Blue Marble Health

Improving health all over the world!

@blumarblehealth
Sheryl Flynn PT, PhD
Disclosures

Sheryl Flynn is the co-founder and CEO of Blue Marble Health
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CATT:

• **DOD:** This work is supported by the US Army Medical Research and Materiel Command under Contract No. W81XWH-15-C-0086. (2) The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

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Health in Motion:

• **NIH:** Research reported in this publication was supported by the National Institute On Aging of the National Institutes of Health under Award Number R44AG043191. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
Team
Plan

1. Describe the Blue Marble Platform
2. Present
   1. Cognitive Assessment and Training Tool
   2. Health in Motion platform
3. Discuss Validation Research
Step 2- Client performs the routine
Step 3. The Administrator Tracks Performance
Step 4. The Administrator Updates the Routines and plan based on client’s performance
Step 5. The Administrator continues to track the client over time
**Step 5. The Client creates self-reports to see progress (digital or paper)**

<table>
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<th>Initial</th>
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<td>April 14, 2017</td>
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<tr>
<td>Attention</td>
<td>100</td>
<td>+250</td>
</tr>
<tr>
<td>Memory</td>
<td>150</td>
<td>+100</td>
</tr>
<tr>
<td>Executive Fxn</td>
<td>300</td>
<td>-50</td>
</tr>
<tr>
<td>Visual Perception</td>
<td>250</td>
<td>+10</td>
</tr>
<tr>
<td>Sensorimotor</td>
<td>175</td>
<td>+205</td>
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</table>
Step 6. The Administrator keeps track of many clients at the same time.
Step 7. The Administrator creates population reports.

<table>
<thead>
<tr>
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<tr>
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<td>This Month</td>
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<td>Users</td>
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<td>150</td>
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<td>Adherence</td>
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<td>3.2hr/wk</td>
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<tr>
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<td>100%</td>
<td>95%</td>
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<tr>
<td>Data 2</td>
<td>25</td>
<td>16</td>
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<tr>
<td>Data 2</td>
<td>Yes</td>
<td>No</td>
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</tbody>
</table>
Blue Marble Platform

Cognitive
- Assessment
- Intervention

Physical
- Assessment
- Intervention
Blue Marble Platform

Cognitive
- Attention
- Memory
- Visual Processing
- Executive Function
- Perceptual Motor Skills

Physical
- Balance
- Coordination
- Strength
- Depression
- Dizziness
Blue Marble Platform

**Cognitive**
- Selective Attention
- Divided Attention
- Visual Spatial Attention
- Processing Speed
- Organization
- Impulse Control
- Working Memory

**Physical**
- Balance
- Coordination
- Strength
- Depression
- Dizziness
Assessment Selection Screen

Select Evaluations

Attention
- Divided Attention
  - Crystal Chompers
- Visual Spatial Attention
  - Patient Reported
  - Line Crossing

Memory
- Associative Memory
  - Gem Guardians
  - Digi-Symbol

Visual Processing
- Visual Perception
  - Visual Discrimination
  - Form Constancy
  - Spatial Orientation
  - Visual Closure
  - Visual Short Term Memory
  - Spatial Orientation / Visual Discrimination
  - Figure Ground

Executive Function
- Processing Speed
  - Two Choice
  - Gem Grab

Cognitive Flexibility
- Fluid Reasoning
  - Trails Making Test
  - Asteroid Adventure

Back  Begin
Blue Marble Platform

Cognitive
- Concussion
- Aging
- Stroke
- MS
- PD
- Etc.

Physical
- Aging
- Fall Risk
- Dizziness
- COPD
- Arthritis
- Etc.
The Blue Marble Platform
Product Validation

- Usability
- Efficacy
- Reliability
- Validity
Blue Marble Platform - Validation

Usability

- The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (usabilitynet.org).

  - **Effectiveness** - can users complete the tasks, achieve the goals
  - **Efficiency** - how much effort do users require to do this? (measured in time)
  - **Satisfaction** - what do users think about the products ease of use?
    - All are affected by the user, their goals and the situation
Blue Marble Platform - Validation

**Reliability**
- Consistency and repeatability

**Validity**
- Does the instrument measure what it is supposed to measure?

**Efficacy**
- Does the intervention have an effect in a controlled setting?
  - Effectiveness - does the intervention have an effect in the real world?
Usability

Cognitive

- Assessments - 76th percentile
- Intervention - 79th percentile

Physical

- Assessments - 69th percentile
- Intervention - 69th percentile
Reliability

- Cognitive
  - Range: r = 0.48 - 0.89

- Physical
  - Range: r = 0.67 - 0.90
Validity

Cognitive

- Younger-
  range r = .70-.81 (p < .01)
- Older-
  range r = .45-.81 (p < .01)

Physical

- Older-
  ICC ranged from .582-.90
Efficacy

Cognitive

• Effect size - Cohen’s D - .432

Physical

• Not inferior
• Less pain
Meaningfulness

Cognitive
• Adherence-better than paper

Physical
• Adherence-not different from paper
Meaningfulness

Cognitive
- Sensitive to aging

Physical
- Reduced fall risk
Importance

Overall Fall Risk

Number of Participants

Start

End

Expected Risk

Higher Fall Risk

7
Validation Research

• **Usability**- the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use [usabilitynet.org].
  • Effectiveness- can users complete the tasks, achieve the goals
  • Efficiency- how much effort do users require to do this? (measured in time)
  • Satisfaction- what do users think about the products ease of use?
    • All are affected by the user, their goals and the situation

• **Reliability**- consistency and repeatability

• **Validity**- does the instrument measure what it is supposed to measure?

• **Efficacy**- does the intervention have an effect in a controlled setting?
  • Effectiveness- does the intervention have an effect in the real world?
Thank you!

For Research
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For Pilots
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