Nutrition Epidemiology

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Chronology of application of the science of nutrition

- 2300 B.C., China: *salt and cerebrovascular disease*

- 47 B.C., Scribonius Largus: *importance of diet in general health*

- 25 B.C., Celsus: *classified foodstuffs and emphasized their role in maintaining health*

- 1542 A.D., Andrew Borde: *A Dyetary of Health: factors affecting the health of man*

- 1628 A.D., William Harvey: *publication on circulation of the blood based on convicing experiments*

Chronology of application of the science of nutrition

- 15th century, Albeek from Unitchov: *excessive intake of fats and energy as a cause of premature death*

Diseases related to nutrition (developed countries)

CVD	Cancers	Cirrhosis
55% deaths (5.3 million)	25% deaths (2.4 million)	1.8% deaths (178thousands)
Osteoporosis 9% population	NIDDM 2.4 % population	Caries 93% popul.
Obesity 12% men 15-20% women	Food allergies 7% population	Cataract 18% 65-75 yrs 46% 75-85 yrs

Diseases related to nutrition (developing countries)

PEM	Kwashiorkor	Dysentery
Vit. A deficiency	IDA	IDD
Cholera	Hepatom (aflatoxins)	Hepatitis A

Nutrition status at the beginning of the 3rd millenium

- 520 million of severely malnourished
- 15 - 20 million victims of hunger a year
- 300 million suffer by deficiency of vitamin A
- 3.5 billion suffer from IDA
- 853 million suffer from IDD
- 75% of total population live in developing countries, but they consume only 15% available energy
- 1 billion drink contamined water

Nutrition status in the beginning of the 3rd millenium

- 11-15 million children die because of hunger
- 250 thousand children get blind because of deficiency of vitamin A
- 50% anaemic children (SE 52%   vs. NW 10%)
- 15 million children < 5 yrs get sick from contamined water
- More than 40% of all death in developing countries are among children < 5 yrs
- 54% from them are related to undernutrition

CVD in the Czech republic

- 1982: SMR 840.2 men and 546.6 women
- 1995: SMR 708.0 men and 454.9 women

- 1986: SMR IM 239.0 men and 233.0 women
- 1995: SMR IM 175.4 men and 77.9 women

- 1986: SMR Cer.d. 258.5 men and 203.2 women
- 1995: SMR Cer.d. 176.3 men and 134.8 women

Role of Nutrition Epidemiology

- Problem detection – epidemiologic studies
- Development of methods of dietary assessment
- Definition of nutrition needs at the population level
- Formulation of dietary recommendations
- Implementation of dietary guidelines
- Influence of research trends
- Education of professionals

Development of dietary assessment methods

- Recall
- Record (weighting, estimation)
- Double portions
- FFQ
- Dietary history
- Dietary habits

- Food balance sheets
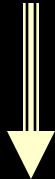- Inventory method
- Food supply

Exact result of any dietary assessment method?

People eat.

Model of influence dietary behaviour at the population level

- Knowledge

  ↓

- Attitude

  ↓

- Behaviour

- Behaviour

  ↓

- Attitude

  ↓

- Knowledge

Atributes of dietary guidelines

- Based on scientific background

- Analysis of local dietary habits

- Social and cultural acceptance

- Limited number of recommendations (the most relevant from the prospective of population health)

- Easy to understand and remember, attractive, motivating to compliance and real behaviour changes

Dietary guidelines in terms of nutrients and energy

Živiny		Modul A	Modul B	Modul C
Energie	kJ	7466	10758	14049
Bílkoviny	g	90.6	126.8	163.2
Tuky	g	44.6	63.2	81.9
Sacharidy	g	262.1	384.4	506.6
Vápník	mg	977	1287	1599
Železo	mg	21.4	30.7	40.1
Draslík	mg	2753	4302	5552
Vláknina	g	25.2	36.6	47.9
Vitamín A	ug	1617	2177	2735
Vitamín B1	mg	1.9	2.7	3.8
Vitamín B2	mg	1.5	1.9	2.5
Vitamín B6	mg	2.2	3.2	4.2
Vitamín B12	mg	6.5	9.5	12.6
Vitamín C	mg	107	150	191
Vitamín E	mg	14.6	21.3	28.2
% tuku z celkové energie		23	22	22

Dietary guidelines for the Czech republic

- Cereals, bread, rice, pasta: 3-6 servings

- Vegetables: 3-5 servings (a 100 g)

- Fruit: 2-4 servings (a 100 g)

- Milk and milk products:

    2-3 servings (equiv. 300 mg Ca)

- Meat, poultry, fish, eggs, pulses:

                       1-3 servings

- Others: 1+1 servings (equivalent of 10 g fat or sugar)

Serving size

- <u>Cereals, pasta, bread, rice:</u>
  1 slice of bread (60 g)
  1 cup of rice or pasta (125 g)
  1 cup musli
- <u>Vegetable</u>
  1piece approx. 100 g
- <u>Fruit</u>
  1piece cca 100 g

Serving size

- <u>Milk and milk products</u>
  1 glass of milk - 300 ml
  1 cup of yogurt approx. 180 ml
  1 serving of „average" cheese - 55 g

- *Each serving is equivalent of 300 mg calcium*

Serving size

Fish, poultry, pulses, meat,…

- 80 g or
- 1 cup of pulses
- boiled egg yolk

Preventive programmes

- High risk strategy
- Population strategy

Recommended physical activity

- Minimum 3 times a week

- Aerobic excercise

- Minimum 20 minutes

- + regular walking 1 hr daily

Evidence about non pharmacological intervention

- <u>Physical activity</u>
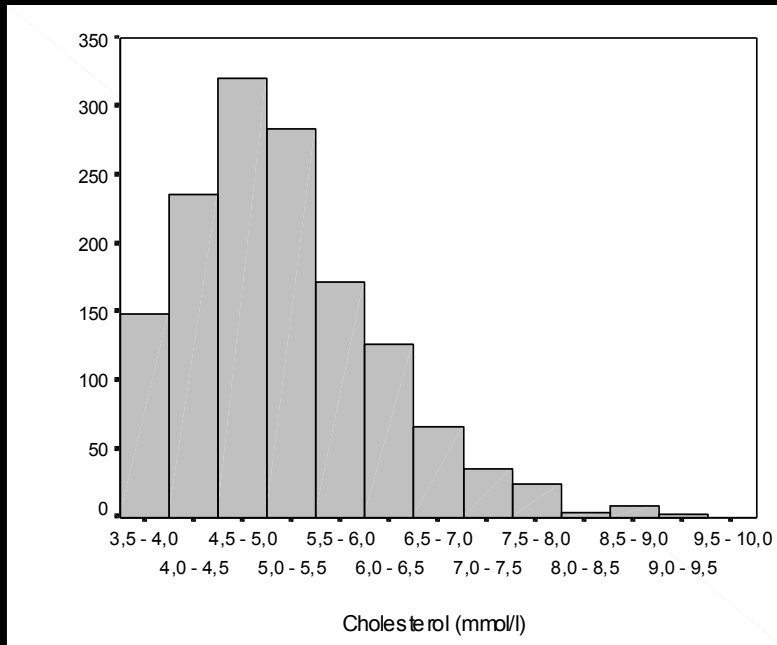
  3 times a week, 30-40 minutes

  aerobic,   i.e. lactates < 4 mmol/l

  by intensity > 7 kcal/min HDL-chol increases,

              > 9 kcal/min total serum cholesterol decreases

  Relation of physical activity to total cholesterol, HDL-chol, atherogenic index is linear, and to the level of TG logaritmic
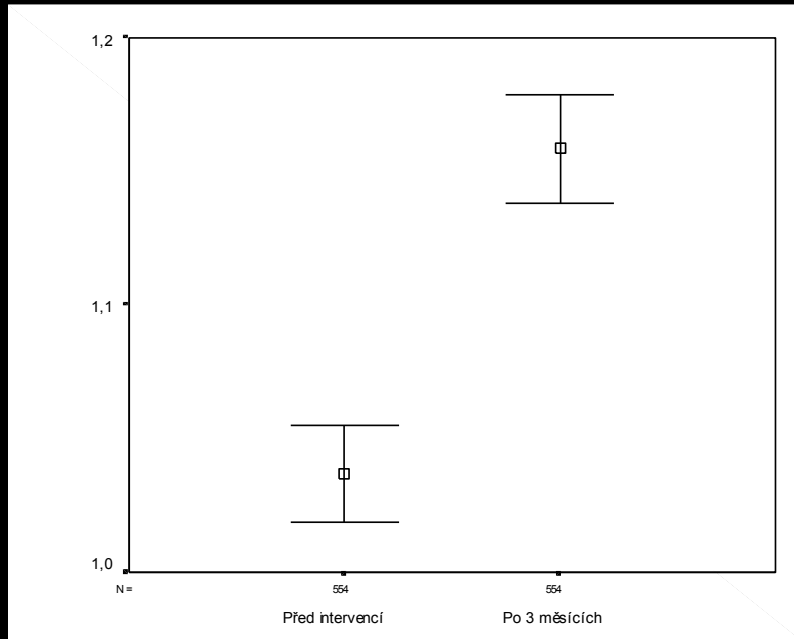
Assessed sample before intervention

- Sample 1426 person, 882 men, 544 women
- Age 39,3 $\pm$ 10,7 years
- T-chol >5,2 mmol/l in 38,8% sample

Intervented sample

- 279 person

- 168 women, 111 men
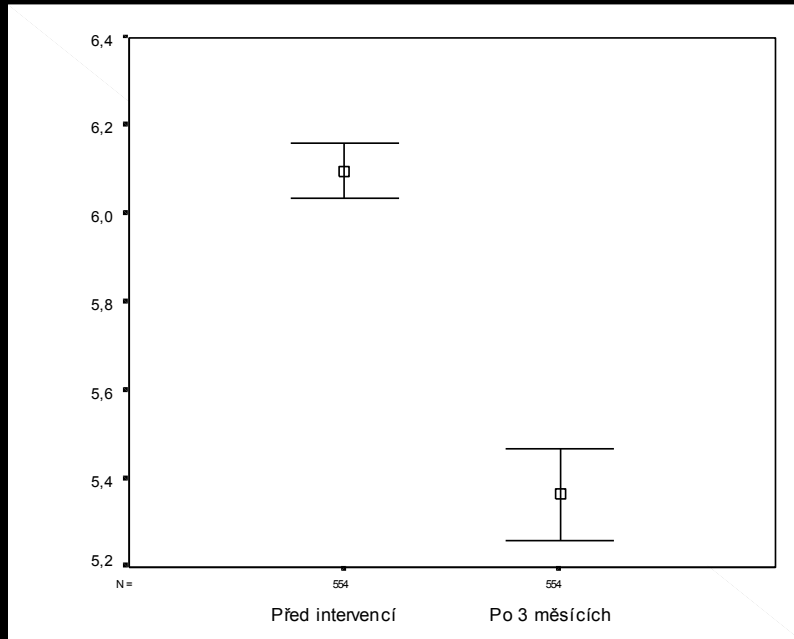
- Age $43,5 \pm 10,3$ yrs

Changes of HDL-chol before and after intervention

- Before intervention
  1,04 ± 0,13 mmol/l

- After intervention
  1,16 ± 0,14 mmol/l

- P < 0,001

Changes of t-chol before and after intervention

- Before intervention 6,1 ± 0,75 mmol/l

- After intervention 5,36 ± 1,24 mmol/l

- P < 0,001

Cholesterol decreasing nutrients

- MUFA
- PUFA
- Sitostanol
- Campestanol
- Guar gum
- Pectin
- Fytosterols
- Stilbenols

Cholesterol decreasing nutrients

- Beta- caroten
- Lycopen
- Cycloartenol
- Beta-sitosterol
- Sitostanol
- Saponins
- Mevinolin
- Niacin ?

Cholesterol decreasing foods

- Vegetables
- Fruits
- Soya
- Peanuts
- Corn
- Cereals
- Psyllium
- China green tea

Cholesterol increasing foods

- Fats with high content SFA
- Non filtered caffee (cafestol)

- Animal sources with high content of cholesterol…. (offals, eggs, skin, butter, …)

CINDI Dietary Guidelines – CVD prevention

Twelve steps of healthy eating:

1. Eat a nutritious diet based on a variety of foods originating mainly from plants rather than mainly from animal origin

CINDI Dietary Guidelines – CVD prevention

2. Eat bread, grains, pasta, rice or potatoes several times per day

3. Eat a variety of vegetables and fruits, preferably fresh and local, several times per day (at least 400 g per day)

CINDI Dietary Guidelines – CVD prevention

4. Maintain body weight between the recommended limits (BMI between 20-25) by taking moderate levels of physical activity, preferably daily

5. Control fat intake (not more than 30% of daily energy) and replace most saturated fats with unsaturated vegetable oils or soft margarines

CINDI Dietary Guidelines – CVD prevention

6. Replace fatty meat and meat products with beans, legumes, lentils, fish, poultry or lean meat.

7. Use low fat milk and dairy products (kefir, sour milk, yoghurt and cheese) that are low in both fat and salt.

CINDI Dietary Guidelines – CVD prevention

8. Select foods which are low in sugar and eat refined sugar sparingly, limiting the frequency of sugary drinks and sweets.

9. Choose a low salt diet. Total salt intake should not be more than one teaspoon (5 gr) per day, including the salt in bread, processed, cured and preserved foods. (Universal salt iodization where iodine deficiency is endemic).

CINDI Dietary Guidelines – CVD prevention

10. If consumed, limit alcohol intake to no more than 2 drinks (each containing 10 gr of alcohol) per day.

11. Prepare food in a safe and hygienic way. Steam, bake, boil or microwave to help reduce the amount of added fats, oils, salt and sugars.

CINDI Dietary Guidelines – CVD prevention

12. Promote exclusive breast feeding for about 6 months and recommended the introduction of appropriate foods at correct intervals during the first years of life.

Epilogue:

Man has to eat foods which he likes.

But he should learn to like these foods, which are good and healthy for him.