A Feasibility and Acceptability Study of the Provision of mHealth Interventions for Behavior Change in Prehypertensive subjects in Argentina, Guatemala, and Peru.

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Outlines

- Introduction.
- Objectives.
- Description of the web-based platform.
- Pilot Study (Methods).
- Results.
- Main Conclusions.
Interventions

- Physician training.
- CHWs home visits.
- mHealth interventions
Background

• In Latin America, nearly half of the adult population in urban settings is hypertensive or has normally high blood pressure.

• Early interventions to increase the practice of healthy lifestyles can reduce blood pressure.

• Studies in developed countries using mHealth to promote behavior changes have shown positive results.

• In Latin America mobile penetration is very high (90%).

• Mobile phones offer a wide-reaching and effective means of communication available at low cost for disadvantaged populations.
Objectives

• To describe an integrated web-based platform for the provision of mHealth interventions (counseling through one to one telephone calls and SMS) to promote lifestyle changes among prehypertensive subjects in poor urban settings of Argentina, Guatemala, and Peru.

• To assess the feasibility and acceptability of a platform among callers (users) and of the interventions delivered to participants.
Methods

• To design the system we began with formative research with men and women in Argentina, Guatemala and Peru to explore lifestyle habits, patterns of use of mobiles.

• The system is web based and consists of four components:
  • Participants Information Screen
  • Agenda for calls
  • Database.
  • An application that generates tailored SMS.
1. Participant Information

2. Agenda for calls

3. Data collected

4. One-way weekly Tailored SMS

Platform Services

- Pre-hypertensive individuals
- selected messages
- Frontline SMS
- phone calls
- Health records

Platform

Web-based Integrated System

- Progress reports
- OpenClinica
- Data Entry
- Participants information Imported to the platform
- Report manager
- Data Entry

Platform Services

- IECS – Dr. A. Pichon - Riviere
- www.iecs.org.ar

¡Muchas gracias!
Data collected from participants

• Demographic and socioeconomic characteristics.

• Anthropometric and blood pressure measurements.

• Lifestyle habits.
### Participants Information

**DATOS DE CONTACTO**

<table>
<thead>
<tr>
<th>Unique ID</th>
<th>Nombre</th>
<th>Apellido</th>
</tr>
</thead>
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<td>34</td>
<td>Soberano(a)</td>
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<table>
<thead>
<tr>
<th>F. de Nacimiento</th>
<th>Educación (años)</th>
<th>Ocupación</th>
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<tr>
<td>20/06/1977</td>
<td>11</td>
<td>Trabajador(a) independiente</td>
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<tr>
<th>Genero</th>
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<th>Municipio</th>
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<tbody>
<tr>
<td>Femenino</td>
<td>Jr. Ayacucho mz 9L Lote 1</td>
<td>Villa María del Triunfo</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Email</th>
<th>Día Llamado Semana</th>
<th>Hora de Llamado Semana</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LUNES - VIERNES 2:00 - 4</td>
<td>Tarde</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Celular</th>
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<th>Hora de Llamado Fin de semana</th>
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<td>988251821</td>
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### PRESIÓN ARTERIAL Y ANTROPOMETRÍA

<table>
<thead>
<tr>
<th>PAS</th>
<th>PAD</th>
<th>Peso</th>
<th>Circunferencia abdominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>108</td>
<td>080</td>
<td></td>
<td>138.0</td>
</tr>
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<table>
<thead>
<tr>
<th>IMC</th>
<th>Talla</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>46.14</td>
<td>155.8</td>
<td></td>
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</tbody>
</table>
1. Participant Information
   - Data Entry
   - OpenClinica
   - Participants information imported to the platform
   - Progress reports

2. Agenda for calls
   - Phone calls

3. Data collected
   - Health records

4. One way-weekly Tailored SMS
   - Pre-hypertensive individuals
   - Selected messages
   - Frontline SMS
   - Web-based Integrated System

Platform Services

Report manager

www.iecs.org.ar
Mobile Counseling

• Involves monthly calls and follows a counseling protocol based on motivational interviewing (MI).

• Target behaviors addressed during MI include one of the following: physical activity promotion, reduction of sodium, simple sugar and saturated fat intake, and increased intake of fruits and vegetables.

• The platform list the participants the caller has to call.

• Offers a database to collect all the information generated during the MI session for further calls and follow-up of the participants.
List of participants

<table>
<thead>
<tr>
<th>ID de Participante</th>
<th>Usuario</th>
<th>Nombre</th>
<th>Apellido</th>
<th>Proximo Llamado</th>
<th>Estado</th>
<th>Ultima EM</th>
<th>Estado de EM</th>
<th>Tema</th>
<th>Manten.</th>
<th>Valor</th>
<th>Accion</th>
</tr>
</thead>
<tbody>
<tr>
<td>02-01-2674</td>
<td>grobles</td>
<td></td>
<td></td>
<td>15/03/2012 17:00</td>
<td>Activo</td>
<td>Em 0</td>
<td>Finalizada</td>
<td>No asig.</td>
<td>No asig.</td>
<td>No asig.</td>
<td>Ver</td>
</tr>
<tr>
<td>02-02-3008</td>
<td>grobles</td>
<td></td>
<td></td>
<td>09/04/2012 21:15</td>
<td>Activo</td>
<td>Em 1</td>
<td>Finalizada</td>
<td>Frutas y verduras</td>
<td>NO</td>
<td>Poco preparado</td>
<td>Ver</td>
</tr>
</tbody>
</table>

Total de Participantes: 26
# Database

<table>
<thead>
<tr>
<th>ID Participante</th>
<th>02-02-3048</th>
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<tbody>
<tr>
<td>Usuario</td>
<td>grobles</td>
</tr>
<tr>
<td>Nro. de EM</td>
<td>1</td>
</tr>
<tr>
<td>Fecha de EM</td>
<td>15/03/2012</td>
</tr>
<tr>
<td>Hora de EM</td>
<td>22:52:59</td>
</tr>
</tbody>
</table>

- ¿Qué conducta objetivo seleccionó el participante?
  - Grasas y azúcares
- ¿Escogió conducta de mantenimiento?
  - No
- ¿Qué valor seleccionó el participante en la Regla de Preparación?
  - Muy preparado
- ¿El participante estableció una o varias metas?
  - Sí

- ¿Cuál o cuáles?
  - Evitar las gaseosas y cambiarlas por jugos de frutas.
  - Evitar las frituras.

- ¿Cuáles son las posibles barreras a esta(s) meta(s)?
  - El sacrificio que tiene que realizar para cambiar
1. Participant Information

Data Entry

Participants information Imported to the platform

Progress reports

OpenClinica

Pre-hypertensive individuals

selected messages

Frontline SMS

phone calls

3. Data collected

4. One way-weekly Tailored SMS

2. Agenda for calls

Health records

Platform

Web-based Integrated System

IECS – Dr. A. Pichon - Riviere

www.iecs.org.ar

¡Muchas gracias!
Tailored SMS

• Formative research was used to create SMS messages on target behaviors.

• Messages were validated using in depth interviews with 108 subjects.

• Sixty four final messages per country were included in the platform were culturally adapted..

• Algorithms and rules were created to generate customized SMS. Tailoring variables were gender, country, stage of change and target behavior.

• Frontlinesms, was used to deliver SMS to participants.
Tailored SMS

Counseling calls
Target Behavior

Increase fruits & vegetables consumption
Reduction of sodium intake
Reduction of simple sugar and saturated fat
Promotion of physical activity

Stage of change
Precontemplative
or
Contemplative

“Fruits and vegetables have no fat. They help you to lose weight and to look good.”
Feasibility Study: Methods

• Pre-hypertensive (30-60 years old) were recruited in health centers of low-resource urban settings in Guatemala, Peru and Argentina.

• Six nutritionists participated in a three-day training session (platform software and MI counseling sessions).

• Over a month, participants received an introductory call (IC) followed by a MI counseling call on one of the target behaviors, and two customized SMS.

• Interviews were conducted with callers to evaluate acceptability and also semi-structured phone interviews with participants to access intervention exposure and acceptability.
Results
## Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Total n=45</th>
<th>Guatemala n=12</th>
<th>Peru n=17</th>
<th>Argentina n=16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years), mean(SD)</strong></td>
<td>45 (8.8)</td>
<td>42.4 (9.3)</td>
<td>47.4 (7.9)</td>
<td>44.4 (9.2)</td>
</tr>
<tr>
<td><strong>Female, %</strong></td>
<td>64.4</td>
<td>58.3</td>
<td>53</td>
<td>81.2</td>
</tr>
<tr>
<td><strong>Married, %</strong></td>
<td>75.5</td>
<td>83.3</td>
<td>64.7</td>
<td>81.2</td>
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<tr>
<td><strong>Years of education, %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;7 years</td>
<td>24.4</td>
<td>50</td>
<td>29.4</td>
<td>0</td>
</tr>
<tr>
<td>7-12 years</td>
<td>55.6</td>
<td>41.6</td>
<td>47</td>
<td>75</td>
</tr>
<tr>
<td>&gt;12 years</td>
<td>20</td>
<td>8.3</td>
<td>23.5</td>
<td>25</td>
</tr>
<tr>
<td><strong>Occupation, %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>36.6</td>
<td>50</td>
<td>23.53</td>
<td>40</td>
</tr>
<tr>
<td>Independent worker</td>
<td>40.9</td>
<td>33.3</td>
<td>52.94</td>
<td>33.33</td>
</tr>
<tr>
<td>Housewife</td>
<td>20.45</td>
<td>16.6</td>
<td>23.53</td>
<td>20</td>
</tr>
<tr>
<td>Other</td>
<td>2.27</td>
<td></td>
<td>5.67</td>
<td>6.67</td>
</tr>
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</table>
## Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Total n=45</th>
<th>Guatemala n=12</th>
<th>Peru n=17</th>
<th>Argentina n=16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systolic Blood Pressure (mmHg), mean (SD)</strong></td>
<td>127.2 (6.8)</td>
<td>128 (7.3)</td>
<td>126.5 (6.9)</td>
<td>127 (6.8)</td>
</tr>
<tr>
<td><strong>Diastolic Blood Pressure (mmHg), mean (SD)</strong></td>
<td>78 (7.3)</td>
<td>73.5 (9.5)</td>
<td>80.7 (5.9)</td>
<td>78.3 (5.3)</td>
</tr>
<tr>
<td><strong>BMI (kg/m2), mean (SD)</strong></td>
<td>31.7 (5.8)</td>
<td>30.3 (3.4)</td>
<td>31.6 (6.5)</td>
<td>33 (6.6)</td>
</tr>
<tr>
<td><strong>Overweight, %</strong></td>
<td>40</td>
<td>33.3</td>
<td>64.71</td>
<td>18.75</td>
</tr>
<tr>
<td><strong>Obesity, %</strong></td>
<td>51.1</td>
<td>58.33</td>
<td>35.3</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Waist circumference (cm), mean (SD)</strong></td>
<td>101 (11)</td>
<td>97.3 (9.9)</td>
<td>102 (11)</td>
<td>103 (13.7)</td>
</tr>
</tbody>
</table>
Process Evaluation Results

• The mean number of phone calls needed to conduct the first introductory call were 2.3 ± 1.0 and 1.7 ± 0.6. for the MI counseling call with an average duration of 20 minutes.
• 85% participants received the full intervention (IC + Counseling call session + 2 SMS)

45 Prehypertensives included

43 participants received the IC

38 participants (IC + MI call + 2SMS)

Main reasons
3. did not receive sms.
2. did not complete the MI call.
Acceptability

• Callers in all countries stated that the platform was easy to use and expressed that it helped them to guide the telephone counseling sessions.

• The tone of the calls was friendly and the participants were receptive to the interventions.

• Participants expressed that counseling calls and SMS were useful and motivated them to change the discussed target behavior.
Difficulties

• To contact participants were related to patterns of cellular use (shared, switched off, turnover due to theft or loss)

• Interruptions, distractions and problems with the cellular signal occurred during the MI call

• Reception of SMS were: message inbox full, signal problems and duplicated messages.
Conclusions

• An integrated web-based platform to support the provision of mHealth interventions to promote lifestyle modification was easy to use and accepted by the callers.

• Participants accepted mHealth interventions and found them useful to motivate them to adopt the promoted changes.

• Limitations regarding the delivery of mHealth interventions in our settings were mostly related to problems with cellular signal, patterns of cellular phone use, and lost or stolen mobile phones.
Thank you for your attention!