Dietetics Introduction

Death causes: 1/3 have to do with dietetic factors

Health parameters

- genetic, biology
- lifestyle
- environment

Spain nutrition: ↓grains ↓fruits&veggies ↓legumes, ↑processed meat ↑sugar ↑salt 9,9g/day

Deficit Zn, Vit.B9, Vit.D, Overweight 39%, Obese 22%, childhood obesity, poor knowledge about nutrition

Definitions

Dietetics: science that studies how to provide each person or group with the food necessary for optimal

Feeding: <u>voluntary</u> action of eating an choosing the food to put in the mouth

Nutrition: <u>involuntary</u> process by which our body can digest, absorb and take advantage of the nutrients

Gastronomy: art of cooking food for nutrition and palatability

Diet: etymology "hygiene of life". Dietary method or regime

Food & Nutrients

Food: basic human need that contains nutrients, non-nutritious substances and that is included in the diet to live a good life

Nutrient: minimal functional unit used by cells in metabolism and derived from food (energetic, plastic and regulatory function)

Nutrition laws

1. Adequate quantity
2. Quality
3. Harmony (%macros)
4. Adequacy (person)

History

Homer, Plato and Hippocrates→ diet indispensable for good life

19th century Dietetics evolves → integrates knowledge from other sciences

Goal: to plan a personalised diet, tailored to the needs and characteristics of the recipient

Dietary Guidelines

Quantitative

Dietary reference intakes
population groups by age and sex

Nutritional requirements
quantities of nutrients needed by an _individual_ to avoid disease and maintain health

Recommended intakes
quantities optimal for the majority of healthy people

RI = Average requirement + 2x standard deviation

Established by organisations EFSA, FNB

FNB		EFSA	
EAR:	estimated average requirement	AR:	average requirement
RDA:	recommended daily allowance	PRI:	population reference intakes
AI:	adequate intakes	RI:	recommended intakes
UL:	tolerable upper intake level	UL:	tolerable upper intake level

Nutritional goals
population level

nutrient based guidelines to the whole population

SENC and AESAN (NAOS)

Nutrition, Physical Activity and Obesity Prevention
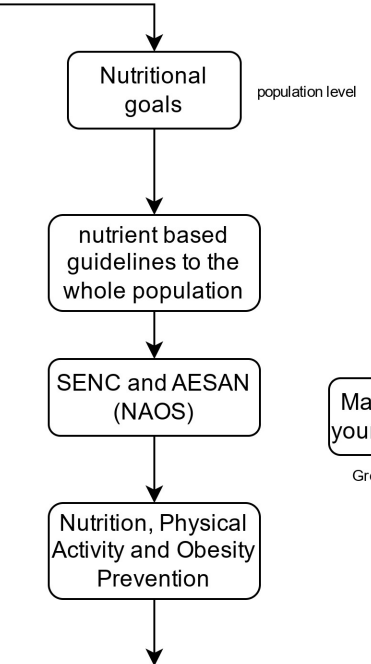
NAOS
Salt: WHO 5g/d → 80% population higher → AESAN 6g/d
Fat: 30-35%(10%sat.) → higher on total and sat. good with unsat.
Sugars: <10%calories → lower to prevent overconsumption of calories
Fibre: EFSA 24g/d → goal of 20-25g/d in ♀ and 25-30g/d in ♂

Qualitative

Dietary Guidelines

they translate the quantitative nutrient recommendations into foods

May food be your medicine
Greece

Microbial theory of disease
19th century

Funk's vitamin theory.
20th century

Framingham 7 countries study
1950-60s

Development of the first guide in USA
1970-80s

+ physical activity. no guidelines for children, pregnant women, adolescents and older adults.
now

Why? because they are the optimal implementation of the nutrient requirements for humans

How?

1. find health-diet problems

2. find responsible nutrients involved

3. translate mismatches into food

4. stage guides, drawings and graphs

5. validate & evaluate the impact

Spanish Dietary Guidelines

Spanish Dietary Guidelines
Base: Physical activity 60 min, 10k steps, emotional balance, energetic balance, healthy cooking techniques, 2.5 L water
2nd level: grains, fruits & veggies, olive oil, dairy, legumes, nuts, white meat, fish and eggs
3rd level: red & processed meat, salt <6g, sugar (industrial pastries, sweets, ice cream…),

Changes
added _healthy habits_ at the bottom
"occasional" becomes "optional"
alcohol removed from daily consumption
added nutritional _supplementation_

Food Composition Tables

background

- 1878 first food composition tables
- 1892 Atwater tables
- 1939 "The composition of foods"
- 1950 USDA "Composition of Foods, raw, processed, prepared"
- 1964 F.A.O. international tables
- 1976 USDA Composition of foods
- 1968 Spanish tables from FAO "Tratado de Bromatología"
- 1986 Souci tables (Germany)
- 1987 "Tablas de Composición de Alimentos" Instituto de Nutrición del CSIC
- 1987 Moreira-Varela tables
- 1992 Mataix tables

applications

- Energetic and nutritional intakes valoration (individual and population group)
- Diets development (low-calorie, restricted or supplemented, specific)
- Menu planning for catering
- Planning countries' food policy aka food guidelines

development

Experimental analytical results, obtained by calculation (different laboratories → references)

Variability Factors

- **Factors that affect the food composition** (plants variety, animal species, nutrition, environment...)
- **other countries data**
- **other times data,** past analysis
- analysis methods not comparable
- some cases of equivalences from similar
- no food source indicated

structure

Name, units (g/100 g, mg/100 g, g oleic acid/100 g total fatty acids...), mean value, standard deviation, number of samples, range of variation (minimum-maximum).

Nutritional Facts Table

- Edible portion (0-1)
- Energy (kcal and kJ, 1 kcal = 4,184 kJ)
- Water content (g)
- Protein content (g)
- Total lipid content (g)
- Carbohydrate content (g) (sugars, starch, fibre)
- Content of minerals, vitamins, (mg or µg)
- Content of cholesterol, amino acids, fatty acids, sugars, carotenoids (mg or µg)
- Type of cooking treatment
- Serving (g) (1 yoghurt = 125 ml)

Dietary Surveys

Goals
Nutritional: Find groups with nutritional risk. Relation between health and food consumption. As a base for nutrition education programs

Economic-social: How resources are distributed. Different diets by social group

Toxicological: Know the intakes of harmful substances

Uses
- nutritional status assessment
- Dietary programming
- Monitoring of population groups
- Experimental research
- Nutritional epidemiology

methods

(national, family, individual), (in/direct), (pro/retro-spective)

How to work with them
1. Dietary survey
2. Food consumption
+ Food composition tables
3. Nutrients intake
+ Dietary guidelines and R.I.
4. Quality of the Diet %RDI

No Easy Assessment
- imperfect techniques
- non-accurate databases and
- diet complexity
- behaviour changes when

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direct methods (individual)

Prospective (registration at the time of consumption)

Weighing food registration

here you have to weight everything you put in your mouth

Advantages: precise and easy,

Disadvantages: interferes with normal diet, 3-5 days register

Food diary

write down everything you eat at a certain time, using weighing or home-made measures

Advantages: quite easy

Disadvantages: modifies normal diet, few days of annotations, no clear portions

Duplicate diet method

you prepare the double of food, one you eat it and the other one goes to the lab for analysis

Advantages: very precise and quite easy as well

Disadvantages: high cost, a lot of time for analysis, non-practical, interferes with normal diet

Retrospective (based on memory)

Frequency of consumption

mark food groups consumption in the last month: 1-3 times per week, never, 1-3 times per day

Advantages: fast, self-applicable, long-term evaluation

Disadvantages: relies on memory, not precise for caloric estimation

24h Reminder

interview with a professional, ask for information on quantities, preparation, ingredients, brands. To be repeated >1 day

Advantages: quite fast, no diet modification, cheap

Disadvantages: relies on memory, not precise, not representative day

Dietary history

combination of the 2 previous ones + specific questions on the topic

new technologies

Digital assistants: laptop with software that record self-consumption.

Image-assisted assessment to estimate portions

Smartphones. Photographing meals for later analysis

Interactive programmes, surveys with images, storytelling,

Scanning technologies. Barcodes

Advantages: faster and cheaper

Disadvantages: complicated programmes, not available for everyone

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indirect methods (population)

household

Consumption and expenditure survey

Sample unit:
- Family (heterogeneous),
- Collectives (homogeneous)

Time:
- One week,
- Full menu cycle (collectives)

Food availability per capita:
- Weigh everything in the pantry (before and after).
- Quantify what is bought and what is thrown away.
- Divide the food available by the number of family/collective members.

Household budget surveys

MAPA Consume Panel to also take in account the consumption outside the house

national

Balance sheets (consumption trend)

Annual. inflows (production + imports) - **outflows** (exports + losses) = **available** (in tonnes per metre) = what the country has per number of people

For what?
- orienting production to the needs
- per capita calorie availability
- food safety Policies

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                          │    Dietary Indicators   │
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Dietary Quality Indicators (DQIs)

DQI: 8 components, 0-16 score. <u>negative</u> correlation ↑points = ↓quality

Revised (DQIr): 10 components, 0-100 score. <u>positive</u> correlation ↑points = ↑quality

Healthy diet (HDI): etiher 0 points (out of the range) or 1 point (in the range). <u>positive</u> correlation ↑points = ↑healthy

Healhty eating (HEI): 10 components, 0-100 score. <u>positive</u> correlation ↑points = ↑healthy

Alternative (AHEI): 9 components, 0-90 score. <u>negative</u> correlation ↑points = ↓inflammation

MedDiet score (MDS): 8 characteristic components. either 0 or 1 point. <u>positive</u> correlation ↑points = ↑healthy

Modified (MDSm): included fish, removed dairy and split fruit from nuts. either 0 or 1 point. <u>positive</u> correlation ↑points = ↑healthy

Mediterranean (MED-DQI): 0-14 score, (0/1/2) points. <u>negative</u> correlation ↑score = ↓Med.Quality. ↑Olive oil = ↓points, ↑fish = ↓points

MedDiet Adherence (MEDAS): 12 questions over frequency of consumption +2 over intake habits. 0-14 score. <u>positive</u> correlation ↑points = ↑MedDiet

Healthy Lifestyle Indicators (HLIs)

Mediterranean Lifestyle (MEDLIFE): either 0 or 1 point. 0-28 score: 15 questions of consumption, 7 of Med. habits & physical activity and 6 of sleep & social habits. <u>positive</u> correlation ↑points = ↑Med. Lifestyle

Health indicator (HI): from 0 to 5 points each component: fruits&veggies, fish, fibre rich foods, sodium, sugar drinks, exercise and stress. Related to cardiovascular health. 0-10 score ↑points = ↑healthy

QUESTIONS→ INDICATORS→ FOOD (TYPES, AMOUNTS AND FREQUENCY)→ NUTRIENTS→ COMPARISON TO RECOMMENDATIONS→ ASSESSMENT

Diet Creation

1. Data of the person
- Anthropometric data and habits of the individual
- Eating habits (surveys)

2. Assessment of nutritional status
- already discussed

3. Calculation of total energy expenditure

Define the goal
- <u>normocaloric</u> diet (maintain weight)
- <u>hypocaloric</u> diet (↓20-30% kcal)
- <u>hypercaloric</u> diet (gain weight)
- <u>Others</u>: focus on macros & micros

Total energy expenditure = basal metabolism + food-induced thermogenesis + physical activity

Calculations: <u>Approximate</u> and <u>Semi-Approximate</u> Methods→ Harris-Benedict * group of activity / each activity group energy expenditure

4. Calculation of macros & micros

EFSA recommendations
- **Carbs:** 45-60% (sugar <10%)
- **Proteins:** 10-15% (30-40% animal protein)
- **Fats:** 20-35% (SFA<10%, PUFA 6-10%, TFA <1%, Cho <300 mg)
- **Water:** 2L for ♀, 2,5L for ♂
- **Fibre:** 25 g/day
- **Salt:** <5 g/day (2 g Na^+/day)
- **Vitamins & Minerals:** Adaptation to needs

5. Distribution of daily meals

4 meals
- 30% Breakfast
- 35% Lunch
- 10% Snack
- 25% Dinner

5 meals
- 20% Breakfast
- 10% Snack
- 35% Lunch
- 10% Snack
- 25% Dinner

6 meals
- 15% Breakfast
- 10% Snack
- 30% Lunch
- 15% Snack
- 25% Dinner
- 5% Snack

6. Designing a diet

7. Monitoring the diet

Convert energy into quantities

Carbs 4 kcal/g

Proteins 4 kcal/g

Fat 9 kcal/g

Fibre 2 kcal/g

Polyalcohols 2,4 kcal/g

Alcohol 7 kcal/g

Organic Acids 3 kcal/g

Salatrim 6 kcal/g

Recommendations and portions

Veggies: ≥3/d 150-200g

Fruits: ≥2-3/d 120-200g

Grains: 3-6/d 40-80g

Legumes: ≥4/w 50-60g

Nuts: 3-7/w 30g

Fish: ≥3/w 125-150g

Eggs: ≤4/w 1 Egg ~60g

Dairy: ≤3/d 200ml, 125ml, 40-60g, 80-125g

Meat: ≤3/w 100-125g

Tubers: 150-200g

Olive Oil: daily 10ml/p

Convert nutrients into food

1. Grammage

2. Homemade food measures. Portions

3. Food equivalents system

4. Pre-established protein percentage system

5. Point system.

Grammage / Portions method

Set the portions in the meals starting with carbs

then protein

and the fats last

Food equivalents system

interchangeable foods inside a group, using equivalents

1 equivalent of <u>carbs</u>: 10g
1 equivalent of <u>proteins</u>: 10g
1 equivalent of <u>fats</u>: 5g

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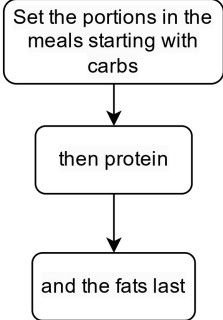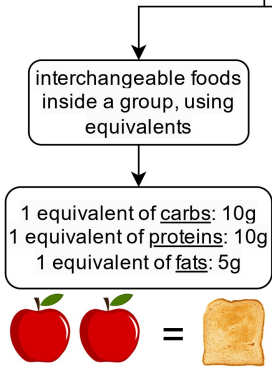
How to use equivalents

1. add half the carbs

2. **protein** adjustment

3. **fat** adjustment

4. **carbs** adjustment using fruits and sugars

Hypocaloric diet

Definition

Diet with +800kcal / day and a deficit of 500-1000 kcal /day

Macronutrients distribution similar to general recommendations (↑protein)

Generalities

progressive weight loss, losing fat and maintaining lean mass

mixed and balanced, providing all the nutrients in sufficient quantities

must be adapted to the lifestyle and diet of the patient

Types

Classic hypocaloric diets

Moderately low calorie diets

For obese or grade 2 overweight

For >2000kcal: -500kcal/day→ -500g/w

For <2000kcal: -25%kcal/day

↓450-500g/week, quit alcohol, sugar, fats... Always >1200 kcal/day

Very low calorie diets

For obesity >35kg/m² Fatigue, weakness... Not for pregnant women, old people, children and adolescents

mainly created with special formulations

always <12 weeks + medical control in hospital

400-800 kcal/day
Proteins: 25-50 % ↑BV
Total fats: <30%
Fiber: 10-30 g/day

Must cover 100% of the RDIs for vitamins and minerals.

Hypocaloric diets according to distribution

General Hypocaloric diets

Proteins: 15-25% ↑BioValue

Fats: 25-35% Cho <300mg

Carbs: 45-55% >100g/day

Water: a lot 2,-2,5ml/kcal

Micronutrients: supplement when <1500 kcal / day

Hypocaloric distribution diets

↑Protein ↑Fat ↓Carbs (<20%)

↓Fat (20-25%) ↑Protein (40-45%)

↑Carbs ↓Protein (25g) ↓Fat (<10%)

Contraindications & Side Effects

Contraindications

Pregnant women & Lactation

Children <6 years old

Mental diseases

Anorexia nervosa

Side Effects

Lean mass loss and ↓BMR

↑chance of acute gout attacks

Micronutrients deficiencies

Increased risk of gallstones

↑risk of osteoporosis in women

Occurrence of eating disorders

Family and/or social isolation