A Community-Hospital Collaborative Approach for Diabetes Management in Beijing

BCDS study group
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# Prevalence of Diabetes increasing in China

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample (10 thousand)</th>
<th>Age (years)</th>
<th>DM prevalence (%)</th>
<th>IGT prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980&lt;sup&gt;a&lt;/sup&gt; (LanZhou)</td>
<td>30</td>
<td>-</td>
<td>0.67</td>
<td>-</td>
</tr>
<tr>
<td>1986 (WHO 1985)</td>
<td>10</td>
<td>25-64</td>
<td>1.04</td>
<td>0.68</td>
</tr>
<tr>
<td>1994 (WHO 1985)</td>
<td>21</td>
<td>25-64</td>
<td>2.28</td>
<td>2.12</td>
</tr>
<tr>
<td>2002 (WHO 1999)</td>
<td>10</td>
<td>≥18</td>
<td>Urban 4.5 Rural 1.8</td>
<td>IFG 2.7 1.6</td>
</tr>
<tr>
<td>2007~2008 (WHO 1999)</td>
<td>4.6</td>
<td>≥20</td>
<td>9.7</td>
<td>15.5&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>: fasting plasma glucose ≥130mg/dl, or (and) 2-hour glucose ≥200mg/dl, or (and) meet at least 3 points with OGGT (0′125, 30′190, 60′180, 120′140, 180′125 (mg/dl), Oral Glucose 100g)

<sup>b</sup>: prediabetes, including IFG，IGT，or IFG+IGT

## Diabetes around the world

### Top ten countries/territories for number of people with diabetes (20–79 years), 2015 and 2040

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country/territory</th>
<th>2015</th>
<th>Number of people with diabetes</th>
<th>Rank</th>
<th>Country/territory</th>
<th>2040</th>
<th>Number of people with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>109.6 million [99.6-133.4]</td>
<td></td>
<td>1</td>
<td>China</td>
<td>150.7 million [138.0-179.4]</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>69.2 million [56.2-84.8]</td>
<td></td>
<td>2</td>
<td>India</td>
<td>123.5 million [99.1-150.3]</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>United States of America</td>
<td>29.3 million [27.6-30.9]</td>
<td></td>
<td>3</td>
<td>United States of America</td>
<td>35.1 million [33.0-37.2]</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Brazil</td>
<td>14.3 million [12.9-15.8]</td>
<td></td>
<td>4</td>
<td>Brazil</td>
<td>23.3 million [21.0-25.9]</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Russian Federation</td>
<td>12.1 million [6.2-17.0]</td>
<td></td>
<td>5</td>
<td>Mexico</td>
<td>20.6 million [11.4-24.7]</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mexico</td>
<td>11.5 million [6.2-13.7]</td>
<td></td>
<td>6</td>
<td>Indonesia</td>
<td>16.2 million [14.3-17.7]</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Indonesia</td>
<td>10.0 million [8.7-10.9]</td>
<td></td>
<td>7</td>
<td>Egypt</td>
<td>15.1 million [7.3-17.3]</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Egypt</td>
<td>7.8 million [3.8-9.0]</td>
<td></td>
<td>8</td>
<td>Pakistan</td>
<td>14.4 million [10.6-20.4]</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Bangladesh</td>
<td>7.1 million [5.3-12.0]</td>
<td></td>
<td>10</td>
<td>Russian Federation</td>
<td>12.4 million [6.4-17.1]</td>
<td></td>
</tr>
</tbody>
</table>

Background and Purpose

A Community-Hospital Collaborative Approach

- the global epicenter (diabetes epidemic)
- “poor control” for diabetes (2.7%)
- poor compliance of patients
- GPs from the local community remain a relatively untapped pool of resources
Beijing Community Diabetes Study (BCDS)

2008.7~

n=4800

5 urban districts

25 communities
Collaborative team

● Experts Panel: 15 Specialists
  (Endocrinology, Cardiology, Ophthalmology, General Practice, Nutrition, Epidemiology and Medical Statistics.)

● 15 diabetologists/endocrinologists
  each certain specialist was responsible for certain communities.

● 150 GPs from 25 community centers

● A supervision team
  (four trained experts)
Intervention and the scheduled follow-up

- Personal lifestyle education
  (group classes, individual interviews)

- Peer Support Groups

- Management adjustment strategies on guidelines

- Scheduled follow-up and Study Testing
  Monthly interview
  Scheduled testing appointment:
  Questionnaire; Records of SMBG; exercise and diet records; Physical examination;
  Laboratory measurements (HbA1c was measured at least every six months); ECG;
  Fundus examination (once a year).

- CRF record and data upload
Training program for community GPs

● **Group training class**  
  (application of agreed guidelines; a detailed curriculum with a fixed class schedule)

● **Interactive workshops**  
  (case discussion monthly)

● **Specialist outpatient services in the community**  
  (once a week during the whole period)

● **Cooperation**  
  (Each specialist will supervise a fixed number of GPs, who are in turn responsible for a fixed number of patients. A computer network facilitates the rapid flow of information and feedback from specialists to GPs and patients.)
Treatment algorithm for people with type 2 diabetes
(blood pressure control, lipid modifying therapy and anti-platelet therapy)

China Society of Diabetes, China Guideline for Type 2 Diabetes (2010)
Online data platform and data upload

evaluation

• **Primary outcomes**
  the percentage of patients reaching target control
  (glycaemia, blood pressure and lipid)

• **Secondary outcomes**
  Incidence and progress of diabetic microvascular complications
  (diabetic retinopathy and albuminuria)

• **Other outcomes**
  Major vascular events
  (cardiovascular death; myocardial infarction; or stroke)
  All-cause mortality
  self-efficacy: activity, diet, self-monitoring, perceptions and knowledge
  (validated questionnaires and records)
Changes of the mean HbA1c level over 7 years for the overall sample

n=4248
Percentage of patients who met HbA1c<7.0% over 7 years

- 2008: 54.4%
- 2011: 63.5%
- 2013: 70.3%
- 2014: 69.9%
- 2015: 67.8%
the rate of optimal control
(who met all the HbA1c, BP, and LDL-C target values)

HbA1c<7.0%
BP<130/80mmHg
LDL-c<2.6mmol/L

N=4248

vs 2009, *P<0.05
Aim: To examine the influence of educational attainment on long-term glucose control and outcome events.

Educational attainment

- low (illiteracy or elementary school)
- medium (middle school)
- high (college or academic degree)
End Events

- **macrovascular complications** (such as myocardial infarction, heart failure, cerebral infarction and stroke)

- **newly-diagnosed microalbuminuria, aggravation of diabetic nephropathy** (clinical grade proteinuria or a twofold plasma creatinine increase or renal replacement therapy)

- **malignant tumors**
FPG and HbA1c in the different educational attainment groups during the 42 months intervention
Cox regression analysis for outcome events in various education attainment groups during 42-month intervention.
Sub-group analysis

**summary**

- Educational level was associated with long-term glucose control, and seemed to be related to the incidence of combined morbid events in people with type 2 diabetes.

- Extra care may be necessary when treating diabetic patients with low educational attainment.
CVD took up to 44.9% of all end events (327/729)

(updated by 11/06/2015)

<table>
<thead>
<tr>
<th>Coronary heart disease</th>
<th>number</th>
<th>Cerebral vascular Disease</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarction</td>
<td>53</td>
<td>cerebral infarction</td>
<td>94</td>
</tr>
<tr>
<td>Coronary Stent/CABG</td>
<td>16</td>
<td>stroke</td>
<td>30</td>
</tr>
<tr>
<td>Unstable angina</td>
<td>93</td>
<td>TIA</td>
<td>23</td>
</tr>
<tr>
<td>Heart failure</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>Total</td>
<td>147</td>
</tr>
</tbody>
</table>
Cum Hazard of CVD in different groups

P = 0.009
Number of Outpatients in Xinjiekou Community during 2012-2014
Publications
summary

• **Community based Collaborative Approach**
  - Collaborative team
  - Multiple centers
  - more than 4000 patients
  - Longitudinal, 7 years
  - Lower cost
  - Strict supervision system

• **Meaningful effects**
  - Optimal target control
  - GPs obviously improved their knowledge and skills
  - guidelines implementation
  - outpatient services increase
  - self-management of patients
This ongoing project:

- next 3 years follow-up study
- Optimal target control
- CVD risk analysis
- Cost-Effectiveness evaluation

The project has been supporting by

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Prof. Mingxia Yuan
Prof. Guangran Yang
Dr. Gang Wan
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TEAM - Together Everyone Achieves More