Obesity in North Africa
EUNAM, Ferrara Sept. 2011

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What are overweight and obesity?

- Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.
- Body mass index (BMI) is commonly used to classify overweight and obesity in adults.
- It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m²).
WHO definitions

• a BMI greater than or equal to \(25\) is overweight

• a BMI greater than or equal to \(30\) is obesity.
Global estimates of obesity

• The prevalence of obesity has increased at an alarming rate over the past 2 decades to the extent that it could be considered as a pandemic.

• In 2008, 1.5 billion adults, 20 and older, were overweight.

• Of these over 200 million men and 300 million women were obese. (WHO, 2008).
Global estimates of obesity (cont.)

• In 2010, around **43 million** children under five were overweight.

• Close to **35 million** overweight children are living in developing countries and **8 million** in developed countries.

In the analyses carried out for World Health Report 2002, approximately:

- 58% of diabetes
- 21% of ischaemic heart disease
- 8-42% of certain cancers globally
- were attributable to a BMI above 21 kg/m².
• For a long time, overweight and obesity were considered a problem only in high-income countries.

• Now they are dramatically on the rise in low- and middle-income countries, particularly in urban settings.

Undernutrition and obesity among women (15–49y): comparison of North African, sub-Saharan and Latin American countries

Obesity among women and men in Morocco (aged 18 years) and Tunisia (aged 20 to 60 years)


York D A et al. Circulation 2004 ,http://circ.ahajournals.org/content/110/18/e463
Tunisia

Overweight & Obesity (BMI ≥ 25 kg/m²), 1997

Prevalence (%)  

Age Group, Years  
0  16  32  48  64  80

Tunisia

Algeria

Overweight & Obesity (BMI ≥ 25 kg/m²), 2003

Algeria

Morocco

Overweight & Obesity (BMI ≥ 25 kg/m²), 2004

Morocco

Egypt

Overweight & Obesity (BMI ≥ 25 kg/m²), 2008

Egypt

Nutritional Status of Women and Men Age 15-59 in Egypt

Overweight (BMI of 25.0 or higher)
- Males: (34 %)
- Females: (28 %)

Obese (BMI of 30.0 or higher)
- Males: (18 %)
- Females: (40 %).

Source: (EDHS, 2008)
Nutritional Status of Youth and Young Adult in Egypt

Among never married 10-19 age group

• 6% of females and 5% of males were classified as overweight

• An additional 15% of males and 19% of females fell between the 85th and 95th percentiles, indicating that they were at risk of becoming overweight.

Source: (EDHS, 2008)
Obesity trends

[Graph showing obesity trends in Morocco and Tunisia for both female and male populations over different years.]
Figure 4: Prevalence of overweight by region, 1992-2005
Figure 1: Distribution of BMI categories, 1992-2005
Obesity levels have begun to rise among women of lower socioeconomic status as measured by education in urban areas.

The social gradient of obesity appears to be reversing in these areas.
Figure 1. Obesity prevalence among urban mothers by education and year (Egypt DHS, 1995-2005) – reversal of risk
Higher prevalence of obesity among females than among males may be attributed to socio-cultural factors in Egyptian communities, such as:

- high unemployment,
- restricted outdoor activities and
- the high illiteracy rate among females

(Tawfik et al, 2003)
Central obesity among adults in Egypt: prevalence and associated morbidity

M.A. Abolfotouh, L.A. Soliman, E. Mansour, M. Farghaly and A.A. El-Dawaiaty
• Home-based survey in 4 Egyptian governorates
• All people aged 18 years and over (n = 1800) in the catchment areas of 12 primary health care centres were subjected to standardized waist and hip measurements.
• Central obesity was determined based on the waist circumference (WC) and waist-to-hip ratio (WHR) indicators.
Table 1 Prevalence of central obesity among Egyptian adults according to different obesity indicators by age and sex

<table>
<thead>
<tr>
<th>Obesity indicator</th>
<th>Total no.</th>
<th>Males No. of cases</th>
<th>%</th>
<th>Females Total No. of cases</th>
<th>%</th>
<th>Males and females No. of cases</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td><strong>Waist circumference</strong></td>
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<tr>
<td>18–24 yrs</td>
<td>153</td>
<td>7</td>
<td>4.6</td>
<td>289</td>
<td>31</td>
<td>442</td>
<td>8.6</td>
</tr>
<tr>
<td>25–44 yrs</td>
<td>380</td>
<td>54</td>
<td>14.2</td>
<td>569</td>
<td>205</td>
<td>949</td>
<td>27.3</td>
</tr>
<tr>
<td>45–64 yrs</td>
<td>187</td>
<td>46</td>
<td>24.6</td>
<td>171</td>
<td>99</td>
<td>358</td>
<td>40.5</td>
</tr>
<tr>
<td>65+ yrs</td>
<td>35</td>
<td>6</td>
<td>17.1</td>
<td>16</td>
<td>6</td>
<td>51</td>
<td>23.5</td>
</tr>
<tr>
<td>Total</td>
<td>755</td>
<td>113</td>
<td>15.0</td>
<td>1045</td>
<td>341</td>
<td>1800</td>
<td>25.2</td>
</tr>
<tr>
<td>(Age-adjusted)</td>
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<tr>
<td></td>
<td>(14.0)</td>
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<td></td>
<td>(34.1)</td>
<td></td>
<td>(24.1)</td>
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<tr>
<td><strong>P–value</strong></td>
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<tr>
<td></td>
<td>$\chi^2 = 72.52, P &lt; 0.001^a$</td>
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<td></td>
<td>$P &lt; 0.001^b$</td>
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<tr>
<td><strong>Waist-to-hip ratio</strong></td>
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<tr>
<td>18–24 yrs</td>
<td>153</td>
<td>10</td>
<td>6.5</td>
<td>289</td>
<td>95</td>
<td>442</td>
<td>23.8</td>
</tr>
<tr>
<td>25–44 yrs</td>
<td>380</td>
<td>48</td>
<td>12.6</td>
<td>569</td>
<td>257</td>
<td>949</td>
<td>32.1</td>
</tr>
<tr>
<td>45–64 yrs</td>
<td>187</td>
<td>32</td>
<td>17.1</td>
<td>171</td>
<td>98</td>
<td>358</td>
<td>36.3</td>
</tr>
<tr>
<td>65+ yrs</td>
<td>35</td>
<td>9</td>
<td>25.7</td>
<td>16</td>
<td>9</td>
<td>51</td>
<td>35.3</td>
</tr>
<tr>
<td>Total</td>
<td>755</td>
<td>99</td>
<td>13.1</td>
<td>1045</td>
<td>459</td>
<td>1800</td>
<td>31.0</td>
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<tr>
<td>(Age-adjusted)</td>
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<tr>
<td></td>
<td>(12.4)</td>
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<td></td>
<td>(44.9)</td>
<td></td>
<td>(28.7)</td>
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<tr>
<td><strong>P–value</strong></td>
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<tr>
<td></td>
<td>$\chi^2 = 194.53, P &lt; 0.001^a$</td>
<td></td>
<td>$P &lt; 0.001^b$</td>
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</tbody>
</table>
• The age-adjusted prevalence of central obesity among adults was 24.1% and 28.7% based on the WC and WHR indicators respectively.

• After adjustment for sex and other confounding factors,
  o **WC was significantly associated with the risk of diabetes and hypertension**, while
  o WHR was not significantly associated with either diabetes or hypertension.
The North African diet

• Much of the diet is based on grains, which are used to prepare flat breads and cereals

• Couscous (made from hard wheat and millet) is often the main dish at lunch, accompanied by vegetables and meat

• Legumes such as broad beans (fava beans), lentils, yellow peas, and black-eyed peas are also important staples
Nutrition transition in Africa

• Africans, especially in the urban area are gradually departing from a traditional diet toward a western diet, high in saturated fat, sugar and refined CHO and low in fibre.

• The processes of urbanization associated with migration (cross country and intra-country) lead to the availability and abundance of calorie-dense/low-fiber foods and the adoption of sedentary lifestyles.
Changes in lifestyle and socioeconomic status

• A sedentary lifestyle is highly prevalent in the North African population.

• A high percentage of the population has decreased the amount of physical activity engaged in during both work and leisure by spending more hours per week watching TV and by utilizing more vehicles.

• And activity-saving appliances.

Obesity among children and adolescents associated with:

- Television advertising
- long periods watching television
- using the internet
- high intake of fast foods
- increase in food intake outside the home

(Musaiger, 2003)
Energy Intake, Diet Composition among Low Social Class Overweight and Obese Egyptian Adolescents

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**Complementary Medicine Department, Medical Division, National Research Centre (NRC), Cairo, Egypt
***Clinical Nutrition, Medical Division, National Research Centre (NRC), Cairo, Egypt.

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Better understanding of **dietary habits** and **activity patterns** is needed to reduce obesity prevalence.

This study was a cross-sectional study that included 129 girls (39 obese, 30 over weights, and 60 normal weights).
Dietary intake

<table>
<thead>
<tr>
<th></th>
<th>Group (1) Normal weight (n=60)</th>
<th>Group (2) Over-weight (n=30)</th>
<th>Group (3) Obese (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intake (k. cal)</td>
<td>2184 (±530.72)</td>
<td>2713 (±321.57)</td>
<td>3338.38 (±1176.42)</td>
</tr>
<tr>
<td>Protein intake (g)</td>
<td>82.26 (±17.76)</td>
<td>101.66 (±20.06)</td>
<td>116.73 (±36.90)</td>
</tr>
<tr>
<td>% of energy intake as protein</td>
<td>14.95 (±2.16)</td>
<td>14.65 (±3.34)</td>
<td>12.56 (±3.25)</td>
</tr>
<tr>
<td>Fat intake (g)</td>
<td>81.32 (±11.71)</td>
<td>116.16 (±36.72)</td>
<td>140.24 (±127.82)</td>
</tr>
<tr>
<td>% of energy intake as fat</td>
<td>33.65 (±4.55)</td>
<td>36.42 (±6.23)</td>
<td>35.28 (±15.84)</td>
</tr>
<tr>
<td>Carbohydrate intake (g)</td>
<td>292.78 (±103.98)</td>
<td>344.85 (±73.35)</td>
<td>492.50 (±189.56)</td>
</tr>
<tr>
<td>% of energy intake as carbohydrate</td>
<td>51.39 (±6.35)</td>
<td>48.93 (±6.96)</td>
<td>52.16 (±13.60)</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>5.64 (±3.36)</td>
<td>7.26 (±3.24)</td>
<td>10.86 (±7.67)</td>
</tr>
<tr>
<td>Vitamin A (IU)</td>
<td>1275.60 (±883.68)</td>
<td>1456.30 (±1322.59)</td>
<td>1337.84 (±1424.19)</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>154.60 (±168.26)</td>
<td>18.60 (±35.01)</td>
<td>21.61 (±33.15)</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>1089.40 (±339.88)</td>
<td>950.83 (±572.30)</td>
<td>820.91 (±634.30)</td>
</tr>
<tr>
<td>Magnesium (mg)</td>
<td>170 (±55.14)</td>
<td>156 (±40.25)</td>
<td>198.69 (±130.40)</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>10.34 (±1.54)</td>
<td>12.16 (±4.44)</td>
<td>18.58 (±7.14)</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>9.74 (±2.53)</td>
<td>10.81 (±5.47)</td>
<td>13.84 (±7.20)</td>
</tr>
<tr>
<td>Copper (mg)</td>
<td>1.63 (±0.30)</td>
<td>1.67 (±0.65)</td>
<td>1.67 (±1.13)</td>
</tr>
</tbody>
</table>

**Overweight and obese**
Consumed more grams of macronutrients (carbohydrates, fat and protein) with high fat percentage.
Vitamin C and calcium intake was low (P<0.05).
Eating pattern

<table>
<thead>
<tr>
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<th>Group (1) Normal weight (n=60)</th>
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<th>Group (3) Obese (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating fruits less than one time/day</td>
<td>24 (40%)</td>
<td>12 (40%)</td>
<td>30 (77%) ^b, ^c</td>
</tr>
<tr>
<td>Eating vegetables less than one time/day</td>
<td>12 (20%)</td>
<td>15 (50%) ^a</td>
<td>17 (44%) ^b</td>
</tr>
<tr>
<td>Soda consumption at least one time/day</td>
<td>12 (20%)</td>
<td>9 (30%)</td>
<td>13 (33%)</td>
</tr>
<tr>
<td>Eating fast food more than 2 times/week</td>
<td>12 (20%)</td>
<td>15 (50%) ^a</td>
<td>13 (33%) ^b, ^c</td>
</tr>
<tr>
<td>Eating junk food at least one time/day</td>
<td>36 (60%)</td>
<td>18 (80%)</td>
<td>13 (33%) ^b, ^c</td>
</tr>
<tr>
<td>Skipping breakfast</td>
<td>12 (20%)</td>
<td>12 (40%) ^a</td>
<td>26 (67%) ^b, ^c</td>
</tr>
<tr>
<td>Number of meals/day (mean ±SD)</td>
<td>(4.4 ±0.49)</td>
<td>(3.6 ±0.81) ^a, ^c</td>
<td>(4.3 ± 0.79) ^c</td>
</tr>
</tbody>
</table>

- Despite a high incidence of skipping breakfast, they had more than three meals per day.
- They used to eat junk food at least once daily, fast food more than 2 times per week and
- Their daily food intake does not regularly include fresh vegetables and fruits.
## TV watching (hours/day) and number of reported exercise or weekly play sessions

<table>
<thead>
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<th>Group (3) Obese (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV watching, hours/day (mean ±SD)</td>
<td>(1.2 ±1.17)</td>
<td>(3 ±2.18) (^a)</td>
<td>(3.2 ±2.45) (^b)</td>
</tr>
<tr>
<td>Sports sessions</td>
<td>36 (60%)</td>
<td>18 (60%)</td>
<td>23 (58.9%)</td>
</tr>
<tr>
<td>One time/week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sport sessions</td>
<td>12 (20%)</td>
<td>6 (20%)</td>
<td>7 (18%)</td>
</tr>
<tr>
<td>2 times/week</td>
<td></td>
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</tbody>
</table>

They used to spend **long time watching TV or playing computer games.**
WHO Response

Source: WHO Global status report on noncommunicable diseases 2010
Noncommunicable diseases (NCDs)

- **Global** Strategy for Prevention of NCD

- **Regional** Strategy for Prevention of NCD

- There is an urgent need for **national** program to prevent and control NCDs.
Future Research

Establishment of National/International Network:
LARGE-SCALE DATA GATHERING and INTEGRATION.
Data can include:

- Researchers
- Institutions
- Publications
- Projects
- Ongoing researches
- Scientific Activities
Genetic and environmental factors in obesity

The research aim at understanding the genetic and environmental factors causing variations in prevalence and incidence of metabolic disorders.

Comparisons between populations in their original and new environment, e.g. as immigrant populations.

Emphasis on the role of genetic, environmental and/or lifestyle factors, as well as their interactions, on the incidence, prevalence, and age of onset of metabolic disorders.

Each project should focus on a particular geographical region.
Thank You