Salud, nutrición y pobreza: Desafíos de política pública

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✓ Nutrition transition: concept and stages (where are the developed and the developing countries?)

✓ Worldwide trends in food availability and the predicted impact on the nutritional and health status of the population.

✓ Obesity, national wealth and individual SES.
THE NUTRITION TRANSITION PROCESS

CHANGES IN THE ECONOMY

CHANGES IN THE PHYSICAL AND THE SOCIO-CULTURAL ENVIRONMENT

CHANGES IN DIETARY PATTERNS AND ENERGY AND NUTRIENT REQUIREMENTS

CHANGES IN MAGNITUDE AND DISTRIBUTION OF NUTRITION-RELATED DISEASES AND RISK FACTORS
<table>
<thead>
<tr>
<th>ECONOMY</th>
<th>DIETARY PATTERN</th>
<th>ENERGY AND NUTRIENT EXPENDITURE</th>
<th>NUTRITIONAL STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunther-gatherer</td>
<td>Fruits, seeds, roots, wild animals</td>
<td>Very high</td>
<td>Fair for all</td>
</tr>
<tr>
<td>Primitive agriculture</td>
<td>One cereal-based diets</td>
<td>Very high</td>
<td>Famine and spread undernutrition</td>
</tr>
<tr>
<td>More developed agriculture</td>
<td>Cereals, some vegetables, fruits and animal products</td>
<td>High</td>
<td>Maternal and child undernutrition mainly among the poor</td>
</tr>
<tr>
<td>Industrial, mass consumption</td>
<td>Declining plant foods, increasing animal products, oil, sugar, salt and processed foods</td>
<td>Low</td>
<td>Obesity, diabetes, CVD, cancer, etc first among the rich, then shifting rapidly toward the poor</td>
</tr>
<tr>
<td>Post-industrial (!)</td>
<td>Cereals, pulses, nuts, F&amp;V, lean meat, skimmed milk</td>
<td>Moderate</td>
<td>Optimum for all</td>
</tr>
</tbody>
</table>
NUTRITION TRANSITION

Where we are?

Developed countries
Developing countries
Burden of disease due to risk factors (2000)

Developed countries (pop: 1.4 billion)

1- Tobacco
2- Blood pressure
3- Alcohol
4- Cholesterol
5- Overweight
6- Low f&v
7- Physical inactivity
8- Illicit drugs
9- Unsafe sex
10- Iron deficiency

Thousands of DALY's

Source: WHO 2002
Burden of disease due to risk factors (2000)
Half poorest developing countries (pop: 2.3 billion)

1-Underweight 124398
2-Unsafe sex 84564
3-Unsafe water 46183
4-Indoor smoke 30393
5-Zinc deficiency 26781
6-Iron deficiency 26170
7- Vit A deficiency 25137
8-Blood pressure 20627
9-Tobacco 16683
17-Overweight 6408

Thousands of DALY's

Source: WHO 2002
Burden of disease due to risk factors (2000)

Half richest developing countries (pop: 2.4 billion)

Source: WHO 2002
Burden of disease due to risk factors (2000)
Most Latinamerican countries (Brazil, Mexico, Argentina ...)

1-Alcohol: 9297
2-Overweight: 3423
3-Blood pressure: 3245
4-Tobacco: 3003
5-Cholesterol: 1873
6-Unsafe sex: 1755
7-Low f&v: 1477
8-Unsafe water: 1289
9-Physical Inactivity: 1167
10-Underweight: 1068

Thousands of DALY's

Source: WHO 2002
National prevalence (%) of women’s chronic energy deficiency (BMI < 18.5) and obesity (BMI >= 30) in 37 developing countries

Source: Monteiro et al (in preparation) 2004
WORLDWIDE TRENDS IN FOOD AVAILABILITY

Source: FAO Food Balance Sheets
Global trends in food availability: 1961-2001

Daily kcal per capita

Source: Food Balance Sheets from FAOSTAT
Global trends in food availability: 1961-2001

Daily kcal per capita

- **Developed Countries**
  - 1961-63: 2.866
  - 1969-71: 2.866
  - 1979-81: 3.169
  - 1989-91: 3.437
  - 1999-01: 3.437

- **Developing Countries**
  - 1961-63: 2.259
  - 1969-71: 2.259
  - 1979-81: 2.582
  - 1989-91: 2.582
  - 1999-01: 2.582

Source: Food Balance Sheets from FAOSTAT
TRENDS IN THE RELATIVE AVAILABILITY OF FOOD GROUPS

Source: FAO Food Balance Sheets
All countries
Changes in the share of the main food groups

STAPLE FOODS

Source: Food Balance Sheets from FAOSTAT
Changes in the share of the main food groups

ANIMAL PRODUCTS

% OF TOTAL KCAL

Source: Food Balance Sheets from FAOSTAT
Changes in the share of the main food groups

FATS AND SUGAR/SWEETENERS

% OF TOTAL KCAL

Source: Food Balance Sheets from FAOSTAT
Changes in the share of the main food groups

FRUITS AND VEGETABLES

% OF TOTAL KCAL

FRUITS
VEGETABLES

Source: Food Balance Sheets from FAOSTAT
Food groups with at least 1% change in the share of total kcal from 1961 to 2001
Changes in the share of the main food groups from 1961 to 2001

Source: Food Balance Sheets from FAOSTAT
Changes in the share of the main food groups from 1961 to 2001

Source: Food Balance Sheets from FAOSTAT
Developed

X

Developing Countries
STAPLE FOODS
DEVELOPED COUNTRIES

% OF TOTAL KCAL

CEREALS  ROOTS  PULSES

Source: Food Balance Sheets from FAOSTAT
Source: Food Balance Sheets from FAOSTAT
ANIMAL PRODUCTS
DEVELOPED COUNTRIES

Source: Food Balance Sheets from FAOSTAT
ANIMAL PRODUCTS
DEVELOPING COUNTRIES

% OF TOTAL KCAL

MEAT  MILK  EGG  FISH

Source: Food Balance Sheets from FAOSTAT
FATS AND SUGAR
DEVELOPED COUNTRIES

% OF TOTAL KCAL

Source: Food Balance Sheets from FAOSTAT
Source: Food Balance Sheets from FAOSTAT
FRUITS AND VEGETABLES
DEVELOPED COUNTRIES

% OF TOTAL KCAL


Source: Food Balance Sheets from FAOSTAT
Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
DEVELOPED COUNTRIES

Source: Food Balance Sheets from FAOSTAT
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CHANGES FROM 1961 TO 2001
DEVELOPING COUNTRIES

Source: Food Balance Sheets from FAOSTAT
Developing Countries

Low income
(GNP <= US$ 765 per capita)

X

Lower-middle income
(GNP US$ 766-3035 per capita)

X

Upper-middle income
(GNP US$ 3036-9385)
CHANGES FROM 1961 TO 2001
LOW INCOME COUNTRIES

CEREALS
PULSES
OILS
SUGAR-SWEETENERS

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
LOWER-MIDDLE INCOME COUNTRIES

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
UPPER-MIDDLE INCOME COUNTRIES

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
LOW INCOME COUNTRIES

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
LOWER-MIDDLE INCOME COUNTRIES

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
UPPER-MIDDLE INCOME COUNTRIES

Source: Food Balance Sheets from FAOSTAT
Changes in selected countries and regions
CHANGES FROM 1961 TO 2001

EUROPE

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001

JAPAN

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001

CHINA

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001

BRAZIL

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001

SOUTH ASIA

Source: Food Balance Sheets from FAOSTAT
CHANGES FROM 1961 TO 2001
SUB-SAHARA AFRICA

Source: Food Balance Sheets from FAOSTAT
Conclusions

• In the last 4 decades the relative availability of staple foods (cereals, pulses, and starchy roots) decreased almost everywhere.

• Staple foods were essentially replaced:
  – by vegetable oils and sugar in low and lower-middle income countries;
  – by vegetable oils, sugar, and meat in upper-middle income countries,
  – by vegetable oils and meat in higher income countries

• The relative availability of F&V was only slightly increased in most countries and it is still well below the recommendations in both the developed and the developing countries.
• Impact of food availability changes on nutritional parameters of the diet

Likely impact:
  – Increased total fat content and decreased total carbohydrate content everywhere
  – Increased energy density everywhere
  – Decreased fibre content everywhere
  – Decreased protein content in less developed countries

Possible impact (need individual evaluation):
  – Increase in saturated fats
  – Decrease in some vitamins and minerals
  – Increase in the glycaemic index
  – Decrease in bioactive compounds (flavonoids, etc)
• Food availability changes in the last 4 decades are therefore consistent with the deterioration of human diets particularly in what concerns the incidence of obesity, CVD, diabetes, certain types of cancer and other nutrition-related NCDs.

• A higher replacement of staple foods by F&V, instead of meat, fats and sugar, would have avoided most of this deterioration.

• A future increase in the availability (and consumption) of F&V, particularly if replacing meat, fats and sugar, has the potential to revert the deterioration seen in the past.
Obesity, national wealth and individual SES.
GNP and obesity in high-income countries

Countries ordered by GNP per capita

Sources: The WHO Global Data Base on BMI, OECD Health Statistics and the World Bank
Obesity and GNP per capita in 23 high-income countries

$y = -4E-05x + 12,691$

$R^2 = 0.0006$

Sources: The WHO Global Data Base on BMI, OECD Health Statistics and the World Bank
Obesity and GNP per capita in high-income countries (without USA)

\[ y = -0.0006x + 24.382 \]

\[ R^2 = 0.1747 \]

Sources: The WHO Global Data Base on BMI, OECD Health Statistics and the World Bank
GNP and obesity in low- and middle-income countries

Countries ordered by GNP per capita

Sources: The WHO Global Data Base on BMI, National surveys and the World Bank
Obesity and GNP per capita in 24 developing countries

\[y = 0.0015x - 0.0327\]

\[R^2 = 0.5672\]

Countries ordered by GNP per capita

 Sources: The WHO Global Data Base on BMI, National surveys and the World Bank
Obesity and GNP per capita in 24 developing countries

\[ y = -3 \times 10^{-7}x^2 + 0.0049x - 0.7431 \]

\[ R^2 = 0.3063 \]
Relationship between individual SES and the risk of obesity
According to a review article still often quoted in the international literature (Sobal and Stunkard, 1989), obesity in the developing world would be essentially a disease of the rich!
13 studies on SES and obesity conducted in national or sub-national samples of adult populations (men and women) from developing countries and published from 1989 to 2003

(Monteiro et al. 2004, WHO Bulletin (in press))
RELATIVE RISK OF OBESITY AMONG THE UPPER SOCIAL CLASS
Lower- and upper-middle income societies (1990-2001)

\[ y = -0.2671 \ln(x) + 3.6015 \quad R^2 = 0.1212 \]

\[ y = -0.2781 \ln(x) + 2.9684 \quad R^2 = 0.2056 \]

Source: Monteiro et al. 2004 (in press)
Economic development and SES as joint predictors of obesity: a study on 148,579 women from 37 developing countries

Monteiro et al. - Obesity and health inequities in the developing world IJO 2004
Obesity in women 20-49 y by SES in 37 developing countries ordered by GNP per capita (1992-00)

Source: Monteiro et al. IJO 2004
Prevalence ratios for women’s obesity by quartiles of years of schooling

<table>
<thead>
<tr>
<th>Quarters of Years of Schooling</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Income Countries</td>
<td>1</td>
<td>2,63</td>
<td>1</td>
<td>0,67</td>
</tr>
<tr>
<td>Lower-Middle Income Countries</td>
<td>1</td>
<td>1,08</td>
<td>1</td>
<td>0,67</td>
</tr>
<tr>
<td>Upper-Middle Income Countries</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0,67</td>
</tr>
</tbody>
</table>

Source: Monteiro et al. IJO 2004
Modeling the probability of obesity as a function of individual SES, the country’s GNP per capita (log) and an interaction term between SES and GNP
Predicted prevalence (%) of women’s obesity in extreme SES at different country’s GNP

Source: Monteiro et al. IJO 2004
The shifting of obesity toward the poorest women in the Southeast of Brazil
THE SHIFTING OF OBESITY TOWARD THE POOREST WOMEN IN SOUTHEAST BRASIL

Source: Monteiro, Conde and Popkin 2002 - Pub Health Nut 5(1A): 105-112
Public policies can re-direct the nutrition transition. Countries are not condemned to “follow” the historical evolution!

The diagram shows the flow from ECONOMY to ENVIRONMENT, then to DIET AND NUTRITIONAL REQUIREMENTS, and finally to NUTRITIONAL STATUS OF THE POPULATION. The flow is indicated by arrows pointing from one box to the next, illustrating the interconnectivity of these factors. The bottom of the diagram emphasizes PUBLIC POLICIES as the overarching context.