Implementation of evidence into practice in low and middle income country settings

David Peiris
Head Primary Health Care Research
dpeiris@georgeinstitute.org
KDIGO LMICs Implementation Conference
Bangkok, June, 2015
How do we provide healthcare to 7B people?
5B have no reliable access to essential care

Half will develop a serious disease before age 60
Numbers at high-risk of cardiovascular disease*

80 million

250 million

*20% ten-year risk of myocardial infarction or death from CVD
Spending on cardiovascular & diabetes disease drugs

$100 billion
80 million
250 million
<$20 billion

*20% ten-year risk of myocardial infarction or death from CVD

Legend:
- AfrD
- AfrE
- AmrA
- AmrB
- AmrD
- EmrB
- EmrD
- EurA
- EurB
- EurC
- SearB
- SearD
- WprA
- WprB
Doctors per 10,000 population

World Health Statistics. World Health Organization, 2009
Secondary prevention of acute coronary syndrome and stroke

PURE Study

Most people in the world with serious cardiovascular disease receive no treatment whatsoever.
Talk outline

1. What is implementation research

2. mHealth as a health systems strategy to implement evidence into practice

3. Case Study - SMARThealth India
Implementation research definition

Implementation research is the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services.

It includes the study of influences on healthcare professional and organizational behaviour.

(Eccles/Mittman, 2006)
Implementation research goals (Mittman 2010)

1. Develop reliable strategies for increasing use of evidence based/effective services to improve outcomes; facilitate widespread adoption (scale-up/spread) of these strategies

2. Produce generalisable knowledge and increased understanding of implementation processes, barriers, facilitators, strategies

3. Develop, test and refine implementation theories and hypotheses; methods and measures
Implementation pipeline - Mittman 2012
Implementation of change model -
Grol and Wensing 2013

Planning and organisation of change

New scientific information,
systematic reviews, guidelines

Problems identified, best practices in improving care

1. Development of proposal for change
2. Analysis of actual performance,
targets for change
3. Problem analysis of target group
   and setting
4. Development and selection of
   strategies and measures to change practice
5. Development, testing and
   execution of implementation plan
6. Integration of changes in routine care
7. Continuous evaluation and
   (where necessary) adapting plan

Selection of appropriate theoies to inform change

Indicator development project
Problem analysis study
Local/ pilot project
Effectiveness study of implementation strategy
Process evaluation and economic evaluation study
Large scale implementation study-
nationwide roll out
COM-B Model

- **Capability**: Psychological or physical ability to enact the behaviour.
- **Motivation**: Reflective and automatic mechanisms that activate or inhibit behaviour.
- **Opportunity**: Physical and social environment that enables the behaviour.

*Michie et al (2011) Implementation Science*
Behaviour Change Wheel

Sociocultural Influences
Environmental Context and Resources
Social/Professional Role and Identity
Beliefs about Capabilities
Optimism
Intentions
Goals
Beliefs about Consequences
Reinforcement
Emotion
Knowledge
Cognitive and Interpersonal Skills
Memory, Attention and Decision Processes
Behavioural Regulation
Physical Skills

Michie et al. Imp Sci 2011
Talk outline

1. What is implementation research

2. mHealth as a health systems strategy to implement evidence into practice

3. Case Study - SMARThealth India
Cardiovascular disease

- Re-engineer the workforce
- Evidence based care supported by low-cost technologies
- Patient-centred approaches
- Systems solutions such as low-cost drugs
mHealth is multi-dimensional

12 common mHealth applications

1. Client education & behaviour changes
2. Sensors and point-of-care diagnostics
3. Registries / vital events tracking
4. Data collection and reporting
5. Electronic health records
6. Electronic decision support
7. Provider-provider communication
8. Provider work-planning & scheduling
9. Provider training & education
10. Human resource management
11. Supply chain management
12. Financial transactions and incentives
Use of mHealth Systems and Tools for Non-Communicable Diseases in Low- and Middle-Income Countries: a Systematic Review

David Peiris, Devarsetty Praveen, Claire Johnson, Kishor Mogulluru

Abstract

With the rapid adoption of mobile devices, mobile health (mHealth) offers the potential to transform health care delivery, especially in the world’s poorest regions. We systematically reviewed the literature to determine the impact of mHealth interventions on health care quality for non-communicable diseases in low- and middle-income countries and to identify knowledge gaps in this rapidly evolving field. Overall, we found few high-quality studies. Most studies narrowly focused on text messaging systems for patient behavior change, and few studies examined the health systems strengthening aspects of mHealth. There were limited literature reporting clinical effectiveness, costs, and patient acceptability, and none reporting equity and safety issues. Despite the bold promise of mHealth to improve health care, much remains unknown about whether and how this will be fulfilled. Encouragingly, we identified some registered clinical trial protocols of large-scale, multidimensional mHealth interventions, suggesting that the current limited evidence base will expand in coming years.
Talk outline

1. What is implementation research

2. mHealth as a health systems strategy to implement evidence into practice

3. Case Study – SMARThealth India
Research Projects

**AUSTRALIA**
- TORPEDO 60 service c-RCT, 50,000 people, NHMRC/ NSW Health
- CONNECT 2000 person RCT, NHMRC
- INTEGRATE c-RCT, 70 services

**CHINA**
- SIMCard- Tibet/ North India, 1000 person RCT, NHLBI
- SMARTDiabetes, 80 communities, 2000 person c-RCT, NHMRC GACD/ Qualcomm

**INDIA**
- SMARThealth India 54 village c-RCT, 15000 people, NHMRC GACD
- SMART Mental Health pilot project rural India, Wellcome-DBT

**Iran**
- SUPPORT-CVD MRC/ UKAid/ Wellcome

**Iraq**
Identification of high-risk individuals by community health workers

Percent identified

Physician: 51
Healthworker: 63

+12
Agreement between health workers and physicians regarding treatment of patients with coronary heart disease

Percent agreement

ACE-inhibitor: 92%
Beta-blocker: 90%
Statin: 94%
Aspirin: 95%

JACC 2012; 59:1188–96
SMARThealth workflow

1: Household CVD risk factor screening/ BP measurement

2: Community worker enters risk factor information into smartphone.

3: Point of care decision support provided to community worker and advice given to patient. High risk individuals advised to visit PHC clinic

4: Consented data from high risk individuals is uploaded to a secure health record

5: PHC physician reviews data for referred high risk individuals

6: Decision support is provided to PHC physician. Advice and treatment given to patient. Follow up care plan sent to community worker’s tablet device

7: Voice message sent to patient for advice on adherence and follow-up visits

8: Community worker provides follow-up care

Open source record system with secure data storage

GPRS/3G
Patient ID: 1001000501
Consent Number: 36363
Given name: GOLLAYYA
Surname: KADALI
Contact Number: 9912621038
Address: Jan_29
Gender: Male
Birthday: 1/2/1954
Age: 60

The phone I am using is shared
Check if unsure of dd/mm of birth
I have verified all fields

Back | Next
Patient Summary: 60 years, Male, Non-Smoker, Non-diabetic

High CVD risk

What If

Recommendations

- Smoking
  Advise on healthy diet (low sat/fat, plenty of fruit/vegetables)

- Nutrition
  Encourage physical activity every day

- Physical activity
  Limit alcohol intake to 2 drinks/day (if drinking)

Next Visit
# Referral Card

<table>
<thead>
<tr>
<th>Referral number</th>
<th>SCAN Ref-Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>1001000501</td>
</tr>
<tr>
<td>Name</td>
<td>KADALI GOLLAYA</td>
</tr>
<tr>
<td>Age</td>
<td>60</td>
</tr>
<tr>
<td>Contact Number</td>
<td>9912621038</td>
</tr>
<tr>
<td>Village</td>
<td>village 1</td>
</tr>
<tr>
<td>AR Score</td>
<td>7</td>
</tr>
<tr>
<td>ASHA</td>
<td>asha asha</td>
</tr>
</tbody>
</table>

**OK**
SMART Health India - Pilot Study:

Objectives:
• To develop and validate a decision support system for CVD risk assessment and management
• To field test this system with a purposive sample

Implementation:
• 11 villages, 11 ASHA’s, 3 PHC doctors
• 260 consenting participants
Follow-up of patients

Patients screened: 227 patients

CVD High risk and requiring treatment:
- Yes: 82 (36%)
- No: 53 (65%)

Visit to a doctor:
- Yes: 29 (35%)
- No: 53 (65%)

Type of doctor:
- Govt PHC: 18 (62%)
  - Yes: 15 (83%)
  - No: 3 (17%)
- Pvt Pract: 11 (38%)
  - Yes: 11 (100%)
  - No: 8 (73%)

BP Medication initiated:
- Yes: 15 (83%)
- No: 3 (17%)

Currently on BP medication (after 3 months):
- Yes: 7 (47%)
- No: 11 (53%)
COM-B Model

- **Capability**: Psychological or physical ability to enact the behaviour
- **Motivation**: Reflective and automatic mechanisms that activate or inhibit behaviour
- **Opportunity**: Physical and social environment that enables the behaviour

*Mitchie et al (2011) Implementation Science*
Promoters of behaviour change

- ASHA role transformation
- Increased knowledge & skills
- Better healthcare navigation
- Useful tools and technology
- Useful tools and technology
- Better healthcare navigation
- Increased knowledge & skills
- ASHA role transformation

Obstacles to behaviour change

- ASHA role conflict with other staff
- Poor access to doctors
- Restrictive workforce entitlements
- Poor access to medicines
- Motivation
- Capability
- Opportunity

KDIGO
Pilot key messages

- A tablet based CDSS, implemented within the PHC system, has potential to contribute to improved CVD outcomes in India
- Screening and identification of risk in the village by ASHAs is highly feasible
- Access to doctors and medicines are major systematic barriers
- Adherence to recommended treatments once initiated is also a major barrier
Decision support

Risk communication

Multimedia resources

Recall & reminder system

Interactive Voice Response

Workshop training

Virtual training platform

Remuneration incentives

Government support

PHC medication supply

Remuneration incentives
Research

18 PHCs, 54 village trial in rural Andhra Pradesh, India
3 year stepped wedge cluster RCT study design

Population: All people identified at high CVD risk (>30% 10 year risk or existing CVD diagnosis) (approx. 10,000 people)

Intervention: HealthTracker system + workforce training and field support to CHWs and Doctors

Comparator: Usual care

Outcomes: Primary: % attaining SBP <140mmHg
Secondary: Mean SBP reduction, change in other CVD risk factors, Quality of Life, CVD events, process outcomes (eg. referrals to doctor)

Funding: National Health & Medical Council, Australia- Global Alliance for Chronic Diseases. Expected completion 2015
### Study design:

<table>
<thead>
<tr>
<th>Number</th>
<th>Time Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Month 0-6</td>
</tr>
<tr>
<td>6 PHCs (18 villages)</td>
<td>CONTROL</td>
</tr>
<tr>
<td>6 PHCs (18 villages)</td>
<td>CONTROL</td>
</tr>
<tr>
<td>6 PHCs (18 villages)</td>
<td>CONTROL</td>
</tr>
</tbody>
</table>
### Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>Total (n= 62,194)</th>
<th>Male (n= 29,097)</th>
<th>Female (n= 33,097)</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Average age (years)</td>
<td>54.1</td>
<td>54.9</td>
<td>53.4</td>
</tr>
<tr>
<td>Gender (%)</td>
<td>47%</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>No schooling (%)</td>
<td>44%</td>
<td>38%</td>
<td>49%</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labourer</td>
<td>39%</td>
<td>56%</td>
<td>25%</td>
</tr>
<tr>
<td>Home duties</td>
<td>30%</td>
<td>2%</td>
<td>56%</td>
</tr>
<tr>
<td>Current smoker/ tobacco</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chewing (%)</td>
<td>21.9</td>
<td>41</td>
<td>5.1</td>
</tr>
<tr>
<td>Self reported diabetes</td>
<td>11.6</td>
<td>11.3</td>
<td>11.9</td>
</tr>
<tr>
<td>Mean SBP (mmHg)</td>
<td>126</td>
<td>124</td>
<td>128</td>
</tr>
<tr>
<td>Mean DBP (mmHg)</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>
### Comparison with 2005 APRHI study

<table>
<thead>
<tr>
<th></th>
<th>APRHI (2005) n=3333</th>
<th>SH (2014) n=62194</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SE/weighted %</td>
<td>SE/weighted %</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>29.6</td>
<td>29.9</td>
</tr>
<tr>
<td>BP lowering treatment (%)</td>
<td>16.7</td>
<td>19.7</td>
</tr>
<tr>
<td>Systolic BP, mean (mmHg)</td>
<td>128</td>
<td>126</td>
</tr>
<tr>
<td>Diastolic BP, mean (mmHg)</td>
<td>78</td>
<td>79.5</td>
</tr>
<tr>
<td>Fasting glucose, mean (mg/dl)</td>
<td>108.2</td>
<td>120.6</td>
</tr>
<tr>
<td>Random glucose, mean (mg/dl)</td>
<td>N/A</td>
<td>147.9</td>
</tr>
<tr>
<td>Suspected diabetes (%)</td>
<td>17.7</td>
<td>18.1</td>
</tr>
<tr>
<td>Current smoking (%)</td>
<td>29.5</td>
<td>25.4</td>
</tr>
<tr>
<td>History of MI/Angina (%)</td>
<td>5.9</td>
<td>2.3</td>
</tr>
<tr>
<td>History of Stroke (%)</td>
<td>2.6</td>
<td>1.7</td>
</tr>
</tbody>
</table>
BP treatment according to risk status at baseline

Total sample n=62194

- **High risk**
  - n=10532 (17%)
  - 45%

- **Moderate risk**
  - n=3386 (5%)
  - 38%

- **Low risk**
  - n=48276 (78%)
  - 13%
What I have learnt so far……

Find a theoretical framework!

Do observational studies to understand barriers/ enablers

Go back to theory to determine the relationship between proposed interventions and barriers/enablers

Do pilot implementation studies to test your assumptions

Large scale controlled trials of complex interventions are needed

Process and economic evaluations are key to scale up