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Review article

Eating habits and food composition of stroke survivors as a form of secondary prevention

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Abstract
Aim: The aim of this review was to analyze eating habits and food composition in stroke survivors.
Methods: In the years 01/2000–06/2020, research published in the following databases was analyzed: Pubmed, EBSCO, Science Direct, Scopus. The literature review integrated 9 studies.
Results: Studies included in the review were published mainly in the years 2015–2019. Dietary analysis in the research was predominantly focused on fruit/vegetable intake and salt intake. Consumption of fruits and vegetables in stroke survivors is not at an adequate level and their intake is lower in comparison with a healthy population. Qualitative analysis of salt intake is limited to a small number of studies (n = 3), with results showing differences in salt intake between countries. Only one study comprehensively assessed diet in stroke survivors (intake of energy, macro- and micronutrients). We did not find any studies to evaluate the adherence of after-stroke patients to the Mediterranean diet/DASH diet (Dietary Approaches to Stop Hypertension), in line with current nutritional recommendations for secondary prevention.
Conclusions: Although diet is one of the modifiable factors of a stroke and it can be well managed, the issue of diet and eating habits after overcoming the disease is not given sufficient attention by researchers.

Keywords: Eating habits; Food composition; Secondary prevention; Stroke survivor

Introduction

A stroke is a serious disease with an increasing incidence. It is the main cause of disability in the world (Katan and Luft, 2018), and determines the quality of life of patients (Šupínová and Sklenková, 2018) and their caregivers (Jellema et al., 2019). A large number of unmodifiable and modifiable factors are involved in the development of diseases (Meschia et al., 2014). The INTERSTROKE study (22 global countries) points to 10 risk factors for stroke, which explain up to 88.1% of all cases of this disease. These include hypertension, smoking, waist-to-hip ratio, inadequate diet, poor physical activity, diabetes mellitus, excessive alcohol intake, psycho-social factors, cardiac causes, apolipoprotein B (ApoB) to ApoA1 ratio (O'Donnell et al., 2010). Many of these risk factors are controllable, suggesting the possibility of reducing the risk of stroke through preventive interventions (Béjot et al., 2016).

Eating habits, food composition, consumption of selected groups of food/nutrients are important protective elements of a stroke. Food intake in relation to strokes is a wide-ranging issue, and it is necessary to look at it from three aspects: nutritional primary prevention, eating in the acute stage of the disease, nutritional secondary prevention (eating in the chronic stage of the disease).

Nutrition as a form of primary stroke prevention

Many studies, reviews and meta-analyses have repeatedly demonstrated the importance of diet in primary disease prevention. Greater adherence to the Mediterranean diet (Chen et al., 2019; Grosso et al., 2017; Liyanage et al., 2016) and to the DASH diet (Dietary Approaches to Stop Hypertension) (Feng et al., 2018; Larsson et al., 2016; Salehi-Abargouei et al., 2013) significantly reduces the risk of a stroke (mainly the ischemic form). The Mediterranean diet and the DASH diet are predominantly plant-based diets, but they are not vegetarian/vegan. Consumption of fresh fruits, vegetables, whole grains, legumes and nuts/seeds is preferred. Intake of lean meat, fish, and especially fermented dairy products is accepted. Red meat, processed meat, sweets and sugar-sweetened beverages should be limited (Juraschek et al., 2017; Martínez-González et al., 2017; Ndlovu et al., 2019). A characteristic feature of the Mediterranean diet is olive oil (Ndlovu et al., 2019).

Dietary risk factors for a stroke include low fruit and vegetable consumption, low fiber intake, low potassium intake, and high glycemic load (Micha et al., 2017). A meta-analysis of 123 studies showed an inverse association between the vegetable intake [RR: 0.92 (0.86–0.98)], fruit [RR: 0.90 (0.84–0.97)], fish [RR: 0.86 (0.75–0.99)] and stroke, as well as a positive association between red meat intake [RR: 1.12 (1.06–1.17)], processed meat [RR: 1.17 (1.02–1.34)], sugar-sweetened bev-

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erages [RR: 1.07 (1.02–1.12)] and the risk of stroke (Bechthold et al., 2019). Larsson (2017) states that a diet rich in fruits, vegetables, olive oil, nuts, and limiting salt and salt-preserved meat protects against strokes.

Nutrition in the acute stage of stroke

In the acute stage of the disease, dieting is centered on the way food is served, how the diet is modified, ensuring adequate hydration and nutrition of patients, and the management of problems with oral food intake. Comprehensive guidelines in this area are analyzed in particular by the European Society for Clinical Nutrition and Metabolism (ESPEN). In 2018, this society formed a total of 21 recommendations regarding the diet of patients in the acute stage of stroke and 16 additional recommendations specifically focused on dysphagia. These nutritional guidelines predominantly deal with the need to assess the nutritional status and risk of malnutrition, the method of food administration (oral – enteral – parenteral), and the form of enteral nutrition (nasogastric tube – percutaneous gastrostomy). A separate area is administering food to patients with stroke and dysphagia (Burgos et al., 2018). Dysphagia is a very common problem in stroke patients (Mandysová and Ehler, 2011), and together with other phenomena such as the problem of gastric emptying, apraxia, physical disability, cognitive deficits, depression (Corrigan et al., 2011; Stavroulakis and McDermott, 2016), impaired consciousness (Burgos et al., 2018), increase in metabolism, and occurrence of comorbidities (Stavroulakis and McDermott, 2016), are involved in changes in nutrition and the risk of malnutrition in the acute stage of stroke. Dysphagia, enteral nutrition and the use of nutritional supplements is also fundamental to the 2019 guidelines of the American Heart Association (AHA/ASA) (Powers et al., 2018).

Patients have difficulties with oral food intake. Problems with food intake include handling food on the plate, transporting food to the mouth, chewing, swallowing, and hoarding food in the mouth (Carlsson et al., 2004). From the subjective point of view of patients this is placing food on the plate, holding the plate when eating food, difficulties in peeling, lack of appetite, change of taste and smell, cleaning the table, thinking of what food needs to be cut into smaller pieces, fatigue during eating, etc. (Medin et al., 2010a). Self-sufficiency problems with food intake have been repeatedly analyzed in patients with stroke by quantitative studies (Medin et al., 2012; Mizrahi et al., 2013; Perry a McLaren, 2004) as well as qualitative studies (Carlsson et al., 2004; Medin et al., 2010b; Perry and McLaren, 2003). The consequences of food management problems are reduced energy intake (Andersson et al., 2003; Gustafsson et al., 2002; Lee et al., 2005; Perry a McLaren, 2004), insufficient intake of some micronutrients (folic acid, iron, fiber, vitamin D, E, calcium) (Gustafsson et al., 2002) and persistence of the risk of malnutrition (Medin et al., 2012).

Nutrition in the chronic stage of stroke – secondary prevention

In the chronic stage of the disease, eating integrates two areas: managing problems with food intake, and food composition.

Eating difficulties, which begin in the acute stage of the disease (during hospitalization), persist to varying degrees in the chronic stage. Medin et al. (2012) found improvements in some areas of food intake (sitting position, managing food on the plate, manipulating food in the mouth). However, these problems still persisted in a certan percentage of patients 3 months after stroke.

While the recommendations of the American Heart Association from the year 2006 aimed at the secondary prevention of stroke (in patients with ischemic stroke/TIA) do not include any nutritional interventions (Sacco et al., 2006), the updated 2014 recommendations integrate nutritional practices (Table 1), which suggests a qualitative shift in this area and emphasizes that nutrition is important not only in primary but also in secondary prevention of stroke (Kernan et al., 2014). However, secondary prevention strategies are still strongly focused on pharmacotherapy and control of cardiovascular risk factors (James, 2019). Diet and lifestyle changes are minimally included in the recommendations. It is important to take into account the fact that according to epidemiological data, the risk of recurrence of stroke reaches almost 40% within 10 years (Béjot et al., 2016) and the diet of after-stroke patients is important and can be well managed (Lim and Choue, 2013). Based on the above reason, it can be stated that the analysis of eating habits and the composition of food intake in the chronic stage of the disease has been given minimal attention in research.

Materials and methods

The aim of the literature review was to assess eating habits and the composition of food intake in patients with a chronic stage of stroke (in stroke survivors).

When processing the literature review, we used the method of content analysis of documents. Relevant sources were detected in the following scientific databases: Pubmed, EBSCO, Science Direct, Scopus in the years 01/2000–06/2020. The search was performed using the keywords “stroke survivors”, “eating habits”, “dietary patterns”, “lifestyle behaviour” using the Boolean operators “and” and “or”. The inclusion criteria for integrating the study in the literature review included: studies carried out in the chronic stage of the disease, studies analyzing eating habits/composition of food intake, quantitative studies in English, Czech and Slovak language. Exclusion criteria included: patient in the acute stage of the disease (during hospitalization), qualitative research, patient in the chronic stage of the disease but dietary practices assessed retrospectively (i.e. in the acute stage or before the onset of stroke), and absence of full text.

During the first step of the search, we identified 640 resources (Chart 1). Duplicates were removed in the next step of the analysis (n = 175). This was followed by screening of the titles and abstracts by two independent authors (SM, MR) and exclusion of studies that did not meet the established inclusion criteria: theoretical articles, review studies/guidelines, nutrition as primary prevention of stroke, studies assessing the quality of life of patients after stroke and their caregivers, studies assessing patients’ awareness of stroke, studies analyzing eating difficulties, smoking/alcohol consumption, physical activity, mental aspects of patients with stroke, studies with a combined sample of respondents (stroke survivors and patients with other disease). In the screening process, we additionally identified 2 surveys in the review studies, which met our inclusion criteria and were included in the literature review. The screening resulted in 14 studies. In 4 studies it was not possible to analyze dietary parameters (absence of exact data in the research methodology; presentation of dietary results in relation to quality of life), or we did not get a full-text article (n = 1). We included 9 studies in the final analysis (Table 2).

Table 1. Summary of nutritional recommendations in primary and secondary stroke prevention

Primary prevention of stroke	**AHA/ASA** (Meschia et al., 2014) To reduce sodium intake and increase potassium intake to reduce blood pressure. To prefer a DASH-diet, which emphasizes the intake of fruits, vegetables, low-fat dairy products and reduced saturated fat to reduce blood pressure. To prefer a diet rich in fruits and vegetables, and a diet high in potassium, and a Mediterranean diet supplemented with nuts, because it can reduce the risk of stroke.
Primary and secondary prevention of hypertension	**ACC/AHA** (Whelton et al., 2018) It is recommended in patients with elevated blood pressure or hypertension: – DASH diet that facilitates desirable weight loss; – reduction of sodium intake; – potassium supplementation, preferably in dietary modification, if it is not contraindicated by the presence of chronic kidney disease or use of drugs that reduce potassium excretion. **ESC/ESH** (Williams et al., 2018) Salt restriction <5 g/d. Increased intake of vegetables, fresh fruits, fish, nuts and unsaturated fatty acids (olive oil), low intake of red meats and intake of low-fat dairy products.
Secondary prevention of stroke (chronic stage of the disease)	**AHA/ASA** (Kernan et al., 2014) It is recommended in patients after ischemic stroke/TIA: – to implement a nutritional assessment focusing on signs of under/overnutrition; – patients with signs of undernutrition should be referred for individualized nutritional counseling; – to reduce intake of sodium to less than 2.4 g/d. Further reduction of sodium intake <1.5 g/d is reasonable and is associated with greater blood pressure reduction; – to consume a Mediterranean diet instead of a low-fat diet. The Mediterranean diet emphasizes the intake of vegetables, fruits, whole grains, and includes low-fat dairy products, poultry, fish, legumes, olive oil and nuts. It limits the intake of sweets and red meats. Routine supplementation with a vitamin or combination of vitamins is not recommended in patients after ischemic stroke/TIA. **Canadian Stroke Best Practices Advisory Committee** (Coutts et al., 2015) Individuals with stroke must be educated to eat a diet high in fruits, vegetables, low-fat dairy products, soluble fibre, whole grains, protein from plant sources, and a diet low in saturated and trans fats and cholesterol (<200 mg daily for patients at increased vascular risk) and low in salt. Patients with stroke must be educated to eat a Mediterranean diet, which is high in vegetables, fruits, whole grains, fish, nuts and olive oil. Patients with stroke and high blood pressure must be educated so that daily sodium intake from all sources is less than 2000 mg per day.

Abbreviations: ACC – American College of Cardiology; AHA – American Heart Association; ASA – American Stroke Association; DASH – Dietary Approaches to Stop Hypertension; ESC – European Society of Cardiology; ESH – European Society of Hypertension; TIA – transient ischemic attack

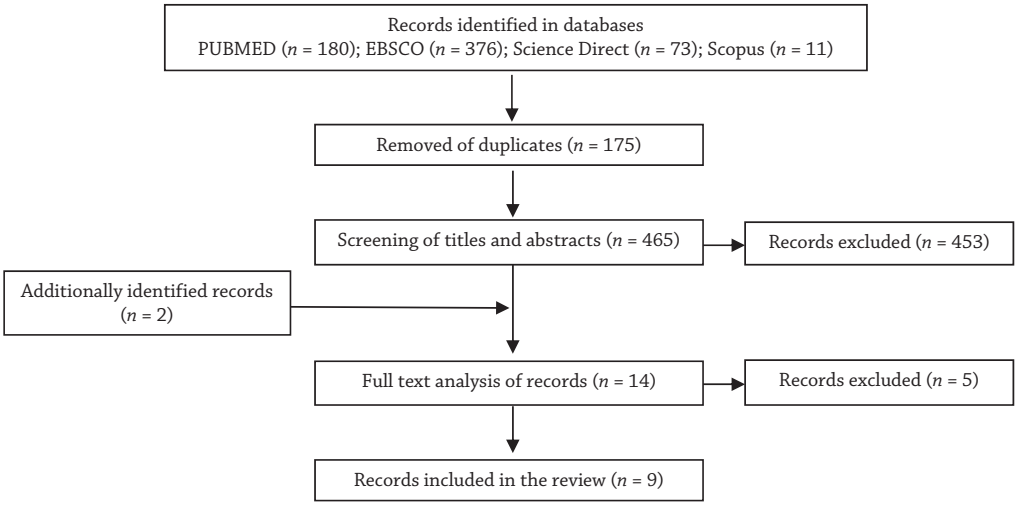

Chart 1. PRISMA diagram

Table 2. Basic characteristics of studies included in the literature review

Author	Country	Study	Sample	Analyzed areas of nutrition
Bailey et al., 2019a	U.S.	Cross-sectional, comparative study	*n* = 18 269 (patients with stroke history) *n* = 421 897 (patients without stroke history	Intake of fruits and vegetables
Faiz et al., 2019	Norway	Prospective study	*n* = 282 (ischemic, hemorrhagic stroke, TIA)	Diet change Intake of food containing sugar, fats
Bailey et al., 2019b	U.S.	Cross-sectional, comparative study	*n* = 37 225 (after stroke) *n* = 851 607 (control group)	Intake of fruits and vegetables
Bailey et al., 2019c	U.S.	Cross-sectional, comparative study	*n* = 26 695 (after stroke, without DM) *n* = 11 861 (after stroke with DM)	Intake of fruits and vegetables
Denham et al., 2018	Australia	Intervention study*	*n* = 19 (after stroke/TIA)	Intake of fruits and vegetables
Wali et al., 2018	U.S.	Cross-sectional, comparative study	*n* = 13 249 (after stroke) *n* = 231 320 (control group)	Intake of fruits and vegetables
Olaiya et al., 2017	Australia	Randomised controlled study*	*n* = 563 (after stroke/TIA)	Intake of fruits, vegetables, salt
Lin et al., 2015	U.S.	Cross-sectional study	*n* = 420	HEI score. HEI includes 3 f 5 primary aspects: intake of fruits/vegetables, whole grains and salt
Lee et al., 2005	Taiwan	Cross-sectional study	*n* = 40 (ischemic stroke) *n* = 40 (control group)	Intake of energy, fats, dietary fiber, micronutrients

* In the intervention studies and the randomized study, nutrition data were reported at baseline.
Abbreviations: DM – diabetes mellitus; HEI – The Healthy Eating Index; TIA – transient ischemic attack

Results

In a cross-sectional study of American adults, Bailey et al. (2019a) found that 45.2% of people after stroke and 52.0% of people without a history of stroke consume ≥1 servings of fruit and ≥1 servings of vegetables daily.

Twelve months after stroke or TIA, the Norwegian authors found that 16.0% of patients changed their diet, 30.1% ate foods containing less sugar and 26.2% consumed less food containing fat. They also showed a low, insignificant correlation (r = 0.082, p = 0.171) between the level of knowledge about stroke and the lifestyle habits (non-smoking, change of diet, regular exercise, intake of lower amounts of foods containing sugar and fats) (Faiz et al., 2019).

In the cross-sectional comparative study, low fruit and vegetable intake (<1 serving of fruit/vegetables per day) was identified in 51.7% of patients after stroke and in 46.0% without a history of stroke (Bailey et al., 2019b).

Bailey et al. (2019c) compared low fruit and vegetable intake (≤1 serving of fruit per day, ≤1 serving of vegetable per day) in stroke survivors without diabetes mellitus and with diabetes mellitus. Low fruit and vegetable intake was found in 53.7% of stroke survivors without diabetes mellitus and in 58.8% of stroke survivors with diabetes mellitus.

In the Australian intervention study (n = 19), the baseline satisfactory consumption of fruit and vegetables was found in only one respondent (5.3%), and unsatisfactory consumption in 18 respondents (94.7%) – unsatisfactory intake was defined as consuming less than 2 servings of fruit and 5 servings of vegetables per day (Denham et al., 2018).

In the other comparative study, Wali et al. (2018) found that 56.93% of patients after stroke consumed fruit ≥ 1 time per day compared to the control group (62.67%) (p < 0.0001). Vegetable intake (≥1 time per day) was observed in 70.64% of patients after stroke and in 79.4% in the control group (p < 0.0001). Fruit intake under 1 serving per day was found in 43.07% of patients after stroke and in 37.33% in the control group (p < 0.0001). Vegetable intake under 1 serving per day was found in 29.36% of patients after stroke and in 20.54% in the control group (p < 0.0001).

Consumption of ≥5 servings of vegetable per day was identified in 4.44% of patients after stroke (n = 25), intake of ≥2 servings of fruit per day in 46.5% (n = 262) and salt intake <5 g per day was found in 3.37% (n = 19) patients (Olaiya et al., 2017).

Healthy eating (HEI index >80) was identified in 22.3% of respondents, HEI in the range of 50–80 was found in 63.5% (medium level of food quality) and HEI index below 50 in 14.2% of patients (poor level diet) (Lin et al., 2015).

Lee et al. (2005) implemented a comparative study in which they analyzed the intake of energy and selected macro- and micronutrients (dominant folic acid) in patients after ischemic stroke and a healthy group of people. Total energy intake (kJ) was significantly lower in patients after stroke (7174 ± 2125) (p = 0.0040) than in the control group (8480 ± 1749). Lower intake in patients after stroke in comparison with the control group was also identified with the intake of fats (p < 0.0001), cholesterol (p = 0.0018), dietary fiber (p < 0.0001), folic acid (p = 0.0337), vitamin B_{12} (p = 0.1855), vitamin C (p = 0.1070), vitamin E (p = 0.7107) and salt (p = 0.0676). Higher insignificant vitamin B6 intake was found in patients after stroke (p = 0.6683).

Total folic acid intake (μg) (from meals and supplements) was significantly lower in patients after stroke (p = 0.0286). While dietary folic acid intake was significantly lower in patients after stroke (322 ± 121) than in the healthy group (409 ± 176) (p < 0.0001). This did not apply to the intake of folic acid from supplements, where intake was similar between the groups (p = 0.7876). In both groups (patients after stroke

and control group), vegetables were the most dominant source of folic acid, followed by intake of supplements. The third most important source was fruit. Vegetable and fruit intake was significantly lower in patients after stroke compared to a healthy group of respondents (Lee et al., 2005).

Discussion

After taking into account the set of criteria, 9 studies were included in the literature review. With the exception of one (Lee et al., 2005), all have been published in the last 5 years. The most frequently examined were fruit/vegetable intake (n = 7) and salt intake (n = 3).

Hypertension is a major risk factor for stroke (Pandian et al., 2018) and accounts for 35% of all strokes (O'Donnell et al., 2010). The negative effect of high salt intake on the risk of stroke is mainly related to the fact that sodium increases blood pressure. At the same time, it promotes water retention, the expansion of extracellular fluids and stimulates potassium and magnesium excretion through the renal tubules (Spence, 2019). Because blood pressure is reduced by reducing salt intake (Graudal et al., 2012; He et al., 2013), several international organizations limit their daily intake (Table 1). However, salt intake has only been assessed in three studies in this review and qualitative analysis of these studies is problematic given the diversity of methodology. In a study by Lin et al. (2015), salt consumption is not evaluated alone, but as part of the HEI index of healthy eating. The daily sodium intake of Taiwanese patients after stroke was adequate (1089 ± 822 mg) – even below the limit (1500 mg sodium/day) according to the 2014 AHA/ASA recommendation. Low sodium intake was also found in a healthy group of respondents (1222 ± 813 mg) in this study (Lee et al., 2005), indicating the specifics of eating habits in this country and probably low salt/sodium intake in this population. In contrast, in the Australian study, adequate salt intake (<5 g/day) was found in only less than 4% of patients (Olaiya et al., 2017), which is an alarmingly negative result. Usual sodium intake varies between countries, and differences also occur between regions within a country (Williams et al., 2018).

High salt intake is also a problem for a healthy population – and in many countries exceeds WHO recommendations (Thout et al., 2019). Most of the sodium consumed by the general population comes from processed foods. Their nutrition labeling is often unclear or misleading (Turlova and Feng, 2013). As the consumption of processed foods plays an important role in Western society and high-salt foods are abundant in shops, following a low-sodium diet is problematic (Kastorini et al., 2012). Ading salt to cooked meals can also be a problem. Kastorini et al. (2012) found that the use of a saltshaker at the table significantly increases the risk of stroke compared to the use of salt during cooking. Reducing salt intake in the population is a public health priority, requiring the combined effort of health professionals and the food industry, governments and the general public/individuals, as 80% of salt consumption is hidden salt in processed foods (Williams et al., 2018).

In this review, the most frequently analyzed food commodity was fruits and vegetables. Globally, it can be stated that the intake of these food groups in the analysed studies is on an average (e.g. Bailey et al., 2019a, b; Wali et al., 2018) to below average level (Bailey et al., 2019c; Denham et al., 2018). In comparative studies, we can see that the consumption of fruits and vegetables is worse in stroke survivors compared to the healthy group. At the beginning of the article, we stated that the intake of fruits and vegetables is one of the important protective factors that reduce the risk of stroke, so their adequate intake is very important – not only in the level of primary prevention but also in secondary prevention. Fruits and vegetables are a rich source of soluble and insoluble fiber, polyphenolic compounds, micronutrients, and natural dyes (Süli et al., 2019). Vitamin C, carotenoids and flavonoids, magnesium, potassium (components highly present in fruits and vegetables) reduce the risk of a stroke. They have antioxidant effects, can reduce the oxidation of LDL – cholesterol, lower blood pressure and systematic inflammation, have an antithrombotic effect, and slow down the progression of atherosclerosis, which may contribute to reducing a stroke (Larsson, 2017). Also, higher fiber intake is associated with a significantly lower risk of a stroke [HR: 0.89 (95% CI: 0.81–0.99)] (Threapleton et al., 2015). In their longitudinal study REGARDS (Reasons for Geographic and Racial Differences in Stroke, n = 20 024), Goetz et al. (2016) showed that flavanone intake (HR: 0.72; 95% CI: 0.55, 0.95; p = 0.03), citrus fruit and juice (HR: 0.69; 95% CI: 0.53, 0.91; p = 0.02) was inversely associated with the occurrence of ischemic stroke.

The relationship between a stroke and diabetes mellitus is reciprocal. Diabetes mellitus is a significant risk factor of stroke recurrence (Shou et al., 2015). Fruit and vegetable intake are the behavioral recommendations in the prevention of not only stroke, but also diabetes – especially in high-risk individuals (Prebtani et al., 2018; Twenefour et al., 2018). Consumption of these food groups is particularly important in stroke survivors and at the same time with diabetes. For diabetic patients, diet is an important part of therapy; vegetables (except starch vegetables) and most fresh fruits have a low glycemic index and contribute to the stabilization of glycemic parameters (Zoboková et al., 2017). Fruit and vegetable intake was insufficient and worse in patients with diabetes and stroke than in stroke survivors alone (Bailey et al., 2019c). Comorbidities and the need to implement multiple pharmacological and behavioral interventions in stroke survivors with co-morbidities (including diabetes) may be more complicated, especially given the high level of disability (Matz et al., 2006) or cognitive deficits in these patients (Stavroulakis and McDermott, 2016).

Hyperhomocysteinemia is one of the modifiable risk factors of stroke, and one of its causes is insufficient folic acid intake (Meschia et al., 2014). Dietary intake of this vitamin in the analyzed study by authors Lee et al. (2005) was significantly lower in patients after stroke compared to the healthy group, while the intake of supplements was similar. The main source of folic acid among the respondents was vegetables and fruits. The results of this study confirm the importance of adequate intake of these food commodities in patients after stroke. One of the ways to solve the real or potential micronutrient deficiency in patients after stroke is their supplementation. The results of supplementation studies are diverse. A meta-analysis by Jenkins et al. (2018) showed that folic acid supplementation (p < 0.01) and B-complex (p = 0.04) had a stroke protective effect, but this was not the case for the other supplemented nutrients analyzed (multivitamins, vitamin D, calcium, vitamin C, antioxidants, niacin). Similarly, other meta-analyses have not shown that micronutrient supplementation reduces the risk of stroke (Chen et al., 2013; Myung et al., 2013). While dietary vitamin C and circulating vitamin C were significantly inversely associated with stroke risk, supplemented vitamin C had no significant effect on reducing the risk of stroke (Chen et al., 2013). Calcium supplementation even increases the risk of stroke (Bolland et al., 2011; Li et al., 2012). The above data indicate that it is not always appropriate to solve the problem

of insufficient diet intake of micronutrients by supplementation as it is not ideal in the prevention of stroke and is harmful under certain circumstances.

We assume that patients have bad eating habits at the level of fruit and vegetable intake even before the onset of stroke (a problem at the level of primary prevention). There are some changes in diet after the development of the disease – in a study by Faiz et al. (2019), however only 16% of patients after stroke/TIA changed their diet, which is insufficient in terms of the effectiveness of secondary prevention. Adherence to lifestyle changes, including diet, is relatively low (Chung et al., 2015; Khan et al., 2014; Mendes et al., 2019) and it is difficult to maintain in the long-term. The level of awareness of stroke is unlikely to have a significant effect on the change in eating habits, as indicated by the results of the study by Faiz et al. (2019). Adherence to diet is determined by many phenomena, but to achieve complex changes in diet it is appropriate to implement educational interventions/programs (Parappilly et al., 2018; Sováriová Soósová a Hrehová, 2014; White et al., 2013) and at the same time respect barriers – in the case of patients after stroke, there may be problems with food management and a lower level of self-sufficiency.

Conclusions

Given the high prevalence of strokes, we must state that the issue of diet in stroke survivors as a form of secondary prevention is only addressed in a minimum amount of research. The low emphasis on the analysis of diet in the chronic stage of the disease is indicated by several phenomena: the relatively low number of studies included in the review; nutrition is predominantly analyzed in research as a secondary output; the absence of research that would comprehensively assess the eating habits of patients in the chronic stage of the disease – with a focus on adherence to the Mediterranean or DASH diet in accordance with current recommendations of international associations. Food composition can affect the risk factors of stroke – predominantly hypertension – but it is still an insufficiently analyzed area in research and it is on the outskirts of the interest of researchers and healthcare professionals.

Conflict of interests

The authors certify that there is no conflict of interests with any financial organization regarding the material discussed in the manuscript.

Authors' statement

The authors state that the article is original, has not been submitted for publication in other journals, and has not yet been published either fully or in part. They confirm that they are responsible for the research they have designed and carried out; that they have participated in drafting and revising the manuscript submitted and approve of its content.

They also state that the research reported in the paper was undertaken in compliance with the Helsinki Declaration and that the study was approved by the ethics committee.

Stravovacie návyky a skladba jedla pacientov po mozgovej príhode ako forma sekundárnej prevencie

Súhrn

Cieľ: Cieľom prehľadu bola analýza stravovacích návykov a skladby jedla u pacientov po mozgovej príhode.
Metodika: Analyzované boli výskumy publikované v rokoch 1/2000–06/2020 v databázach Pubmed, EBSCO, Science Direct, Scopus. Literárny prehľad integroval 9 výskumov.
Výsledky: Výskumy zaradené do prehľadu boli publikované najmä v rokoch 2015–2019. Analýza stravovania bola vo výskumoch dominantne orientovaná na príjem ovocia/zeleniny a príjem soli. Konzumácia ovocia a zeleniny u pacientov po mozgovej príhode nie je na adekvátnej úrovni a v komparácii so zdravou populáciou je ich príjem nižší. Kvalitatívna analýza príjmu soli je limitovaná pre nízky počet výskumov (n = 3), pričom výsledky poukazujú na rozdiely v príjme soli medzi krajinami. Iba jedna štúdia komplexne posudzovala stravovanie u pacientov po mozgovej príhode (príjem energie, makro- a mikronutrientov). Nedohľadali sme štúdie, ktoré by hodnotili adherenciu pacientov po mozgovej príhode k stredomorskej strave/DASH diéte (Dietary Approaches to Stop Hypertension), v zhode s aktuálnymi nutričnými odporúčaniami sekundárnej prevencie.
Záver: Napriek tomu, že stravovanie patrí k modifikovateľným faktorom mozgovej príhody a je možné ho dobre manažovať, problematike stravovania a stravovacím návykom po prekonaní ochorenia nie je venovaná dostatočná pozornosť výskumníkov.

Kľúčové slová: pacient po mozgovej príhode; sekundárna prevencia; skladba jedla; stravovacie návyky

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