Health outcomes & research objectives in (cross-cultural) international research

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www.worldmapper.org; cartogram algorithm: Mark Newman
Translation and exchange

- Between settings
- Between populations
- Between cultures and/or countries...
What is Behavioral Medicine?

... an interdisciplinary field concerned with the development and integration of socio-cultural, psychosocial, behavioral and biomedical knowledge relevant to physical health and illness and the application of this knowledge to disease prevention, health promotion, etiology, diagnosis, treatment and rehabilitation.

Yale Conference, Schwartz, and Weiss, 1978
Disciplines/domains/fields contributing to the field of behavioral medicine

- Anthropology
- Dentistry
- Endocrinology
- Epidemiology
- Health Education/Promotion
- Immunology
- Medicine
- Nursing
- Economics and policy sciences

- Nutrition
- Pharmacology
- (Psycho)Physiology
- (Health) Psychology
- Public Health
- Social Work
- Social sciences
- Other clinical health sciences
Summary

1. Causation and influences on health and outcomes of interest
2. Trends in health risks and outcomes
3. Prevention and control of T2DM – what do we know?
4. Translation/exchange of evidence base
1. The web of causation...and choosing the correct lens to look thru.
A Familiar World Map

www.worldmapper.org; cartogram algorithm: Mark Newman
Area Proportional to Population

[Map showing area proportional to population]

www.worldmapper.org; cartogram algorithm: Mark Newman
Area Proportional to GDP 2002

www.worldmapper.org; cartogram algorithm: Mark Newman
Area Proportional to HIV (prevalence ages 15 – 49)

www.worldmapper.org; cartogram algorithm: Mark Newman
Causes of chronic diseases

UNDERLYING
SOCIOECONOMIC,
CULTURAL, POLITICAL
AND ENVIRONMENTAL
DETERMINANTS
- Globalization
- Urbanization
- Population ageing

COMMON MODIFIABLE
RISK FACTORS
- Unhealthy diet
- Physical inactivity
- Tobacco use

NON-MODIFIABLE
RISK FACTORS
- Age
- Heredity

INTERMEDIATE RISK
FACTORS
- Raised blood pressure
- Raised blood glucose
- Abnormal blood lipids
- Overweight/obesity

MAIN CHRONIC
DISEASES
- Heart disease
- Stroke
- Cancer
- Chronic respiratory
diseases
- Diabetes
Links between social structure, health & disease

Social structure and the global world

Material factors

Work

Social environment

Psychological

Health behaviours

Brain

Neuroendocrine and immune response

Pathophysiological changes

Organ impairment

Well-being

Morbidity

Mortality

Early life

Genes

Culture

Source: WHO Commission on Social Determinants of Health 2005
Alternative disciplinary lenses for factors influencing health outcome

THE BIOMEDICAL LENS

Responses
- Physical
- Biology
- Genetics

Outcomes
- Morbidity
- Mortality
- Health-Related Quality of Life
Alternative disciplinary lenses for factors influencing health outcome

THE PSYCHOSOCIAL LENS

Relative Risks
- Coping repertoires
- Self-efficacy
- Personality Influences

Responses
- Physical
- Biology
- Genetics

Outcomes
- Morbidity
- Mortality
- Health-Related Quality of Life

THE BIOMEDICAL LENS
Alternative disciplinary lenses for factors influencing health outcome

THE BIOMEDICAL LENS
- Physical Exposures
- Economic Exposures
- Social Exposures

THE PSYCHOSOCIAL LENS
- Coping repertoires
- Self-efficacy
- Personality Structures

THE PUBLIC HEALTH LENS
- Physical
- Biology
- Genetics
- Morbidity
- Mortality
- Health-Related Quality of Life

Alternative disciplinary lenses for factors influencing health outcome

Coping repertoires
Self-efficacy
Personality Structures

Physical
Biology
Genetics
Morbidity
Mortality
Health-Related Quality of Life

THE PUBLIC HEALTH LENS
2. Health trends and epidemiologic transitions between countries and regions
Deaths in the world by “cause” – the double burden (2002)

Noncommunicable diseases:
- Heart disease 30.2%
- Cancer 15.7%
- Diabetes 1.9%
- Other chronic diseases 15.7%

Infectious diseases:
- HIV/AIDS 4.9%
- Tuberculosis 2.4%
- Malaria 1.5%
- Other Infectious Diseases 20.9%
- Injuries 9.3%

Total: 58.0M

(WHO, 2005)
# Deaths in the world by “cause” (2004-2030)

<table>
<thead>
<tr>
<th>Disease or injury</th>
<th>Deaths (%)</th>
<th>Rank</th>
<th>Disease or injury</th>
<th>Deaths (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischaemic heart disease</td>
<td>12.2</td>
<td>1</td>
<td>Ischaemic heart disease</td>
<td>14.2</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>9.7</td>
<td>2</td>
<td>Cerebrovascular disease</td>
<td>12.1</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>7.0</td>
<td>3</td>
<td>Chronic obstructive pulmonary disease</td>
<td>8.6</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>5.1</td>
<td>4</td>
<td>Lower respiratory infections</td>
<td>3.8</td>
</tr>
<tr>
<td>Diarrhoeal diseases</td>
<td>3.6</td>
<td>5</td>
<td>Road traffic accidents</td>
<td>5.0</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>3.5</td>
<td>6</td>
<td>Trachea, bronchus, lung cancers</td>
<td>3.4</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>2.5</td>
<td>7</td>
<td>Diabetes mellitus</td>
<td>3.3</td>
</tr>
<tr>
<td>Trachea, bronchus, lung cancers</td>
<td>2.3</td>
<td>8</td>
<td>Hypertensive heart disease</td>
<td>2.1</td>
</tr>
<tr>
<td>Road traffic accidents</td>
<td>2.2</td>
<td>9</td>
<td>Stomach cancer</td>
<td>1.9</td>
</tr>
<tr>
<td>Prematurity and low birth weight</td>
<td>2.0</td>
<td>10</td>
<td>HIV/AIDS</td>
<td>1.8</td>
</tr>
<tr>
<td>Neonatal infections and other*</td>
<td>1.9</td>
<td>11</td>
<td>Nephritis and nephrosis</td>
<td>1.6</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1.9</td>
<td>12</td>
<td>Self-inflicted injuries</td>
<td>1.5</td>
</tr>
<tr>
<td>Malaria</td>
<td>1.7</td>
<td>13</td>
<td>Liver cancer</td>
<td>1.4</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>1.7</td>
<td>14</td>
<td>Colon and rectum cancers</td>
<td>1.4</td>
</tr>
<tr>
<td>Birth asphyxia and birth trauma</td>
<td>1.5</td>
<td>15</td>
<td>Oesophagus cancer</td>
<td>1.3</td>
</tr>
<tr>
<td>Self-inflicted injuries</td>
<td>1.4</td>
<td>16</td>
<td>Violence</td>
<td>1.2</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>1.4</td>
<td>17</td>
<td>Alzheimer and other dementias</td>
<td>1.2</td>
</tr>
<tr>
<td>Cirrhosis of the liver</td>
<td>1.3</td>
<td>18</td>
<td>Cirrhosis of the liver</td>
<td>1.2</td>
</tr>
<tr>
<td>Nephritis and nephrosis</td>
<td>1.3</td>
<td>19</td>
<td>Breast cancer</td>
<td>1.1</td>
</tr>
<tr>
<td>Colon and rectum cancers</td>
<td>1.1</td>
<td>20</td>
<td>Tuberculosis</td>
<td>1.0</td>
</tr>
<tr>
<td>Violence</td>
<td>1.0</td>
<td>21</td>
<td>Neonatal infections and other*</td>
<td>1.0</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>0.9</td>
<td>22</td>
<td>Prematurity and low birth weight</td>
<td>0.9</td>
</tr>
<tr>
<td>Oesophagus cancer</td>
<td>0.9</td>
<td>23</td>
<td>Diarrhoeal diseases</td>
<td>0.9</td>
</tr>
<tr>
<td>Alzheimer and other dementias</td>
<td>0.8</td>
<td>24</td>
<td>Birth asphyxia and birth trauma</td>
<td>0.7</td>
</tr>
</tbody>
</table>

*(WHO, 2008)*
Disease Burden Distribution by Select World Bank Region, 2001

Note: Numbers are rounded.

Source: Disease Control Priorities in Developing Countries, second edition, 2006, Table 4.1
Disease Burden Distribution by Select World Bank Region, 2001

Note: Numbers are rounded.

Source: Disease Control Priorities in Developing Countries, second edition, 2006, Table 4.1
### Noncommunicable diseases (2005-2015)

<table>
<thead>
<tr>
<th>Geographical regions (WHO classification)</th>
<th>Total deaths (millions)</th>
<th>NCD deaths (millions)</th>
<th>NCD deaths (millions)</th>
<th>Trend: Death from infectious disease</th>
<th>Trend: Death from NCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>10.8</td>
<td>2.5</td>
<td>28</td>
<td>+6%</td>
<td>+27%</td>
</tr>
<tr>
<td>Americas</td>
<td>6.2</td>
<td>4.8</td>
<td>53</td>
<td>-8%</td>
<td>+17%</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>4.3</td>
<td>2.2</td>
<td>25</td>
<td>-10%</td>
<td>+25%</td>
</tr>
<tr>
<td>Europe</td>
<td>9.8</td>
<td>8.5</td>
<td>88</td>
<td>+7%</td>
<td>+4%</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>14.7</td>
<td>8.0</td>
<td>89</td>
<td>-16%</td>
<td>+21%</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>12.4</td>
<td>9.7</td>
<td>105</td>
<td>+1</td>
<td>+20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>58.2</td>
<td>35.7</td>
<td>388</td>
<td>-3%</td>
<td>+17%</td>
</tr>
</tbody>
</table>

WHO projects that over the next 10 years, the largest increase in deaths from cardiovascular disease, cancer, respiratory disease and diabetes will occur in Africa, the Middle East and Asia

(WHO, 2005)
Trends across SE Asia and South Asia
Age-standardized disability adjusted life years (DALYs) per 100,000 by “causes” in year 2002

<table>
<thead>
<tr>
<th>Cause</th>
<th>India</th>
<th>Malaysia</th>
<th>Sri Lanka</th>
<th>Thailand</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicable diseases (all)</td>
<td>11,279</td>
<td>2,779</td>
<td>2,889</td>
<td>5,939</td>
<td>5,126</td>
</tr>
<tr>
<td>Injuries (all)</td>
<td>3,626</td>
<td>1,489</td>
<td>2,371</td>
<td>2,559</td>
<td>2,040</td>
</tr>
<tr>
<td>Non-communicable diseases (all)</td>
<td>12,632</td>
<td>11,209</td>
<td>12,857</td>
<td>11,682</td>
<td>10,141</td>
</tr>
<tr>
<td><strong>Cardiovascular diseases</strong></td>
<td>3,284</td>
<td>1,797</td>
<td>2,056</td>
<td>1,569</td>
<td>2,036</td>
</tr>
<tr>
<td><strong>Respiratory diseases</strong></td>
<td>1,132</td>
<td>688</td>
<td>1,188</td>
<td>717</td>
<td>795</td>
</tr>
<tr>
<td><strong>Malignant neoplasms</strong></td>
<td>942</td>
<td>1,127</td>
<td>1,080</td>
<td>1,192</td>
<td>1,027</td>
</tr>
</tbody>
</table>

## Diabetes Prevalence in Kerala and China

<table>
<thead>
<tr>
<th>Age group</th>
<th>Kerala, India ¹</th>
<th>China ²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>20-29</td>
<td>0.0</td>
<td>3.7</td>
</tr>
<tr>
<td>30-39</td>
<td>7.9</td>
<td>10.4</td>
</tr>
<tr>
<td>40-49</td>
<td>16.0</td>
<td>17.9</td>
</tr>
<tr>
<td>50-59</td>
<td>26.1</td>
<td>40.6</td>
</tr>
<tr>
<td>60-69</td>
<td>35.1</td>
<td>41.0</td>
</tr>
<tr>
<td>70+</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.6</strong></td>
<td><strong>19.4</strong></td>
</tr>
</tbody>
</table>

3. Prevention of Type 2 Diabetes and its Complications in Developing Countries – the urgent need for more evidence development
Diabetes as a problem

- Diabetes is the fourth leading cause of disease-related death.

- Over 285 million people worldwide are affected by type 2 diabetes (T2DM) and this is estimated to increase to 438 million by 2030.

- Over 70% of people with T2DM live in developing countries but 80% of the world’s diabetes care-related expenditure occurs in developed countries.
What do we know about control and prevention?

- Studies in developed populations have demonstrated that non-pharmacological interventions can be effective in reducing the risk of developing T2DM – **PREVENTION**

- Lifestyle interventions have also been shown to be effective in reducing glycemic levels in people with T2DM, which can lead to a reduction or delay in diabetes complications – **CONTROL**

- Despite the evidence in developed countries, the translation of these programs to developing countries still presents a significant challenge

- There is an urgent need for the development, implementation and evaluation of programs to prevent T2DM and its complications in LMICs.
Review of trial evidence from LMIC

- To review the study characteristics, efficacy and cost-effectiveness of non-pharmacological interventions aimed at preventing T2DM and its related complications in developing countries.
9 publications from 7 studies were included in the review.

Main findings of each study were divided into four sub-sections:
- Sample characteristics,
- Intervention or program characteristics,
- Effectiveness of the program,
- Cost–effectiveness.
## Results

<table>
<thead>
<tr>
<th>Study Type</th>
<th>Prevention of T2DM</th>
<th>Prevention of Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Studies found</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Study Design</td>
<td>2 RCT, 1 community-based</td>
<td>All RCT</td>
</tr>
<tr>
<td>Duration of studies</td>
<td>7 mths – 6 years</td>
<td>3 – 6 mths</td>
</tr>
<tr>
<td>Number of participants</td>
<td>532 – 703</td>
<td>34 – 150</td>
</tr>
</tbody>
</table>
Prevention of T2DM in developing countries (1)

- Studies have been done in China (1997) and India (2006 and 2008)

- All studies showed significant reductions in the development of T2DM in the intervention group compared with controls

- Interventions involved small group or individual counselling sessions aimed at improving exercise and/or diet modification
Prevention of complications in developing countries (2)

- Interventions were conducted in China (2008), Thailand (2007) and Korea (2007 & 2008)

- Each program reduced HbA1c levels and risk factors for coronary heart disease in intervention groups

- Interventions included diabetes management/lifestyle modification, or diabetes education and were delivered by nutritionists or nurses.
Limitations of T2DM prevention studies (1)

- Use of expensive screening methods

- In one Indian study, only 1/5 of participants were female, yet the number of males and females in India with T2DM are comparable

- Indian study also included a sample from a middle class working people in an urban setting without including people from rural areas

- Cost and cost–effectiveness of programs rarely reported
Limitations of complication prevention studies (2)

- Short follow-up periods (3–6 months)

- One study had a large discrepancy between the number of participants in the control and intervention groups

- 2 studies had sample sizes that were too small to reliably establish intervention effects
Despite the escalating burden of T2DM in developing countries, the current evidence concerning the prevention of T2DM and its complications in these countries is limited.

Urgent need to stem the growing epidemic of T2DM

Significant primary prevention effort is needed, with the use of low-cost behavioral medicine and related approaches to screen and identify high-risk individuals.

Development, implementation and evaluation of community-based programs that are culturally relevant and cost-effective is urgently needed.
4. Translation and exchange

- Between settings
- Between populations
- Between cultures and/or countries...
Case example - The “spread”/translation of diabetes prevention programs from Finland to Australia

1. Diabetes Prevention Study (DPS in Finland)

2. GOAL program (Finland)

3. Diabetes Prevention Program (DPP in Australia)

4. Life! Program (Australia)

5. The rest of the world (Malaysia, China, India, South Africa etc)
From basic research to practice

Randomized, controlled trials: Efficacy of lifestyle modification
Tuomilehto et al., 2001

Population-based risk factor studies

Applying behavioral sciences to lifestyle change

Feasibility of method
Implementation trials: Effectiveness and feasibility of lifestyle counselling
Absetz ym., 2007

Implementation trial: Guidelines for CVD prevention
Kuronen et al., 2006

Adaptability
Organizational changes

Quality control

Systemicity
Maintenance: Processes and infrastructure for prevention
Absetz & Patja (eds.), 2008

How to change the behaviors? Does it work in routine care?

How to identify target group and maximize reach? How to organize follow-up?

How to support maintenance and fidelity of the programs and support professional development?
Translation and exchange

- More focus needed on LMICs

- How to build, develop and sustain international research collaboration in LMICs?
  - Can give examples later on
Thank you