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Effectivity of Therapeutic Lifestyle Changes in Cardiology

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Abstract

Ischaemic heart disease and stroke are the world's biggest killers. The good news is that 80% of cardiovascular diseases can be prevented with healthy lifestyle habits. The most effective approach to improve this situation is the reduction of risk factors levels. Small positive shifts of risk factors, across a whole population consistently leads to greater reductions in disease burden than the huge investment to the new drugs and devices including invasive procedures. Motivation is a key element of cardiovascular prevention. It means in practice non-smoking, support for nutrition changes, regular and effective physical activities and obesity management mainly.

As for nutrition how much people with high risk profile for Ischaemic heart disease and stroke know the role of saturated fatty acids and their recommended maximal daily intake (cca 30g) ? How much from them monitor their content on food labels? But the decrease of their intake about to 10% of daily energetic intake leads to decline cardiovascular risk about 20-30%!. How much people know that adding 30 g unsalted nuts daily decreases cardiovascular risk about 30%?. The same accounts for increasing the fiber content. We present some concrete examples of daily menu and adequate proposals how to change to reach recommended values.

Regular and effective physical activities mean 150 to 300 min. of moderate-intensity exercise or 75 to 150 minutes of vigorous-intensity exercise each week for health benefits. This translates into an energy expenditure of 7.5 to 15 MET hours per week. That leads to a 31% reduction in all-cause mortality. The benefit concerns not cardiovascular diseases only but the metabolic and oncological protection too. Clinical evaluation, including exercise testing, should be considered for sedentary people with risk factors who intend to engage in vigorous physical activity. Specialized prevention programmes such as complex cardiovascular rehabilitation (including cardiotraining, education and cognitive-behavioural methods), home-based cardiac rehabilitation and yoga are very effective.

The nutrition and physical activity changes are two milestones of obesity management. The increase of BMI about 5kg/m2 leads to increase of mortality risk about 30% and about 40% risk of ischemic heart disease, stroke and other vascular diseases. Weight decrease in obese patients leads not only to reduction of these parameters, but moreover, to reduction of drug intake, hospitalisations and diagnostic and therapeutic procedures rate. It means significant economical benefit.

Keywords: *lifestyle changes, nutrition, regular exercise, cardiovascular prevention effectivity, obesity reduction.*

Introduction

Ischaemic heart disease (IHD) and stroke are the world's biggest killers. The good news is that 80% of cardiovascular diseases can be prevented with healthy lifestyle habits (1, 2). The most effective approach to improve this situation is the wide application of the therapeutic lifestyle changes and the reduction of risk factors levels. Small positive shifts of risk factors, across a whole population consistently leads to greater reductions in disease burden than the huge

investment to the new drugs and devices including invasive procedures. Convincing evidence has come from Finland, at the end of previous century, where the significant decrease of cardiovascular mortality was attributed in more than 50% to risk factors reduction and 23% to the treatment investments invasive procedures including (3). Motivation is a key element of cardiovascular prevention. It means in practice non-smoking, support for nutrition and behavior changes, regular and effective physical activities and obesity management mainly (4,5). The key element is implementation of the programs which support regular cardiotraining, education concerning right nutrition principles, relaxation, stress management and sleeping hygiene.

As for nutrition how much people with high risk profile for Ischaemic heart disease and stroke know the role of saturated fatty acids (saFA) and their recommended maximal daily intake (less than 10% of the daily energy intake i.e,. less than 30g in average)? How much from them monitor their content on food labels? But the decrease of their intake about to 10% from daily energy intake and their substitution by polyunsaturatded fatty acids (polyunFA) leads to decline cardiovascular risk about 20-30% (4, tab.1)! The examples how to substitute saFA by polyunFA are in the tab. 2 and 3 (6,7). As for spreads, one portion contents about 20g of fat, one portion of animal fat spread contents 9g saFA, vegetable spread 3g saFA (an exeption is palm kernels oil with high saFA content) In the tab. 4 are presented FA contents in 100g of spread (8). The impact of dietary cholesterol on serum cholesterol levels is weak compared with that of the fatty acid composition of the diet. When guidelines are followed to lower saturated fat intake, this usually also leads to a reduction in dietary cholesterol intake. The trans fatty acids, a subclass of unsaturated fatty acids, havebeen shown to be especially harmful due to their unfavourable impact on both total cholesterol (increase) and HDL-C (decrease). A 2% increase in energy intake from trans fatty acids increases IHD risk by 23% and therefore is recommended to avoid them. They can occur especially in industrially prepared bakery products and some margarines.

Table 1. *European Guidelines on cardiovascular disease prevention in clinical practice (4)*

Healthy diet characteristics
• Saturated fatty acids to account for <10% of total energy intake, through replacement by polyunsaturated fatty acids.
• Trans unsaturated fatty acids: as little as possible, preferably no intake from processed food, and <1% of total energy intake from natural origin.
• <5 g of salt per day.
• 30–45 g of fibre per day, preferably from wholegrain products.
• ≥200 g of fruit per day (2–3 servings).
• ≥200 g of vegetables per day (2–3 servings).
• Fish 1–2 times per week, one of which to be oily fish.
• 30 grams unsalted nuts per day.
• Consumption of alcoholic beverages should be limited to 2 glasses per day (20 g/d of alcohol) for men and 1 glass per day (10 g/d of alcohol) for women.
• Sugar-sweetened soft drinks and alcoholic beverages consumption must be discouraged.

Table 2. *Saturated fatty acids should create less than 10% from the daily energy intake.If the averaged intake is 2500 kcal/day, 10% is 250kcal,1g of fat is equal 9 kcal., i.e. 250:9= 28g/day of saturated fatty acids (saFA) per day.*

Sa FA content in the sample of the day intake:

	Breakfast	Lunch	Dinner
Butter 20g, caprine cheese 100g	10g 20g i.e.30g		
Cabbage soup, Fried pork schnitzel		4g 12g i.e.. 16g	
Ham and eggs spread Together per day: 73g			27g

Table 3. *Substitution of saFA by polyunsaturated fatty acids (polyunFA).*

	Breakfast	Breakfast	Lunch	Lunch	Dinner	Dinner
	saFA	polyunFA	saFA	polyunFA	saFA	polyunFA
Oats flakes 100g	1,1g	1g				
Beans soup. Broccoli with baked cheese			0,2g 3.6g	0,9g 1,5g		
Mixed boiled vegetables with egg					1,6g	3,4g
Toghether/day:	6,5g	6,8g				

Table 4. *Spreads: animal vs vegetable fat.*

	SaFA g/100g	Trans forms	PolyunFA g/100g	Energy kcal/100g
Butter	47	2,8	3,5	748
Duck´s grease	32		11	898
Pork´s grease	44		13	896
Soya oil	15		61	894
Veto (vegetable)	9	1,0	20	360
Flóra (vegetable)	18	0,1	38	632
Palm kernels - oil	83		8	

Source: Potravinové tabuľky VÚP, Bratislava 2000

Slide Source: Lipids Online www.lipidsonline.org

The recommended fat intake principles were partially deconstructed by the results of PURE study (10,11,12). But there were some methodological restrictions formulated by American Heart Association (questionaire method, countries composition, missing separation of "good" and "bad" sacharids). Moreover, the autors have accepted that fat intake of 30% and saFA 13% from daily energy intake might be adequate and 13% means 36g saFA. In the tab.2 is presented an example of common daily menu containig 73g saFA!

How much people know that adding 30 g unsalted nuts (not coconut!) daily decreases cardiovascular risk about 30%? (tab.5) (4) The same accounts for increasing the fiber content (9). The recommended daily fiber intake should be 30-45g (4) but even in the daily menu including a lot of fruit, legumes and vegetables daily fiber intake reaches 20g (tab.6). Meta-analyses of prospective cohort studies show that a 7 g/day higher intake of total fibre is associated with a 9% lower risk of IHD and a 10 g/day higher fibre intake is associated with a 16% lower risk of stroke and a 6% lower risk of type 2 diabetes mellitus (4). There is known that a high fibre intake reduces postprandial glucose responses after carbohydrate-rich meals and lowers total cholesterol and LDL-C levels. Adequate proposals how to reach recommended fiber values must be based on increase of wholegrain cereals intake (tab. 7).

The Nurse study results (16 years duration, 180000 probands) showed,that the foood intake changes in the preferring of vegetables, fruits, whole grain cereals, legumes, nuts and fishes are reasonable, because they are followed by mortality reduction 26% (13).

Table 5. *30g unsalted nuts per day= cca 2.5 g saFA and 200 kcal energy intakeand cardiovascular risk reduction cca 30%.*

	SaFA g/100g	MonounFA g/100g	PolyunFA g/100g	Energy kcal/100g
Walnuts	6,7	12	45	670
Almonds	4,5	35	11	
Poppy seeds	5	7	28	
Sunflower seeds	5,6	10	27	550
Pumpkin seeds	8,7	14	21	570
Coconut pulver	58	5	1	

Source: Potravinové tabuľky VÚP, Bratislava 2000

Slide Source: Lipids Online www.lipidsonline.org

Table 6. *Optimal fiber intake: 30-45 g/day. From whole grain foodstuffs mainly!*

	Breakfast		Lunch		Dinner
Wheat flakes 50g, fruit yogurt	5+1=6g				
Whole grain bread with sunflower seeds 50g, butter, ham, cheese	6+0=6g				
Lentils soup,rice natural 100g, tofu, peanuts 50g			2,5+1.50+3 = 7		
Tomato soup, boiled potato 100g, trout, tomato-pepper mixed salad			1,5+20+1,5=5		
Spagetti Bologna style					4g
Whole grain bread with sunflower seeds 50g, butter, ham, cheese Apple 120g Banana 100g		2		3	6g
Together per day **20g**	6g	2	5g	3	5g

Table 7. *How to add 15-20g of fiber to daily menu.*

Vegetables	Fruits	Cereals
• kohlrabi,carrot, green peas 100g=3g • 300g=9g • Broccoli 100g=3g • Together 12g	• blackberry, raspberry 100g = 7g • dried apricots 50g =4g • Together 11g	• Out flakes 50g = 5g • Wheat bran 30g=15g • Together 20g

Slide Source: Lipids Online www.lipidsonline.org

All national and international guidelines for cardiovascular prevention and rehabilitation recommend regular and effective physical activities150 to 300 min. of moderate-intensity exercise or 75 to 150 minutes of vigorous-intensity exercise each week for health benefits. This translates into an energy expenditure of 7.5 to 15 MET hours per week. That leads to a 31% reduction in all-cause mortality. In

the many European countries were found impressive decreases of mortality for IHD, in the last decades, even more singifficant: 40-60% (14, 15). Benefit concerns not cardiovascular diseases only but the metabolic and oncological protection too. There are more long-term benefits from physical activity, including improved brain health, reduced risk of eight types of cancer, reduced risk for fall-related injuries in older adults, and reduced risk of excessive weight gain. Physical activity helps manage more chronic health conditions. It can decrease pain for those with osteoarthritis, reduce disease progression for hypertension and type 2 diabetes, reduce symptoms of anxiety and depression, and improve cognition for those with dementia, multiple sclerosis and Parkinson's disease.

Clinical evaluation, including exercise testing, should be considered for sedentary people with risk factors who intend to engage in vigorous physical activity. Specialized prevention programmes such as complex cardiovascular rehabilitation (including cardiotraining, education and cognitive-behavioural methods), home-based cardiac rehabilitation and yoga are very effective (16,17). Programs of ambulatory cardiovascular rehabilitation (ACVR) are key elements of secondary prevention needed for implementation of therapeutic lifestyle changes during second posthospitalization phase after acute coronary syndrome and/or revascularisation procedures (18). Without including and maintenance the patient into theses programs the benefit of expensive revascularization is rapidly missing. Comprehensive ACVR programs, based on regular exercising have reduced total mortality 15-28%, cardiovascular mortality 26-31%, have reduced hospital admissions and risk factors levels. Non-inclusion of the patient in the program ACVR has increased mortality 28%(19). Moreover, these programs are highly „cost effective", because they are going for out patients, wihtout covering the expenses for accomdation and food and their duration is 2-4 longer than in spa. There is some evidence , that long term ACVR followed by home-based training is more effective than percutaneous coronary angioplastic procedure(20,21,22).

The ACVR program is based on aerobic exercise sessions which should last a minimum 30 minutes, but if combined with resistance training, balance training or stretching, should last longer (23). Formal exercise sessions are scheduled usually 2-3 times per week, but some form of physical activities on most days/ week are advised. Aerobic interval training appears to be more effective than moderate continuous training in coronary artery disease patients (24).

Exercise training has evidenced effect at molecular level, working muscles are presenting by paracrine and endocrine activities. They produce myokines which induce production of vasodilation mediators in endotelium, cytokines and progenitor cells with favourite imnulogical and antiinflamation effects (25, 26, 27, 28). So we can consider exercise training as a pleiotropic medicine. Therefore are more clear wider indications of exercise training : metabolic syndrome, diabetes mellitus 2nd type, oncologic diseases (including the attenuation of side effects of chemotherapy) and the peripheral arteries disease (29).

The nutrition and physical activity changes are two milestones of obesity management. The increase of BMI about 5kg/m2 leads to increase of mortality risk about 30% and about 40% risk of ischemic heart disease, stroke and other vascular diseases.Weight decrease in obese patients leads not only to reduction of these parameters, but moreover, to reduction of drug intake, hospitalisations and diagnostic and therapeutic procedures rate. It means significant economical benefit. The diet + exercise combined interventions in inducing weight loss are more effective than diet-only inerventions at 6 months (30). Such interventions typlically result in 8-11% weight loss. Moderate-intensity to high-intensity aerobic exercise-only, without prescribed diet, conducted at a frequency of at least 3-5 times per week, result in 2-3% weight loss. Low intensity walking (step counts) and habitual activity produce 1-1,5% weight loss of the initial weight at 3-6 months, resistance training alone does not produce weight loss (30).

In Conclusion

- Decrease of saFA about to 10% from daily energy intake and their substitution by polyunFA leads to decline cardiovascular risk about 20-30%
- 2% increase in energy intake from trans fatty acids increases IHD risk by 23%
- 30 g unsalted nuts daily decreases cardiovascular risk about 30%
- 7 g/day higher intake of total fibre is associated with a 9% lower risk of IHD and a 10 g/day higher fibre intake is associated with a 16% lower risk of stroke and a 6% lower risk of type 2 diabetes mellitus

- effective physical activities150 to 300 min. of moderate-intensity exercise or 75 to 150 minutes of vigorous-intensity exercise each week lead to a 31% reduction in all-cause mortality
- Secondary prevention ACVR programs, based on regular exercising, have reduced total mortality 15-28%, cardiovascular mortality 26-31%
- Non-inclusion of the patient in the secondary prevention program ACVR has increased mortality 28%
- The increase of BMI about 5kg/m2 leads to increase of mortality risk about 30% and about 40% risk of IHD, stroke and other vascular diseases

Together: 80% of cardiovascular diseases can be prevented with healthy lifestyle habits. To implement this approach to health care system by education programs is not enough effective. Health insurance companies should not consider lifestyle as a private matter of their insured persons. Economic motivation to needed therapeutic lifestyle changes is a key element of cardiovascular prevention in the population level.

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