MHEALTH SERVICE FOR SMOKING CESSATION

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Structure

- Background
- Literature review
- Gaps
- Objective
- Service Design model
- System Design & Architecture
- SmartQuit: Smoking Cessation App
- Future Work
Background

- Addiction to smoking has become a rampant problem globally
- Major reason for lung cancer and heart diseases
- Smoking causes more than 6 million deaths worldwide per year.
- Rising costs of healthcare services

Source: WHO report on global tobacco epidemic 2011
Rapid Spread of Mobile technology

- Rapid growth in application of information systems and communication technology in the public healthcare domain
- More than 6.6 billion mobile phone subscriptions worldwide that is almost 87% of the world population owning a mobile phone
- Mobile phones have become ubiquitous mode of communication in developing as well as developed countries

<table>
<thead>
<tr>
<th>Key ICT indicators for developed and developing countries and the world (totals and penetration rates) (ITU 2012)</th>
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<tbody>
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<td><strong>Mobile-cellular subscriptions</strong></td>
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<td><strong>Active mobile-broadband subscriptions</strong></td>
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<th><strong>Individuals using the Internet</strong></th>
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Literature Review

**Keyword Selection** - Initial search in google scholar from first 370 searches to find the key words

SMS, Mobile interventions, smoking cessation, behaviour change

**Databases searched**: Wiley online library, PsycINFO, PubMed, MEDLINE, CINAHL, Web of Science, ERIC, Proquest Science Journals, EMBASE, Informit e-library, Scopus, CochraneDatabase of Systematic reviews, Cochrane Library, Cochrane Central Register for Controlled Trials, Cochrane Methodology Register, Cochrane DSR ACP Journal Club and DARE (18)

- Initial search resulted in 2753 articles using multiple combinations of key words

**Selection of studies** -

- Four iterations
- 23 studies selected on the basis of
  - Mobile phones as primary mode of communication
  - Focus on smoking cessation
  - Using Short message service
Gaps

- Studies have been conducted on mobile based smoking cessation interventions. Some major gaps found were
  - Very few smoking cessation interventions (14 SMS based RCT) and 9 interventions (sms as well as internet based)
  - No studies involving smartphone based multi intervention service designing /planning for smoking cessation
  - All interventions had researcher-participant interaction. None of the studies focussed on instant peer support intervention through mobile application
  - Perception towards mobile based multi-intervention service for smoking cessation yet to be explored
Objective

- Exploring the requirements for designing a smart mHealth based multi-intervention service for smoking cessation

- Designing a smartphone based multi-intervention service involving
  - Tailored motivational & informational messages
  - Instant peer support mobile platform
  - Links to games/ videos/ blogs

- Exploring perception of users regarding the instant peer support component of the service and designing a service framework
Service Design using Persuasive Systems

- Interactive information technology designed for changing users’ attitudes or behavior is known as persuasive technology [Fogg 2003]

- Human communication designed to influence the autonomous judgments and actions of others” [Simons et al. 2001]

- The Web and other Internet-based systems are optimal for persuasive communication, because they are able to combine the positive attributes of interpersonal and mass communication [Cassell et al. 1998]

- Healthcare software applications to motivate people toward healthy behavior, and possibly delay or even prevent medical problems as well as ease the economic situation in public healthcare [Intille 2003; Kraft et al. 2009]

- “Computerized software or information systems designed to reinforce, change or shape attitudes or behaviors or both without using coercion or deception” [Oinas-Kukkonen and Harjumaa 2008]
Phases in Persuasive Systems Development in the context of Developing Countries (Adapted from PSD model by Oinas-Kukkonen and Harjumaa 2009)

Understanding key issues
1. Adaptability: Smoking Cessation program/intervention able to adapt with user behaviour change
2. Commitment and consistency: Instant support by providing options when user craves
3. Direct & Indirect strategies: Combination of strategies for different kinds of users
4. One step at a time - Gradual progress
5. Open- Information on smoking shared should be true and verified
6. Unobtrusive: Persuade when time is right.
7. Useful and easy to use mobile application/ web service

Analyzing the context

The Intent - Smoking Cessation
Event: Behaviour change (quit smoking)
Target Population (Developed/Developing countries)

STRATEGY
- Motivational Message
- Progress Tracking
- Instant peer chat
- Distraction through games
ROUTE
Smart phone/ mobile application

Features of system design
Primary Task Support
1. Reduction
2. Personalization
3. Self monitoring
4. Simulation

Dialogue Support
1. Praise
2. Reminders
3. Liking

System credibility
1. Expertise
2. Verifiability

Social Support
1. Social Learning
2. Social comparison
3. Normative influence
4. Social facilitation
5. Recognition

Behaviour Change (Quit smoking)
### Framework for incorporation of persuasive qualities in multi-intervention smoking cessation service

<table>
<thead>
<tr>
<th>Service Properties</th>
<th>Mobile app interface</th>
<th>Messaging</th>
<th>Progress Tracking</th>
<th>Games</th>
<th>Videos</th>
<th>Real time peer chat</th>
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<tr>
<td>Persuasive strategies</td>
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<td>Primary Task Support</td>
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<td>Personalization</td>
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<td>Self Monitoring</td>
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<td>Reminders</td>
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<td>System Credibility Support</td>
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The framework is designed to incorporate various persuasive qualities into a multi-intervention smoking cessation service. Each service property is assessed for the presence of specific persuasive strategies, with a 'Y' indicating the presence of that strategy.
System Workflow and Architecture

System Workflow

Step 1: Website
Step 1: Mobile App
Step 2: Create Account
Step 3: Add user to Group
Push motivational messages to user
Push chat notifications to user

User Interface (HTML 5, Javascript)
Send messages, links
Send / receive chat notifications
Receive profile information, send progress report

Core API (REST)
Pushes user content
Pushes messages

System Logic

Database
Pre compiled message list
User profile
Chat messages
Analytics Data
Smart phone based Mobile App: SmartQuit

**Fig 1:** Real time chat support

**Fig 2:** Instant message & progress tracker

**Fig 3:** Games for distraction
Experimental Design for evaluation of service

**Aim:** Investigate the role of virtual support system and role of size and motive of instant social support

**Interventions:**
- Tailored SMS
- Links of games, videos, blogs
- Instant peer support through chat platform

**Measures:**

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Smoking Cessation Service in Bangladesh

**Phone Support**
- Ready to quit
- Talk to specialist
- Confidential
- One to one counselling

Call Now

**Online Services**
- 24/7 Support
- Community and blog support
- Maintain Progress through Quit metre

Register Now

**Text and Voice Messages**
- Ready to quit
- Determine quit date
- Interactive support

Subscribe Now

**Mobile Apps**
- Information
- Cessation
- Lifestyle
- Counselling
- Peer Support Chatting
- Quit metre

Learn More

APuHC
Asia-Pacific Ubiquitous Healthcare Research Centre
Tobacco control program: Chakaria, Bangladesh

Project: Reducing tobacco use by cell phone messaging to the community, motivating women, young men, school and college students, and counselling patients through village doctors in Chakaria, Bangladesh.

Aim:
- SMS/voice message to motivate villagers to quit smoking
- Courtyard meeting for women to create awareness
- Peer group counseling session displaying videos/pictures
- Show pictures/videos to students and families to create awareness
- Train village doctors to counsel patients
Future Work

- Use of Persuasive System Design through smart phone applications for control/prevention of
  - Hypertension
  - Type 2 Diabetes
  - Old age dementia
  - Obesity
  - Depression
Thankyou

(Questions/ Suggestions ?)