diet and a diet rich in fruits, vegetables and low-fat dairy products. The DASH diet in comparison to the typical US diet notably decreases BP in both hypertensive individuals by 11.4 mmHg-systolic and 5.5 mmHg -diastolic, and normotensive individuals respectively 3.5 and 2.1 mmHg. The results were achieved within 2 weeks and maintained for the next 6 weeks of the research [15]. In the different study in United Kingdom, after the 30 days of the DASH diet consumption, values of mean fasting systolic and diastolic BP has lowered significantly by 4.6 and 3.9 mmHg respectively. Additionally the diet was well accepted by the participants [17].

Other beneficial impacts of the DASH diet

The DASH diet which is high in low-fat diary foods, lowers not only BP but also significantly reduces low-density lipoprotein(LDL) and high-density lipoprotein(HDL) cholesterol. In a randomized controlled trial, the DASH diet was compared to a lower-carbohydrate, but higher-fat DASH(HF-DASH) diet and their impact on lipids and lipoproteins. That modification allows for more liberal total and saturated fat intake, but also with moderate limitation of carbohydrate intake, from sugars and fruit juices. The study revealed that HF-DASH modification is no down to the classic DASH, and to the same extent lowered BP. Furthermore the HF-DASH remarkably reduced triglycerides and large and medium very-low density lipoprotein(VLDL), without significantly increasing LDL cholesterol [19]. The third most common cancer and the fourth most common cause of cancer-related death globally is colorectal cancer(CRC) [20]. Well known risk factors of CRC are inflammatory bowel disease, age, smoking, but also obesity and diet. 499 participants was included in the recent, case-control study, where the aim of the study was to investigate the association between DASH dietary pattern with the risk of CRC and colorectal adenomas as its precursor. Study revealed that the DASH diet might be helpful and could decrease the risk of CRC both in men and women [21]. Furthermore the meta-analysis [22] of seventeen studies showed that high adherence to the DASH diet is associated with a reduced risk of mortality from all cancer types. What is more, patients with high adherence to the diet compared to those with the lowest adherence, had lower risk of developing colon, rectal and colorectal cancers. In the cohort study, which involved 88,517 female nurses aged 34-59 years with absence of diabetes or CVD in 1980, the DASH diet was assessed 7 times during 24 years of follow-up. The research aimed to evaluate long-term effects of the DASH diet on cardiovascular system. According to the above-mentioned, study revealed that adherence to the DASH dietary pattern is associated with a lower risk of stroke as well as coronary heart disease among middle-aged women during long-term follow-up [23]. According to the recent study the DASH diet could help combat cardiometabolic diseases as well as chronic kidney disease(CKD). Additionally adherence to a DASH-style diet is related with a lower risk of hyperuricemia, which is a known risk factor for CKD [24]. Moreover a prospective study from Singapore Chinese Health Study noted a 29% lower risk of developing type 2 diabetes in patients with greater adherence to a DASH-style diet [25].

Conclusions

Hypertension is an important public health challenge and is associated with a worldwide burden of CVD as well as premature death [1]. It can lead to various complications such as heart failure, kidney failure or stroke. Dietary Approaches to Stop Hypertension is a commonly prescribed diet, which is known of its effectiveness in BP reduction [8,17]. High adherence to the DASH diet can also lead to several different benefits including LDL cholesterol significant reduction [19], a reduced risk of developing colon, colorectal and rectal cancer [22], lower risk of developing type 2 diabetes [25]. What more the DASH diet has a potential to reduce the risk of CVD such as coronary heart disease in the long term [23]. Finally, the research give the recommendation, that the DASH diet should be pursued to increase the antihypertensive drug treatment effectiveness, but also to delay hypertension onset [8].

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