Mobile health and health behavior change: cultural adaptation and clinical application in low resource settings.

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mHealth in low resource settings

• mHealth has proven itself in many fields as being a viable alternative method of delivery
• Very little is written about the large scale implementation of mHealth
  • Particularly in low resource settings or targeting those who need it most
  • Even though mobile phones are our most ubiquitous communications delivery method in those settings
• Need to share lessons to avoid repeating issues each time
• Need for a consistent way to measure impact in the real world for decision makers, for comparison, and for improvement
Global ICT developments, 2001-2017*

Note: * Estimate
Source: ITU World Telecommunication /ICT indicators database
mCessation
2018 Review of mCessation BHBM

• Costa Rica
  • MoH – shifting priorities affected promotion
  • Local provider for technology, technology issues early, only works with one telco provider
  • Innovative financing model using tobacco taxes
  • Want it more personalised & WhatsApp

• The Philippines
  • MoH, integrated with national quitline
  • Change of staff in MoH and local WHO
  • Technology issues led to low registrations

• Tunisia
  • World Diabetes Foundation & MoH
  • Technology capacity building to support programme an issue
Early lessons

- Promotion vitally important
- Ease of use, particularly registration, and free
- Technology critical
- Broad & high level support
TextMATCH
(Text Messaging for MATernal and Child Health)

A FREE text messaging programme to support pregnant women and their families with information about eating well and being active.

HBHF Consortium:
• 11% of children (aged 2–14 years) were obese
  • A further 21% were children were overweight but not obese
  • 15% of Māori children were obese
  • 30% of Pacific children were obese
• Children living in the most deprived areas are 3 times as likely to be obese those living in the least deprived areas
• The child obesity rate is increasing
  • 8% in 2006/07 to 11% in 2014/15
Development process

Direction (Roopu Kaitiaki) → Focus groups → Develop Key Messages → Adapt for SMS

Cultural review → Cultural Adaptation → Expert review – external → Expert Review – TAG

Translations → Review → Testing → Roll out
Focus groups

• Views of pregnancy and nutrition during pregnancy heavily influenced by culture and tradition
• Translations needed for Chinese and Korean
• Pacific and South Asian wanted messages in English
• Asian group use WeChat rather than SMS
• Keen for NZ-based information
Cultural adaptation

• Core messages adapted into four cultural versions
  • Words, tone, foods, activities, pregnancy practices
• Reviewed to ensure cultural appropriateness and relevance
  • Maori, Pacific, Asian, South Asian
• Translations
  • Chinese, Korean, Japanese, Te Reo
  • Key words/terms in other languages

Intervention type: Support
Information
Tailoring variables: Culture Ethnicity Language Gestational age/child’s age Relationship to baby
Personalisation variables: Name Baby’s name Baby’s gender

Kia ora [name]. Kua rēhita koe ki TextMATCH. Ka tuku i te 3 karere iti iho rānei ki a koe ia wiki mō te kai pai me te kori tinana i te wā e hapū ana

안녕하세요 아이들은 스스로 먹을 것을 준비할 때 새로운 음식을 시도하는데 관심을 갖습니다. [babynam]가 크래커나 샌드위치를 만드는 것을 도와주도록 해주세요.

Hi [name]. Congratulations on the birth of [babynam]. We hope you are enjoying this special & exciting time. Thanks for having TextMATCH on board

By feeding [babynam] healthy foods & encouraging [him/her] to be active you will help [him/her] to create good habits & set [him/her] up for a healthy future

Hi. Throwing, catching & kicking balls are fun activities for the whole family & also help [babynam] to develop balance & physical coordination

Hi [name]. Keeping active towards the end of pregnancy can be tough but the health benefits make it worth it. Try swimming or a very gentle walk

Talofa [name]. Keeping active towards the end of pregnancy can be tough but the health benefits make it worth it. Try swimming or a very gentle walk

Hi [name]. If you are feeling emotional & struggling to cope support is available. Talk to a nurse/doctor or call the Postnatal Distress Support Network 098366967

Kia ora. If you are feeling emotional & struggling to cope support is available. Talk to a nurse/doctor or call the Postnatal Distress Support Network 098366967

Malo e lelei. Taking time to care for yourself is important. Ask a trusted friend or family member to come & care for [babynam] while you take a break

By feeding [babynam] healthy foods & encouraging [him/her] to be active you will help [him/her] to create good habits & set [him/her] up for a healthy future

Talofa [name]. Keeping active towards the end of pregnancy can be tough but the health benefits make it worth it. Try swimming or a very gentle walk

Hi [name]. If you are feeling emotional & struggling to cope support is available. Talk to a nurse/doctor or call the Postnatal Distress Support Network 098366967

Malo e lelei. Taking time to care for yourself is important. Ask a trusted friend or family member to come & care for [babynam] while you take a break
Today, over 4,500 people have been through TextMATCH

“They are great. I feel as if someone is constantly there to help me through parenting. Although virtual, I am extremely satisfied with the help you provide. Most of your messages are coincidental and valuable piece of information.”

“I absolutely appreciate the messages. They motivate me to make the right choices.. I especially like the fact that they are specific to my culture. Thank you.”

“Kia ora. I enjoy receiving the messages. Even though I am confident that I am doing the right things with my Pepe the messages are reassuring. The service is very much appreciated”

“Awesome texts, great reminder even after 7 babies it's nice to be reminded, encouraging, supportive. Love the texts keep them up please.”
# Evaluation

| Found messages to be relevant & culturally appropriate | 100% |
| Specific food practices & activities in the messages were appropriate | 93% |
| Improvements to eating habits | 62% |
| Improvements to family’s eating habits | 55% |
| Positive changes to food shopping | 66% |
| Positive impact on exercising | 52% |
| Improvements to knowledge or understanding | 72% |
| Feeling more supported | 100% |
| Would recommend TextMATCH to others | 100% |
there’s a lot of time in isolation when it’s just you and bubba, it’s quite nice to receive that message

Hi, your txts r really helpful. They give me helpful ideas for my son’s development. Thanks a lot

He rawe ēnei pātuhi hei awhina i ta māua pēpi. Tēnā koe.

非常好吃！很有用，学到很多知识，希望能接收更多的信息，感谢！

I really appreciate the reminders and especially like that they are personalised with our names

[when it’s] a stressful time and then you get the message and realize you’re not doing too bad

It’s quite empowering actually just to get that little bit more information... you think you know everything after seven children so it’s actually quite cool

Hello, your texts are really helpful. They give me helpful ideas for my son’s development. Thanks a lot

종종 주시는 문자 받고 지키지 못했던 것들 상기시켜 주셔서 좋아요. 유용하게 이용하고 있습니다

Thank you team... we find the messages extremely helpful and I share it with my husband. It is a great way to remind us of how we can do our best to bring up baby into healthy lifestyle. Thank you once again😊😊
SMS4BG: Text message-based diabetes self-management support
Need

Growing burden of diabetes +
Health disparities in prevalence and outcomes

Need for innovative solutions to support patients to increase motivation for good diabetes control in their day to day lives.

- People that current services not reaching
- People who live rurally
- People from indigenous and ethnic minority groups
- Those who have limited technology access
Designed to support patients in their everyday lives to increase motivation for good blood glucose control

**Core modules**
- Insulin Module
- Smoking Module

**Young adult module**
- Lifestyle modules
- Foot care module
- Cardiac check module

**Māori**
- Healthy Eating
- Exercise
- Stress management

**Pacific**
- Blood glucose monitoring reminders

**Feedback via website**

**Personally tailored**

**Text message based**

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**SMS4BG:** Hi [name]. Your diabetes can be controlled, reducing the impact on your health & your life! Do it for your [motivation1] & [motivation2]

**SMS4BG:** Good foot care as well as managing your blood glucose, eating healthy & keeping active will help to prevent problems with your feet in the future

**SMS4BG:** Kia ora. Control of your glucose levels involves eating the right kai, exercising & taking your medication. Your whanau, doctor & nurse can help you

**SMS4BG:** Hi [name]. Good management of your diabetes & your future health includes not smoking. Call Quitline on 0800 778 778 for support

**SMS4BG:** Self-care is key to feeling good & managing stress. Good self-care involves eating well, regular exercise, good sleep & relaxation time
SMS4BG

Adapted from Whittaker, 2012
Evaluation

An RCT of SMS4BG vs usual care found it to:

- Be effective at improving glycemic control
- Be highly acceptable
- Improve feelings of diabetes related support
- Be cost-effective

A great way of getting to people with diabetes, text is personal and comes to you, it gives you a better chance to do well having someone there for you, you weren’t on your own with it.

(Male, 40-60yrs, non-Maori/Pacific, Urban, Type 2)

Loved it. It really made you know where your levels are at. I became very lazy after having diabetes for 10 years and I wouldn’t test, I just didn’t pay attention to myself, the messages made me more aware of what you should be doing and whether you’re doing it or not.

(Female, 60+, non-Maori/Pacific, Rural, Type 2)

[I liked the] empowerment I have felt by the constant text messages…my HbA1c is the lowest it’s been in 12 years, I’m more active, can spend more time with my kids, and I will live a longer life because of it.

(Male, 40-60yrs, Maori/Pacific, Urban, Type 2)

Effectiveness of text message based, diabetes self management support programme (SMS4BG): two arm, parallel randomised controlled trial

Rosie Dobson,1 Robyn Whittaker,1,2 Yannan Jiang,1 Ralph Maddison,3 Matthew Shepherd,4 Catherine McNamara,5 Richard Cutfield,5 Manish Khanolkar,6 Rinki Murphy,6,7

ABSTRACT

OBJECTIVE

To determine the effectiveness of a theoretically based and individually tailored, text message based, diabetes self management support intervention (SMS4BG) in adults with poorly controlled diabetes.

DESIGN

Nine month, two arm, parallel randomised controlled trial.

RESULTS

The reduction in HbA1c at nine months was significantly greater in the intervention group (mean −8.85 mmol/mol (standard deviation 14.84)) than

Dobson, R. et al. BMJ, 2018
Users wanted to see SMS4BG made available

When is it going be available to everyone? Even if it only helps some people I fell it is still a worthwhile service.
(Female, 40-60yrs, Maori/Pacific, Urban, Type 2)

“I think you guys are doing an awesome job, hopefully the programme can get out there to other people like my brothers and sisters”
(Female, 40-60yrs, Maori/Pacific, Rural, Type 2)

“Just make the programme more readily available to anyone with diabetes. As I said it helped me feel less alone and isolated.”
(Female, 40-60yrs, non-Maori/Pacific, Urban, Type 1)

“I would love it to continue”
(Male, 25-40yrs, non-Maori/Pacific, Urban, Type 2)
Implementation

• SMS4BG:
  • Was developed in consultation with clinicians, patients, Māori advisory group, decision makers and researchers
  • Is evidence based
  • Is effective at improving clinical outcomes
  • Is cost-effective
  • Is highly acceptable to end users
• But this doesn’t mean it will get implemented
Lessons learnt

• **Funding** for effectiveness and implementation need to be considered together right from the start.

• Fundamental to successful implementation are (clinical) **champions**.

• **Evidence** of effectiveness as well as user experience **feedback** are needed to inform the decision to implement a programme.

• Starting small with implementation and building **momentum** can be more successful and quicker.
Example from Samoa

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Regional diversity
High NCD (obesity, tobacco)
Vector borne disease
Climate change
Weak, under-resourced HIS
Reliance on OAD / remittances
Pacific digital ecosystem

Connectivity gaps decreased / increase smart phone and internet usage

Subscriber penetration range 16% (Marshall Is to 80% New Caledonia)

Mobile ecosystem growing with regional investment (but lower than other LMIC reg)

Global mobile data surveillance glosses socio-demographic and geographic variations
TXTTaofiTapaa (TXT Stop Smoke)

• A NZ /US initiative to find a technology based initiative to reduce NCD risk factors in Pacific*

• Adapt and pilot test an mCessation tool to support tobacco control goals in Samoa
  - Increase quit attempts
  - Reduce tobacco use

• Understand the process (and outcome) to adapt a successful mHealth programme (STOMP, TXT2Quit) to different settings*
**Goal of the Activity:** Reduce tobacco use in Samoa and American Samoa

**Long-term outcome(s):**
- Enhanced health service delivery partnerships between New Zealand, United States, and the Pacific
- Progress made towards reducing tobacco use over time in Samoa and American Samoa (in line with the WHO target)

**Medium-term outcomes:**

**Short-term outcomes:**
- Comprehensive understanding of the process required to adapt an mCessation initiative to other Pacific settings.
- Strengthening capacity and local leadership for mCessation
- Increase in public awareness of tobacco addiction and cessation in Samoa and American Samoa

**Outputs:**
- Fully costed model for the scale up to other Pacific countries.
- Establish governance network (advisory group and in-country working group)
- mCessation programme(s) tailored for S and AS
- Media campaign for cessation
Project overview

**Initial engagement and ethical approval**
This phase included consultation with local stakeholders, establishing a Pacific Advisory Group, and gaining both local Pacific and New Zealand ethics approval.

**Exploratory study and intervention pilot**
This phase included an exploratory study consisting of local focus groups, and testing of draft text messages, technical set-up of the mCessation intervention, media campaign development and implementation, and an 8-week pilot of the mCessation intervention.

**Analysis and development of mCessation intervention**
This included stakeholder interviews, a cost-effectiveness evaluation, protocol development and modelling for potential scale-up.
Project timeline

2013
- Samoa site visit
- Confirmation of Samoa MOH support
- Samoa ethics approval
- UoA Ethics approval
- American Samoa site visit
- US-NZ collaboration 1st meeting
- Pacific Advisory 1st meeting
- Exploratory focus groups

2014
- MOU for mCessation coordinator signed
- Sponsorship agreement with Bluesky
- UoA Ethics approval for media campaign study
- Samoa Ethics approval for media campaign study
- Media campaign
- Media campaign focus group
- Recruitment and enrollment to mCessation programme
- Exploratory focus groups

2015
- Media campaign development

2016
- Pre and post evaluation of mCessation programme
- Cancellation of implementation in AmSam

2017
- Data analysis
- Project end
The process

- Focus group with M and F smokers and ex-smokers
- Analysis of interviews to adapt message content and delivery
- Update and re-test messages
- Trial messages with 100 smokers
- Mass media campaign
- Follow-up after 3 months
- Model cost of scale-up Samoa
### Exploratory focus group (mobile phone use)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>% of sample</th>
</tr>
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<tbody>
<tr>
<td><strong>Sharing a mobile phone</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>39%</td>
</tr>
<tr>
<td>No</td>
<td>61%</td>
</tr>
<tr>
<td><strong>Using a smartphone</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>53%</td>
</tr>
<tr>
<td>No</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Use of SMS</strong></td>
<td></td>
</tr>
<tr>
<td>Everyday</td>
<td>58%</td>
</tr>
<tr>
<td>Most days</td>
<td>11%</td>
</tr>
<tr>
<td>Few times a week</td>
<td>17%</td>
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<tr>
<td>Few times a month or less</td>
<td>3%</td>
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</tbody>
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mCessation Programme

TXTTaofiTapaa text messages

- **Countdown to Quit Day**: 2 SMS/day (14 + welcome SMS)
- **Quit Day**: 3 SMS
- **4-week programme**: 2 SMS/day
- **Relapse prevention**: 3 SMS/week for 6 weeks
Cultural translation and adaptation

• Assessing the appropriateness of text messages in terms of:
  – current tobacco policies in Samoa (i.e., smoke-free environment)
  – local activities and traditions (e.g., replacing ‘savings to be used for shopping’ to ‘savings to be used for family’)
  – reference to family as support and beneficiary to the smoker’s quitting

• Text messages were personalized (i.e., names/nicknames were used)

• Changing text message delivery timing (e.g., after meals, church times)
mHealth adaptation?

- Basic premise that a prescribed sequential suite of messages, delivered via mobile phone, stimulates cognitive processes required for behaviour change.

- Theoretical origin in health psychology (trans-theoretical model of behaviour change) provide a accepted framework for message development and adaptation.

- Stages of change: iterative, sequential, rational and individual.

- Adaptation works with a validated tool to reflect contextual and cultural nuances (e.g. focus group data).
Linear process in non-linear worlds
Thoughts and questions

- Adaptation is feasible but local expertise essential.
- How far to adapt – cultural, values, social, linguistic only?
- Impacts are potentially sustainable [incl meso and macro elements]
- Adaptation is acceptable but may undermine local investment in de novo and co-design
- Dominance of individualistic approach to behaviour change models
- How can TXT initiative promote broader social change processes?
- Who needs and who gains access to mobile based support?
- Measuring impacts (M+E) at multiple levels (user to systems level)