Diabetes Mellitus in Egypt, Epidemiological Profile: Population Based Survey 2012
DM Epidemic

Global Projections for the Diabetes Epidemic: 2003-2025

World
- 2003 = 194 M
- 2025 = 333 M
- ↑ 72%

NA
- 23.0 M
- 36.2 M
- ↑ 57.0%

EUR
- 48.4 M
- 58.6 M
- ↑ 21.1%

EMME
- 19.2 M
- 39.4 M
- ↑ 105%

SEA
- 39.3 M
- 81.6 M
- ↑ 108%

AFR
- 7.1 M
- 15.0 M
- ↑ 111%

SACA
- 14.2 M
- 26.2 M
- ↑ 85%

WP
- 23.0 M
- 75.8 M
- ↑ 179%

M = million, AFR = Africa, NA = North America, EUR = Europe, SACA = South and Central America, EMME = Eastern Mediterranean and Middle East, SEA = South-East Asia, WP = Western Pacific

DM Epidemic

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In Middle East and North Africa,
In Middle East and North Africa, MENA Region has a high prevalence of diabetes.
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Comparative prevalence

- 2010: 9.3
- 2030: 10.8
In Middle East and North Africa, MENA Region has a high prevalence of diabetes.

Comparative prevalence

- 2010: 9.3
- 2030: 10.8

1 out of 10 will be diabetic
# Diabetes in adults (20-79 years old) Egypt, 2013

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total adult population</td>
<td>48 million</td>
</tr>
<tr>
<td>Prevalence of diabetes in adults</td>
<td>16%</td>
</tr>
<tr>
<td>Total cases of adults with diabetes</td>
<td>7.5 million</td>
</tr>
<tr>
<td>Undiagnosed cases of diabetes in adults</td>
<td>3.8 million</td>
</tr>
<tr>
<td>Deaths in adults due to diabetes</td>
<td>86 thousand</td>
</tr>
<tr>
<td>Mean healthcare expenditures due to diabetes per person</td>
<td>351 USD/year</td>
</tr>
</tbody>
</table>

Top 10 countries of number of people with diabetes (20-79 years), 2013

- China: 98.4 million
- India: 65.1 million
- USA: 24.4 million
- Brazil: 11.9 million
- Russian Federation: 10.9 million
- Mexico: 8.7 million
- Indonesia: 8.5 million
- Germany: 7.6 million
- Egypt: 7.5 million
- Japan: 7.2 million
Top 10 countries of number of people with diabetes (20-79 years), 2013

- China: 98.4 millions
- India: 65.1 millions
- USA: 24.4 millions
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- Mexico: 8.7 millions
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- Germany: 7.6 millions
- Egypt: 7.5 millions
- Japan: 7.2 millions
Egypt vs. World Prevalence of Diabetes

Diabetic eye complications

- In Egypt, 42% of people with diabetes experience early-stage eye disease.
- 5% of diabetics are classified as legally blind.¹

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• Number of Diabetics will almost double by 2030 if concerted action is not taken to tackle the risk factors fuelling the epidemic of diabetes throughout Egypt...
As First Step,

- FETP Egypt, in collaboration with WHO, conducted a population-based STEPwise survey in 2012 to estimate prevalence of NCDs, including DM, and identify risk factors in Egypt
To .......

• Describe the epidemiology of DM and its risk factors among Egyptian population aged 15-65 years

• Evaluate quality of health-care services available to DM patients in Egypt
METHODOLOGY
Population based survey

• Participants were selected to representing the Egyptian population 15-65 years of age
• Multi stage cluster sample was used
10 of the 27 Egyptian governorates was selected
<table>
<thead>
<tr>
<th>Number of Clusters within each governorate</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of house hold at each cluster</td>
<td>106</td>
</tr>
<tr>
<td>Number of participants per house hold</td>
<td>1</td>
</tr>
</tbody>
</table>
Sample size

<table>
<thead>
<tr>
<th>Calculated sample size</th>
<th>5300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of NCDs combined risk factors (^1)</td>
<td>24%</td>
</tr>
<tr>
<td>Confidence level</td>
<td>95%</td>
</tr>
<tr>
<td>Power of the study</td>
<td>80%</td>
</tr>
<tr>
<td>(\alpha) error</td>
<td>5%</td>
</tr>
<tr>
<td>expected response rate</td>
<td>0.8</td>
</tr>
<tr>
<td>Design effect</td>
<td>1.5</td>
</tr>
</tbody>
</table>

1. Based on 2005 Step Wise survey, Egypt.
Data collection tool

Standard WHO tool was used in 3 steps
Step 1: Standardized questionnaires

- Demographic data,
- History of DM and other NCDs,
- Behavioural risk factors
  - tobacco use,
  - alcohol consumption,
  - unhealthy diet,
  - physical inactivity
Step 2: Physical measurements

- Weight,
- Height,
- Hip and waist circumstances,
- Blood pressure,
- Heart rate
Step 3: Biochemical measurements

• Fasting blood glucose
• Lipid profile
## Case Definitions:

<table>
<thead>
<tr>
<th>DM Risk factor</th>
<th>Case definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>smoking</td>
<td>Current daily smoker</td>
</tr>
<tr>
<td>low physical activity</td>
<td>&lt;600 MET-minutes</td>
</tr>
<tr>
<td>Overweight</td>
<td>BMI ≥ 25 kg/m²</td>
</tr>
<tr>
<td>low intake of fruits&amp; vegetables</td>
<td>&lt; 5 servings per day</td>
</tr>
<tr>
<td>Hypertension</td>
<td>SBP* ≥ 140 and/or DBP *≥ 90 mmHg or currently on medication for hypertension</td>
</tr>
<tr>
<td>impaired glucose tolerance:</td>
<td>FBG ≥110 –&lt;126 mg/dl</td>
</tr>
<tr>
<td>Raised blood glucose level</td>
<td>FBG ≥ 126 mg/dl</td>
</tr>
<tr>
<td>case definition for diabetes</td>
<td>FBG ≥ 126 mg/dl or having history of DM</td>
</tr>
</tbody>
</table>
Data were analyzed using Epi Info 7

<table>
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<td>106</td>
</tr>
<tr>
<td>Total sample size</td>
<td>5300</td>
</tr>
<tr>
<td>Results weighted by</td>
<td>Probability of individual selection</td>
</tr>
<tr>
<td>Response rate</td>
<td>Male: female ratio in Egyptian population</td>
</tr>
</tbody>
</table>
RESULTS

DIABETES

BLOOD SUGAR

COMPICATIONS
## Response Rate

<table>
<thead>
<tr>
<th>Calculated sample size</th>
<th>5300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of participants</td>
<td>5080</td>
</tr>
<tr>
<td>Response rate for step 1: questionnaire</td>
<td>96%</td>
</tr>
<tr>
<td>Response rate for step 2: physical measurements</td>
<td>96%</td>
</tr>
<tr>
<td>Response rate for step 3: biochemical analysis</td>
<td>43%</td>
</tr>
</tbody>
</table>
Prevalence of Diabetes Mellitus in Egypt, STEPwise Survey, Egypt, 2012

- Normal blood glucose: 72.3%
- Diabetes: 17.2%
- Impaired glucose tolerance: 10.5%
Mean fasting blood sugar, 2012

Mean fasting blood sugar 107mg/dl

Blood sugar mg/dl vs. years

- Diabetes
- Impaired glucose tolerance

15-24
25-34
34-44
45-54
55-65

years
Mean fasting blood glucose by gender, 2012

- Diabetes
- Impaired glucose tolerance

Mg/dl

15-24 25-34 34-44 45-54 55-65 years

women
Mean fasting blood glucose by gender, 2012

- **Diabetes**
- **Impaired glucose tolerance**
Prevalence of Diabetes by Age and Gender, Among Adult Egyptians, 2012

Diabetes Prevalence (%) vs. Age (years)

- Male
- Female

Age categories: 15-24, 25-34, 35-44, 45-54, 55-65
Among diabetics,

- 17.2% Diabetics
  - 6.4% Previously diagnosed
  - 10.8% diagnosed during survey
  - 5.3% taking oral medication*
  - 1.5% taking insulin*

* Not mutually excluded
Prevalence of Diabetes Mellitus Risk Factors, Egypt, 2012

- Low level physical activity
- Family history
- Raised blood pressure
- Eating <5 servings fruits/...
- Smoking
- Overweight or obesity

Prevalence (Percent)
Prevalence of DM risk factors by gender, Egypt, 2012

% with 3-5 risk factors

% with 1-2 risk factors

% with 0 risk factors

- Women
- Men
### Health Seeking Behaviour Among Previously Diagnosed Diabetics,

<table>
<thead>
<tr>
<th></th>
<th>During last year</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of diabetics sought medical advice at least once</td>
<td>38%</td>
</tr>
<tr>
<td>Main reason of these visits</td>
<td>Follow up for DM 29%</td>
</tr>
<tr>
<td></td>
<td>Follow up for hypertension 28%</td>
</tr>
<tr>
<td>Had eye examination</td>
<td>1.7%</td>
</tr>
<tr>
<td>Had feet examination</td>
<td>2.6%</td>
</tr>
</tbody>
</table>
Percent of previously diagnosed diabetics, as part of their medical follow up, who ever had

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Had eye examination</td>
<td>63%</td>
</tr>
<tr>
<td>Had feet examination</td>
<td>54%</td>
</tr>
<tr>
<td>Told having eye complications</td>
<td>28%</td>
</tr>
</tbody>
</table>
Percent of diabetics who were advised by a health care worker to modify their life-style

<table>
<thead>
<tr>
<th>Life-style modification advice</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>to have special diet</td>
<td>78.5</td>
</tr>
<tr>
<td>to reduce their weight</td>
<td>58.3</td>
</tr>
<tr>
<td>to do physical exercise</td>
<td>54.8</td>
</tr>
<tr>
<td>to stop smoking</td>
<td>35.7</td>
</tr>
</tbody>
</table>
Seen a traditional healer for diabetes among those previously diagnosed

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Men</th>
<th>Women</th>
<th>Both Sexes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>15-24</td>
<td>0.0</td>
<td>11.5</td>
<td>5.7</td>
</tr>
<tr>
<td>25-34</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>35-44</td>
<td>6.1</td>
<td>5.8</td>
<td>5.9</td>
</tr>
<tr>
<td>45-54</td>
<td>53.2</td>
<td>1.4</td>
<td>27.3</td>
</tr>
<tr>
<td>55-65</td>
<td>10.3</td>
<td>2.7</td>
<td>8.1</td>
</tr>
<tr>
<td>15-65</td>
<td>22.7</td>
<td>2.8</td>
<td>14.6</td>
</tr>
</tbody>
</table>
Currently taking herbal or traditional treatment for diabetes among those previously diagnosed

<table>
<thead>
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<th>Men</th>
<th>Women</th>
<th>Both Sexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>25-34</td>
<td>0.3%</td>
<td>0%</td>
<td>0.2%</td>
</tr>
<tr>
<td>35-44</td>
<td>1.5%</td>
<td>1.0%</td>
<td>1.2%</td>
</tr>
<tr>
<td>45-54</td>
<td>53%</td>
<td>0.7%</td>
<td>27%</td>
</tr>
<tr>
<td>55-65</td>
<td>2.7%</td>
<td>1.4%</td>
<td>2.3%</td>
</tr>
<tr>
<td>15-65</td>
<td>19%</td>
<td>0.9%</td>
<td>11%</td>
</tr>
</tbody>
</table>
CONCLUSION
In Egypt, Diabetes is a swelling health problem

Comparing DM prevalence 2005 VS 2012

- Male: 14% (2005) vs. 21% (2012)
- Female: 18% (2005) vs. 13% (2012)
- Both: 16% (2005) vs. 17% (2012)
DM prevalence by age group
2005 Vs 2012

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2005</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>16.1</td>
<td></td>
</tr>
<tr>
<td>25-34</td>
<td>3.1</td>
<td>8.1</td>
</tr>
<tr>
<td>35-44</td>
<td>13.7</td>
<td>14.2</td>
</tr>
<tr>
<td>45-54</td>
<td>24.6</td>
<td>20.9</td>
</tr>
<tr>
<td>55-65</td>
<td>34.8</td>
<td>34.3</td>
</tr>
</tbody>
</table>
Prevalence of DM in Arab countries

Data obtained from Step wise survey for chronic NCDs and their risk factors
Prevalence(%) of DM in Arab Countries

Data obtained from Step wise survey for chronic NCDs and their risk factors
Conclusion

• Diabetes is a major public health problem in Egypt and prevalence may increase because of high levels of risk factors in Egypt

• Overweight, smoking and low intake of fruits and vegetables are the most common preventable behavioral risk factors for DM in Egypt

• Health-seeking behavior among diabetics is limited in Egypt
RECOMMENDATION
These findings acted as a guide for

- Establishing NCD unit reside in MOHP
- Developing a national strategic plan for combating NCD especially DM and hypertension
- Developing policies and strategies for prevention and control NCD
Based on this survey,

• High level political commitment was ensured,
• Partnership with local and international NGOs was established
• Whole community was mobilized to take steps in fighting NCD...
LIMITATION

DIABETES

BLOOD

SUGAR

COMPLICATIONS

COMBINED-TERM

MEDICAL

CELLS

LIFESTYLE
• Low response rate for biochemical measurement of the survey,
• political and security situation during which survey was conducted, post revolutionary,
THANK YOU.....