Technology, Self-management, and Peer Support and the Future of Mental Health Services

Steve Bartels, MD, MS
Herman O. West Professor of Geriatrics, Professor of Psychiatry and Community & Family Medicine
Director, Dartmouth Centers for Health and Aging
Overview

- Serious mental illness as a *health disparity*
- Serious mental illness as a *high cost health condition*
- The failure of conventional treatment to reduce early mortality and costs
- The promise and potential of technology
Serious Mental Illness: The Nation’s Greatest Health Disparity?

THE LANCET Psychiatry

Volume 4, Issue 5, May 2017, Pages 351-352

Comment

Why serious mental illness should be designated a health disparity and the paradox of ethnicity

Stephen J Bartels a✉, Peter DiMilia a
The Epidemic of Premature Death in Middle-aged Persons with Mental Illness

The average life expectancy in the US has steadily increased to 77.9 years (increasing by almost 5 years since the 90s alone)
At the same time ..........

Mentally ill die 25 years earlier, on average
By Marilyn Elias, USA TODAY

Adults with serious mental illness treated in public systems die about 25 years earlier than Americans overall, a gap that’s widened since the early ’90s when major mental disorders cut life spans by 10 to 15 years, according to a report due Monday.

For people with major mental illness:
The average life expectancy is 53 yrs.
“50 is the New 75”
The Hidden Health Disparity of Early Mortality for Patients with Major Mental Illness

Mean Years of Potential Life Lost

<table>
<thead>
<tr>
<th>Year</th>
<th>AZ</th>
<th>MO</th>
<th>OK</th>
<th>RI</th>
<th>TX</th>
<th>UT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>26.3</td>
<td>25.1</td>
<td></td>
<td></td>
<td>28.5</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>27.3</td>
<td>25.1</td>
<td></td>
<td></td>
<td>28.8</td>
<td>29.3</td>
</tr>
<tr>
<td>1999</td>
<td>32.2</td>
<td>26.8</td>
<td>26.3</td>
<td></td>
<td>29.3</td>
<td>26.9</td>
</tr>
<tr>
<td>2000</td>
<td>31.8</td>
<td>27.9</td>
<td></td>
<td></td>
<td>24.9</td>
<td></td>
</tr>
</tbody>
</table>

Compared with the general population, persons with major mental illness lose 25-30 years of normal life span

Colton CW, Manderscheid RW. Prev Chronic Dis [serial online] 2006 Apr [date cited]. Available at: URL:http://www.cdc.gov/pcd/issues/2006/apr/05_0180.htm
Cardiovascular Disease Is Primary Cause of Death in Persons with Mental Illness*


Colton CW, Manderscheid RW. Prev Chronic Dis [serial online] 2006 Apr [date cited].
Available at URL: http://www.cdc.gov/pcd/issues/2006/apr/05_0180.htm
• 203 studies including 29 countries over six continents
• mental health disorders 2.22 times higher mortality risk compared to general population or people w/o mental illness.
• average of 10 years of potential life lost
• Medical causes 2/3 (67.3%) of deaths, 17.5% “unnatural causes; remaining unknown.
The 2007 National “10 By 10” National Campaign

Aim: To Increase the Life Expectancy of People with Mental Illness by 10 Years in 10 Years

SAMHSA, HRSA, CDC, Healthy People 2020, and Numerous Organizations and Advocacy Groups

A Decade Later there has been no change in life expectancy
Health Care Costs of Mental Illness

- Mental illness and substance abuse account for 29% of all hospital days and 22% of hospital costs in the US.
- Direct cost of care for mental illness estimated at $100 billion per year, indirect costs estimated at an additional $193 billion.
- Hospitalization and emergency service costs (>25%) account for much of the excess in health care costs for people with SMI.
Increasing Life Expectancy and Reducing Costs for People with Serious Mental Illness

1. Telehealth, mHealth and Integrated Illness Self-Management

2. Prevention, Health Promotion, Peer Support and Mobile Technology
Telehealth and Illness Self-Management
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008:</td>
<td>Contacted by Riverbend Mental Health Center, Concord, NH to evaluate use of automated telehealth for medically complex consumers</td>
</tr>
<tr>
<td>2008-12</td>
<td>Partnered with Bosch Healthcare and obtained funding from Endowment for Health to conduct 2 pilot studies (n=70, n=38) at Riverbend Mental Health Center</td>
</tr>
<tr>
<td>2012-14:</td>
<td>Pre-post evaluation (n=88) as part of CMMI Boston Grant (Bird, PI) “Community Behavioral Health Homes for Adults with Serious Mental Illness”</td>
</tr>
</tbody>
</table>
Pilot 1: Automated Remote Telemedicine Supported Medical Illness Self-Management

Health Buddy: Electronic unit connected to a phone line provides two-way communication between healthcare providers and patients.

-100 participants age 18+ with SMI plus CHF, COPD, Diabetes, or CAD) enrolled in 12 month RCT cross-over design (HB v. wait list control)
Health Buddy
Automated Daily:
- Self-monitoring
- Health Data Entry
- Self-management
- Education
- Remote Nurse Monitoring
At Baseline: 63% FG>130

After Telehealth
Majority (2/3) in range
FG<120
Service Use Outcomes for People with Diabetes (both p<.05)
Which Works Best for Implementing Chronic Disease Self-Management in High Risk, Complex Patients?

- Automated Telehealth?
  
  Or

- Health Coaching and Self-management Training

NIMH Randomized Trial with VinFen (n=300)
Bartels, PI
Pilot 2: Unstable Psychiatric Illness

n=38: Serious mental illness and psychiatric instability: 2 admissions or ER visits past year or >10 crisis calls over 3 months

Pre-post 6 month evaluation of automated telehealth: psychiatric symptoms, service use, illness self management, health self-efficacy, quality of life.
Psychiatric Diagnoses (n=38)

PTSD (32%)
Depression (21%)
Schizophrenia (26%)
Bipolar Disorder (21%)
Adherence with Sessions

- Average adherence across all participants for 6 months: 71%
- Average adherence for participants over 70% (n=24)=84%
Psychiatric Symptoms (BPRS), Quality of Life (Heinrichs), Health Self-Efficacy (SRAHP),

- BPRS Total: Baseline vs 6 Month, p<.0001
- Heinrichs Total: Baseline vs 6 Month, p<.0001
- SRAHP Total: Baseline vs 6 Month, p=.011
Service Use - Hospitalizations

Baseline: p<.001

6 Months
Service Use – ER Visits

Baseline

6 Months
Development of “TeleFriend”


2015 (June): Bosch announces removal of remote monitoring product from market!

2015 (Sept): Partnership with Philips Healthcare and creation of Telefriend program
TeleFriend

- Tablet-based, in-home program
- Users complete daily sessions (5-10 minutes)
- Sessions include medication adherence monitoring, symptom monitoring, education about illness, training on illness self-management and healthy lifestyle behaviors, trivia question or inspirational quote
- Content & monitoring matched to users’ diagnoses
- Responses sent to secure server and reviewed daily on desktop application by Telehealth Specialist
Ongoing TeleFriend Study: Automated Telehealth to Improve Psychiatric Self-Management and Community Tenure

- The Providence Center, Greater Nashua Community Mental Health
- RCT TeleFriend vs. usual care
- N=300 people with SMI and psychiatric instability (≥2 ER visits or hospitalizations)
- Symptoms and use of acute services (ER and hospital)

(NIMH R01 MH107625, Pratt, PI) “Automated Telehealth to Improve Psychiatric Self-Management and Community Tenure"
What About Peers, Mobile Technology And Illness Self-management?
Illness Self-Management Health Coaching for n=71 older adults (mean age 60) with mental disorders and chronic illness (diabetes, COPD, CHF, CVD, hypertension, arthritis)

Self-management support, cognitive behavioral, and motivational skills training
Self-Management Training and Support Outcomes

**Improved Self-management**

- Patient and provider ratings of self-management
  - Knowledge of Symptoms, Meds, Coping
  - Symptom Distress
  - Symptoms Affecting Functioning

- Improved participation in the health care encounter

**Decreased hospitalizations**

<table>
<thead>
<tr>
<th>Time</th>
<th>I-IMR</th>
<th>UC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td>31%</td>
<td>12.10%</td>
</tr>
<tr>
<td>10mo</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>14mo</td>
<td>17.40%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Pilot Study of Integrated Medical and Psychiatric Self-Management mHealth for Adults with SMI

- Psychoeducation
- Coping skills training
- Relapse prevention training
- Behavioral tailoring

# PeerTech Pilot Study Results

## Sociodemographic Characteristics of the Sample

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Study participants (N=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>68.8 (4.9)</td>
</tr>
<tr>
<td>Range</td>
<td>62-77</td>
</tr>
<tr>
<td>Sex, n</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
</tr>
<tr>
<td>Mental health disorder, n</td>
<td></td>
</tr>
<tr>
<td>Major depressive disorder</td>
<td>6</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>1</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>1</td>
</tr>
<tr>
<td>Two or more chronic health conditions</td>
<td>8</td>
</tr>
</tbody>
</table>

## Changes in Outcomes from Baseline to Post-treatment for Study Participants

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>Post treatment</th>
<th>Change in raw score</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical self-management</td>
<td>62.63</td>
<td>76.63</td>
<td>14.00</td>
<td>0.140</td>
</tr>
<tr>
<td>Psychiatric self-management</td>
<td>2.38</td>
<td>3.69</td>
<td>1.31</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Quality of life</td>
<td>34.12</td>
<td>44.71</td>
<td>10.59</td>
<td>0.138</td>
</tr>
<tr>
<td>Hope</td>
<td>33.00</td>
<td>35.63</td>
<td>2.63</td>
<td>0.131</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>4.65</td>
<td>6.04</td>
<td>1.39</td>
<td>0.181</td>
</tr>
<tr>
<td>Social Support</td>
<td>39.49</td>
<td>53.53</td>
<td>14.04</td>
<td>0.245</td>
</tr>
<tr>
<td>Empowerment</td>
<td>2.36</td>
<td>2.18</td>
<td>-0.18</td>
<td>0.336</td>
</tr>
</tbody>
</table>
What About Prevention?
Cardiovascular Disease (CVD) Risk Factors and Major Mental Illness

<table>
<thead>
<tr>
<th>Modifiable Risk Factors</th>
<th>Prevalence Compared to General Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal Obesity</td>
<td>4.4 X</td>
</tr>
<tr>
<td>Smoking</td>
<td>3-4X</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2X</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1.4 X</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>2.4X</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>2.7X</td>
</tr>
</tbody>
</table>

Vancamfort et al., 2013: Meta-analysis of 136 studies
The InSHAPE Program
Integrated Health Promotion and Health Behavior Change: In SHAPE

- Nurse Evaluation and Consultation
- Initial Fitness Assessment
  - Individualized fitness and healthy lifestyle assessment
- Individual Meetings with a “Health Mentor”
- Vouchers to Local Fitness Centers
- Individual and group nutrition education
- Smoking cessation referrals
- Group Education/Motivational “Celebrations“

Promoting Health and Functioning in Persons with SMI: CDC - R01 DD000140 (PI: Bartels)
Health Promotion and Fitness for Younger and Older Adults With SMI: R01 MH078052-01 (PI: Bartels)
1st RCT (n=133):
At 12 months: **49%** in intervention group achieved either **clinically significant increased fitness** (>50 m on 6MWT) or **weight loss** (5% or greater)
**2nd RCT Boston, Mass**
(Multiple Sites: n=210; half underserved minorities)

51% achieved either clinically significant increased fitness (>50 m on 6MWT) or weight loss (5% or greater)

---

**Pragmatic Replication Trial of Health Promotion Coaching for Obesity in Serious Mental Illness and Maintenance of Outcomes**

**Objective:** Few studies targeting obesity in serious mental illness have reported clinically significant risk reduction, and none have been replicated in community settings or demonstrated sustained outcomes after intervention withdrawal. The authors sought to replicate positive health outcomes demonstrated in a previous randomized effectiveness study of the In SHAPE program across urban community mental health organizations serving an ethnically diverse population.

**Method:** Persons with serious mental illness and a body mass index (BMI) >25 receiving services in three community mental health organizations were recruited and randomly assigned either to the 12-month In SHAPE program, which included membership in a public fitness club and weekly meetings with a health promotion coach, or to fitness club membership alone. The primary outcome measures were weight and cardiorespiratory fitness (as measured with the 6-minute walk test), assessed at baseline and at 3, 6, 9, 12, and 18 months.

**Results:** Participants (N=210) were ethnically diverse (46% were nonwhite), with a mean baseline BMI of 36.8 (SD=8.2). At 12 months, the In SHAPE group (N=104) had greater reduction in weight and improved fitness compared with the fitness club membership group only (N=106). Primary outcomes were maintained at 18 months. Approximately half of the In SHAPE group (51% at 12 months and 46% at 18 months) achieved clinically significant cardiovascular risk reduction (a weight loss ≥5% or an increase of ≥50 meters on the 6-minute walk test).

**Conclusions:** This is the first replication study confirming the effectiveness of a health coaching intervention in achieving and sustaining clinically significant reductions in cardiovascular risk for overweight and obese persons with serious mental illness.
**Research Review of Health Promotion Programs for People with Serious Mental Illness**


**Health Promotion Resource Guide: Choosing Evidence-based Practices for Reducing Obesity and Improving Fitness for People with Serious Mental Illness**


---

### Summary of Findings

Current research demonstrates that lifestyle interventions inconsistently achieve clinically significant weight loss for overweight individuals with serious mental illness. When successful, these interventions result in clinically significant weight loss for only a minority of participants. To date, it is unknown why some individuals participating in lifestyle interventions achieve significant weight loss, and others do not. However, some program characteristics (e.g., program duration and design) seem to facilitate greater success than others do. It is important to note that improving cardiovascular fitness has substantial health benefits, independent of weight loss.

### Key Findings & Recommendations

<table>
<thead>
<tr>
<th>Key Finding</th>
<th>Evidence</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interventions that last longer than 3 months are superior to those of shorter duration. Longer duration is associated with greater overall weight change, and shorter duration programs reported little or no change.</td>
<td>Interventions lasting longer than 3 months were 39% more likely to report statistically significant weight loss (25% versus 64%).</td>
<td>Implementing longer programs will likely lead to greater success. Based on comparison data, the intensive phase of programs should last at least 6 months or more, followed by maintenance or booster sessions.</td>
</tr>
<tr>
<td>Programs focused on non-specific wellness education are not successful in achieving results.</td>
<td>Programs that combine education and activity-based approaches are 34% more likely to report statistically significant weight loss than programs that provide education alone (70% versus 50%).</td>
<td>Education alone will not achieve substantive lifestyle and health behavior change. Wellness education programs result in very modest or no substantive weight loss or fitness outcomes. By implementing programs that consist of guided active participation in weight management activities and physical exercise, it will improve the likelihood of positive outcomes.</td>
</tr>
</tbody>
</table>
But How Do We Spread and Sustain Health Behavior Change?
Participants wore the device for an average of 89% of the days they were enrolled in the program.

Half of participants wore the device 100% of days enrolled.

**Abstract**

Obesity prevalence is nearly double among individuals with serious mental illness (SMI), including schizophrenia spectrum disorders, bipolar disorder, and depression, compared to the general population. Mobile health (mHealth) technologies are increasingly available and affordable, with some individuals with SMI successfully using these technologies to maintain a healthy lifestyle. We evaluated the feasibility and acceptability of popular m-Health device technologies among individuals with SMI, and found that half of participants wore the device 100% of the days enrolled. The study demonstrates the potential for m-Health devices to support weight loss among individuals with SMI, and highlights the need for further research to explore the effectiveness of these technologies in the treatment of obesity.
Finding: Step Count and Weight Loss

Significant association between average daily step count and weight loss (p=0.0314)

Encouraging participants enrolled in lifestyle interventions to collect more steps may contribute to greater weight loss.

Social Media for Health Promotion Among People with Serious Mental Illness?

- Over 2 billion social media users worldwide (over 1.5 billion Facebook users)
- Wide access to online communities
- Potential to:
  - Challenge stigma
  - Increase consumer activation
  - Deliver interventions for mental and physical wellbeing

The future of mental health care: peer-to-peer support and social media

J. A. Naslund\textsuperscript{1,2*}, K. A. Aschbrenner\textsuperscript{1,3}, L. A. Marsch\textsuperscript{3,4} and S. J. Bartels\textsuperscript{1,3,5}

*Corresponding author. Email: jaschbrenner@nysunyhealth.edu
New Project: Facebook for Smoking Cessation in Serious Mental Illness

• 8-week Facebook intervention for adults with serious mental illness
• Funded by a NIDA P30 Center
• Aim to increase motivation to quit
• Explore how peer interactions influence motivation to quit
• Enrolling 120 people across iterative pilot studies
How About Peers?  
What About Technology?

Peer Health Coaching:
- Supporting illness self-management
- Mutual exchange of ideas and problem solving
- Role modeling

Technology:
- mHealth
- Social media
PeerFIT
Overview

• Group-based behavioral weight management
• Supported exercise groups
• Technology support

Goals:
• Lose 7% of baseline body weight
• Increase physical activity to 150 minutes per week

Over 6 month period
PeerFIT mHealth

- Text Messaging Support
- Accelerometer Activity Tracking
- Use existing technology
Can lifestyle interventions lead to clinically significant cardiovascular risk reduction among young adults?
Boston Fit Forward Lifestyle Study for Young Adults

144 Young Adults
Ages 18 to 35
BMI ≥25 kg/m²
SMI Diagnosis

Randomized

12 Month Study

**Basic Education in fitness and nutrition supported by a wearable Activity Tracking device (BEAT)**

**Group-based peer support and mobile health technology (PeerFIT)**

Dr. Kelly Aschbrenner: We are looking for participants!
PeerFIT Lifestyle Program

• Group coaching with weight management sessions and exercise groups

• Private Facebook group moderated by the coach where participants can connect outside of program sessions

• Wearable fitness tracker (Fitbit) for self-monitoring physical activity

• Weekly text messages from the coach with reminders and encouragement to be physically active, eat healthy and flavorful foods, and use self-monitoring techniques
Once weekly PeerFIT exercise group sessions

- Fun and challenging
- Uses minimal equipment
- Does not require a gym
- Participants learn ways to exercise in their natural environments
Now Accepting Referrals

• Do you know a DMH client age 18 to 35 with SMI who may benefit from this study? Make a referral today.

• See Stacy McHugh and Reid Fultz at the Fit Forward Study table outside this room

• Or contact: mchugh@vinfen.org
Summary

• Conventional mental health services are failing to reverse the early mortality health disparity ...and escalating costs of care are unsustainable.

• A series of pilot studies by our group (and others) support the potential effectiveness of automated telehealth and mobile health supporting self-management of physical and mental health conditions.

• Ongoing large scale randomized trials underway

• The combination of peer support and mobile health and social media hold promise in helping to develop scalable and sustainable solutions.