Smartphone-enhanced symptom management and relapse prevention in serious mental illness: a randomised controlled trial

Shôn Lewis

John Ainsworth, Caroline Sanders, Matt Machin, Richard Hopkins, Sandra Bucci, Charlotte Stockton-Powdrell, Zhimin He, Charlotte Bamford, Eve Applegate, Chris Roberts, Jasper Palmier-Claus, Til Wykes
What’s the need?

• Psychosis and schizophrenia
  – Affects 1%, onset in early adult life
  – 80% relapse within 5 years
  – Direct annual healthcare costs £3bn UK – 38% of which are on inpatient care for relapse. Each relapse costs £25k.

• Current treatments imperfect
  – Users feel uninvolved in their received care (CQC)
  – Little prevention focus
  – Treatments limited by low availability or poor adherence
  – Users value social recovery
• Smartphone app developed 2010, funded by MRC
• Experience-driven design with people with psychosis
• Proof of concept demonstrated 2010-2015:
  – Safety (and data security)
  – Acceptability (for SMI users and health professionals)
  – Validity (of symptom data against traditional rating scales)
  – Efficacy (for target symptoms)
• Real time upload of personalised symptom profiles
• Enables symptom self management
CareLoop

– An end to end solution linking user and professional in the **co-production** of care.
– Customisable, secure interface for clinical teams
– Real time data summaries streamed to team base and into ECRs.
– Personalised relapse signature/early warning signs incorporated into crisis plan triggers alert at team base.
Opinions of health professionals 2010

They said

• Few users own and use a mobile
• Users won’t be interested
• They’ll lose or sell the handset
• It will make users paranoid
• It will be too complicated
• It will take too long to complete
• They will stop using it
• Responses might be made up
• Responses won’t resemble interview data
Opinions of health professionals 2010

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We found
• 85% do.
• 80% of those approached agreed
• 1/44 lost handset
• 2/44 discontinued for this reason
• 36/44 completed >33% of 36
• Average 70 seconds
• 81% completed a week
• Not the case.
• Very high correlations on key items
Experience-based design

Service user advisory group:
Dawn Perry, Neal Sinclair, Kate Lurie, Helen Yeoman, Deborah and Peer Bhati

• Advice on study information, design of methods, focus group topics and questions, feedback/ suggestions for app design changes. Barriers to adoption.

• Focus groups: 31 SMI users, 9 carers, 30 staff

EBD is a user-focused design process with the goal of making user experience accessible to the designers. (Bate & Robert, 2006)
Personalisation and usability

Remember how good you feel when you go for a run

www.keepitusable.com
Four impacts

- Improved user experience of care
- User health self-management
- Early intervention and prevention
- Research capability
How it works
How it works

Beep
How it works

Beep

Respond
How it works

- Beep
- Feedback
- Respond
- Share

Family/friends
How it works

Beep

Feedback

Respond

Share

Show

Health professional

Family/friends
How it works

Mental health team

Thresholds

Careloop

Health professional

Family/friends

Share

Respond

Feedback

Beep
How it works

- Contact
  - Beep
  - Feedback
  - Respond
  - Share

- Thresholds
  - Show
  - Careloop

- Mental health team
  - Health professional

- Family/friends
Interface for staff
Integrating mobile-phone based assessment for psychosis into people’s everyday lives and clinical care: a qualitative study

Jasper E Palmier-Claus1,2, Anne Rogers2, John Ainsworth3, Matt Machin3, Christine Barrowcough1, Louise Laverty4, Emma Barkus5, Shitij Kapur5, Til Wykes6 and Shôn W Lewis7

Abstract

Background: Over the past the management of long-term clinically- and cost-effective in individuals with schizophrenia how they might be implemented. Method: 24 community based cross-over design study, who own phone, or via a purpose interviews were conducted i

A Comparison of Two Delivery Modalities of a Mobile Phone-Based Assessment for Serious Mental Illness: Native Smartphone Application vs Text-Messaging Only Implementations

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TECHNICAL ADVANCE

The feasibility and validity of ambulatory self-report of psychotic symptoms using a smartphone software application

Jasper E Palmier-Claus1,2, John Ainsworth1, Matthew Machin3, Christine Barrowcough1, Graham Dunn1, Emma Barkus5, Anne Rogers2, Til Wykes6, Shitij Kapur5, Iain Buchan7, Emma Säfer1 and Shôn W Lewis7

Abstract

Background: Semi-structured interview scales for psychosis are the gold standard approach to assessing psychotic symptoms. However, such assessments limit inclusivity such as recall bias, averaging, insensitivity to change and variable Intercoder reliability. Ambulant, real-time self-report assessment devices may hold advantages over interview measures, but it needs to be shown that the data thus collected are valid, and the collection method is acceptable, feasible and safe. We report on a monitoring system for the assessment of psychosis using smartphone technology. The primary aims were to: i) assess validity through correlations of item responses with those widely accepted interview assessments of psychosis, and ii) examine compliance to the procedure in individuals with psychosis of varying severity.

Methods: A total of 44 participants (acutely or remitted DSM-4 schizophrenia and related disorders, and prodromal) completed 14 branching self-report items concerning key psychotic symptoms on a touch-screen mobile phone.
Correlations with gold standard interviews

*Correlations marked with an asterisk are significant at the p < 0.05 level.*
Correlations with gold standard interviews

* p < .05
How to tell what works

• Randomised controlled trials
  – Difficult and expensive to do well
ClinTouch/CareLoop

• Feasibility
  – 181 with DSM5 psychotic disorders eligible; 81 (46\%) consented
  – 95\% randomised to ClinTouch completed 12 weeks’ monitoring
  – Adherence over 12 weeks:
    • 84\% of participants >33\% response rate.
  – Health professional use of system
    • 100\% of care coordinators accessed the system at least once over 12 weeks, with a mean of 24 times.
ClinTouch/CareLoop

- Efficacy on primary outcomes ClinTouch vs standard care:
  - **PANSS total** (assessed 6 and 12 weeks), **PANSS positive**
    - ANCOVA NS across two centres
    - BUT predicted interaction by centre $p<0.01$ of early intervention (EI) site ($n=44$, mean age 26y) vs community team site ($n=37$, mean age 46y).
  - EI site: **PANSS total adjusted mean benefit of 6 points** ($p=0.08$, 2 tailed). **PANSS positive AMB of 3 points** ($p=0.02$)
  - Exit qualitative interviews suggested improved self management skills
“You felt as if you were improving your condition by paying attention to it. It made you become engaged.”

“I found it very useful with the graphs and things.. to see how my mood was going up and down.”

“It made me more acutely aware of my mood and how it fluctuates...”
ClinTouch/Careloop

- Efficiency in detecting early warning signs of relapse
  - ClinTouch personalised alerts to clinical team desktop compared to blindly rated episodes of EWS from electronic care records (ECR) over 12 weeks
  - ClinTouch alerts in 88% of cases vs 33% of cases as recorded in ECR (cf 43% in standard care ECRs).
  - Sensitivity 75%, specificity 8%
  - BUT further analyses form the basis for adjusting ClinTouch alert criteria to improve ROC curve eg specifying minimum duration of alerts.
POCKET PSYCHIATRY

MOBILE MENTAL-HEALTH APPS HAVE EXPLODED ONTO THE MARKET, BUT FEW HAVE BEEN THOROUGHLY TESTED.

BY EMILY ANTHES

Type ‘depression’ into the Apple App Store and a list of at least a hundred programs will pop up on the screen. There are apps that diagnose depression (‘Depression Test’), track moods (‘Optimism’) and help people to ‘think more positive’ (‘Affirmations’). There’s ‘Depression Cure Hypnosis’ (‘Therapists’ Depression Cure Hypnosis App in the App Store’). Gratitude Journal (‘the easiest and most effective way to rewire your brain in just five minutes a day’), and dozens more. And that’s just for depression. There are apps pitched at people struggling with anxiety, schizophrenia, post-traumatic stress...
www.clintouch.com
Recent and next steps

- Attachable modules
  - Medication management support, side effects monitoring: Optimise trial
  - Contextual assessment
  - Social networking: “virtual drop in”
  - CBT support
  - Biosensors: sleep and exercise sensors; mood recognition
  - Neurocognition
  - Ecologically-valid functional assessment
Declaration of interests

• Advisory board fees Abbvie, Janssen-Cilag.
• Research funding MRC, EU, NIHR
• Spin out company Affigo CiC.
Clintouch/Careloop

- **Clintouch**
  - Development funded by 3 MRC grants
  - Commodity mobile phone technology, using existing device, so minimal lifestyle intrusion. Familiar operability and interface.
  - Safety assessed first
  - Generalisable: 80% of SMI clients own and use mobile phones
  - Acceptable: (short term at least): 81% compliant
  - Personalisable: modular, with machine learning of responses
  - Clinical data shown to be valid
  - Platform technology for monitoring and interventions across long term conditions

- **Careloop**
  - provides an end to end solution linking client and professional in the co-production of care