Mobilizing Nutrition Education-Is There An App For That?

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Today’s Presenters

Justine Karduck, MS, RDN, LDN, CDE  
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- PhD Candidate in Human Nutrition at the University of Illinois Urbana Champaign (UIUC)  
- Director of the Didactic Program in Dietetics at UIUC.

Kristen DiFilippo, PhD, RDN, LDN  
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- Teaching Assistant Professor  
- Interdisciplinary Health Sciences at UIUC.
Learning Objectives:

After this presentation, participants should be able to:

1. Analyze the benefits and limitations of app use in nutrition interventions based on the research evidence.

2. Appraise app quality in order to guide app selection and incorporation into nutrition interventions.

3. Explain current developments and future directions for nutrition educators.
US Adult Phone Users

% of U.S. adults who own the following devices

Source: Surveys conducted 2002-2018.
PEW RESEARCH CENTER

("Mobile Fact Sheet", 2018)
Technology Use Across the Generations

Millennials lead on some technology adoption measures, but Boomers and Gen Xers are also heavy adopters

% of U.S. adults in each generation who say they ...

- **Own a smartphone**
  - Millennials: 92%
  - Gen X: 85%
  - Boomers: 67%
  - Silent: 30%

- **Own a tablet computer**
  - Millennials: 45%
  - Gen X: 34%
  - Boomers: 17%
  - Silent: 5%

- **Use social media**
  - Millennials: 81%
  - Gen X: 75%
  - Boomers: 64%
  - Silent: 15%

Source: Survey conducted Jan. 3-10, 2018. Trend data are from previous Pew Research Center surveys.

PEW RESEARCH CENTER

("Mobile Fact Sheet", 2018)
“Smartphone Dependency” by US Adults

% of U.S. adults who do not use broadband at home but own smartphones

Source: Surveys conducted 2013-2018. Data for each year based on a pooled analysis of all surveys containing broadband and smartphone questions fielded during that year.

PEW RESEARCH CENTER

(“Mobile Fact Sheet”, 2018)
Apps for Special Populations

• mHealth has potential to *reduce* the incidence & prevalence of health disparities.

• mHealth messages need to meet:
  • literacy, language, cultural & motivational needs of the target population.

• SMS text-messaging interventions have proven successful in low income populations.

• More research is needed on health apps in underserved populations.

(Anderson-Lewis, Darville, Mercado, Howell & Di Maggio, 2018)
Health Apps

• 100,000 health apps currently available in App stores

• 58% of US mobile phone users have downloaded a mobile health app$^1$

Most common reasons to download a health app:

◦ Track physical activity (52.8%)
◦ Track diet (46.6%)
◦ For weight loss (46.8%)
◦ To learn new exercises (34.0%)$^2$

($^1$Carroll et al., 2017; $^2$Krebs & Duncan, 2015)
Characteristics of Health App Users

• Young, urban, educated, English-speaking females
• Report excellent health & meet PA guidelines
• Have intentions to:
  • Improve fruit & veg intake
  • Increase physical activity
  • Lose weight

(¹Carroll et al., 2017)
Most Popular Diet Health Apps in the US

(Nikolaou & Lean 2017)
Why use health apps?

• Familiar
• Low to no cost
• Accessible
• 24-7 availability

• Provides different types of support
  a. Self-monitoring behaviors
  b. Social support

• Improved scalability & feasibility of health services
  – Decreased health care costs & burden

• Frequent engagement
  – Consistency
  – Convenience
  – Feedback w/ pts

***Superior effectiveness on health outcomes & behaviors?

(Hingle & Patrick 2016) (Redman & Sutton 2016)
Apps efficacy to improve Diet & PA

Significant improvements in diet & PA behaviors in interventions that included:

- Single health behavior interventions
- Sample sizes > 90 participants
- Durations > than 8 weeks

Behavior change techniques included:

- Goal setting
- Self-monitoring with performance feedback
- Motivational, tailored messages
- Gamification
- Social support
- Team challenges

(Schoeppe et al., 2016)
2018 Effectiveness of Apps for Lifestyle Improvements Systematic Review

• Assess the effectiveness of app-based interventions > than 3 months

• 1228 screened, 9 included in systematic review
  • In 8/9 studies, apps more effective for improving lifestyle
  • In 6/9 studies, app group had statistically sig improvements in lifestyle

• Further research needed on app interventions besides diabetes

(Lunde, Nilsson, Bergland, Kværner & Bye, 2018)
Client Perceptions of Health Apps

• 42% downloaded more than 5 health apps\(^1\)
• Nutrition & fitness apps are most popular w/ daily use
  – Trust in accuracy & in data safety high
  – Perceived improved health
• Preferred App Features:
  – HCP communications, reminders, tracking, progress charts, view medical records, personalized recs
• Barriers to App Use: cost, data entry burden, attrition\(^2\)
• App-supported learning can promote behavior change, even in older adults without previous app experience\(^3\)

(\(^1\)Krebs & Duncan 2015; \(^2\)Wang et al., 2016; \(^3\)Chui & Liu, 2017)
Barriers to Using Apps

• Evidence-based app quality poor\(^1\)
  – Rate of app dissemination outpaces research

• Lack of personalization, health care expert involvement, behavior theory, & scientific evaluation in apps

• Time consuming data entry & analysis-decreases engagement
  • Slow results, dislike & complexity of tracking
  • On-going support, goal setting, photos, motivational messages wanted

• High level of health & technology literacy by both clients & educators

\(^{1}\text{Brzan et al., 2016; }^{2}\text{Solbrig et al., 2017}\)
App Safety & Privacy Precautions

• Lack of awareness of privacy & security aspects of mobile health apps by nutrition education community
  • Absence of personal data encryption, privacy policies, etc.¹

• FDA Regulates Apps that:
  • Are intended for use as an accessory to a regulated medical device (ex. Glooko Device System)
  • Transform a mobile platform into a regulated medical device

• FDA DOES NOT Regulate:
  • Sale or general consumer use of smartphones
  • Apps that function as an electronic/personal health record system (EHR)²

• Mobile Health Apps Interactive Tool
  • Federal laws for mobile health app developers³

¹Kamel Boulos et al., 2014; ²"Mobile Medical Applications", 2018; ³"Mobile Health Apps Interactive Tool", 2018
Justine’s Take Home Messages

• Many popular diet/physical activity apps available for use
  • Can improve engagement & augment behavior change techniques in nutrition interventions

• Interventions employing apps may produce superior results for:
  • Improving Diet Quality
  • Increasing Physical Activity
  • Decreasing Sedentary Behavior
  • Weight Loss
  • Reducing HbA1c

• Many issues with safety & privacy of health apps, more research needed!
Today’s Second Presenter:

Kristen DiFilippo, PhD, RDN, LDN
kdifilip@illinois.edu
Changing Food Choice Behavior
Goals of Nutrition Interventions

**SHORT-TERM**
- Knowledge
- Attitudes
- Self-efficacy
- Beliefs
- Skills

**LONG-TERM**
- Body weight
- Biochemical indices
- Health outcomes
- Cost savings
- Quality of life
Potential Activities

Knowledge
◦ Games

Skill-related (procedural knowledge)
◦ Demonstration videos
◦ Practice
Most Common Behavior Change Techniques

Goal setting

Self-monitoring

Feedback

Bardus et al., 2016
Apps & Nutrition Education

Systematic Review of Literature

Will nutrition apps result in
– increased knowledge or
– improved nutrition behavior?

• Specifics:
  – Adults
  – Without disease
  – Intervention included nutrition app

DiFilippo, Huang, Andrade, & Chapman-Novakofski, 2015
Apps & Nutrition Education
Systematic Review of Literature

• Very few published studies exploring behavior and knowledge outcomes
  – 3 high quality studies identified from 17,032 reviewed titles
  – All focused on weight loss

DiFilippo, Huang, Andrade, & Chapman-Novakofski, 2015
Knowledge Measures

• Only *one* study reviewed measured *knowledge*

• *No change in knowledge* found
Behavior Change Measures

• No app = less willing to continue diet\(^1\)
• App = higher participant retention\(^2\)
• App = increased use of intervention tools\(^2\)
• App = more user control\(^3\)
• App = recorded twice as many days\(^3\)

Take home:

*People are more likely to remain engaged with your recommendations with the support of an app.*

\(^1\)Brindal et al., 2013, \(^2\)Carter et al., 2011, \(^3\)Turner-McGrievy & Tate, 2011
Weight Change Measures

• But does this mean they lose weight?
• Yes:
  • Weight loss with app was similar or greater than the same diet education without app\textsuperscript{1,2,3}
  • Weight change at 6 months\textsuperscript{2}
    • With app: -4.6 kg (10 pounds)
    • With paper diary: -2.9 kg (6 pounds)
    • With website: -1.3 kg (3 pounds)
• Same results found in another review\textsuperscript{4}

\textsuperscript{1}Brindal et al., 2013, \textsuperscript{2}Carter et al., 2011, \textsuperscript{3}Turner-McGrievy & Tate, 2011, \textsuperscript{4}Mateo et al., 2015
Quality of Weight Management Apps

- Moderate overall
- Higher in functionality & aesthetics
- Lowest in information quality
App Evaluation

- Thousands of apps available
- Aspects to consider when evaluating apps
  - Quality of content
  - Technology
  - Usability

Bardus et al. 2016; DiFilippo, Huang, & Chapman-Novakofski, 2017
App Evaluation

• App Quality Evaluation Tool (AQEL)
  – Quantitative tool for nutrition professionals to use for nutrition app evaluation
  – Allows for comparison of apps based on various aspects of app content, design, and function

DiFilippo, Huang, & Chapman-Novakofski, 2017
AQEL
(abbreviated version)
# My Fitness Pal AQEL

<table>
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<th>Category</th>
<th>Mean Score / 10</th>
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<tr>
<td>Behavior Change Potential</td>
<td>6.4 / 10</td>
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<tr>
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<tr>
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<td>6.7 / 10</td>
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<tr>
<td>Function</td>
<td>7.5 / 10</td>
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<tr>
<td>App Purpose</td>
<td>8.3 / 10</td>
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DiFilippo, Huang, & Chapman-Novakofski, 2018
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DiFilippo, Huang, & Chapman-Novakofski, 2018
App Resources for Nutrition Educators

NutriCare Tools Mobile App
- The NutriCare Tools app offers evidence, research, and knowledge based tools that a registered dietitian nutritionist can use in nutrition assessment and intervention of patients and clients.

NutriGuides Mobile App
- This app provides nutrition recommendations at your fingertips and highlights evidence-based recommendations from the Academy's Evidence Analysis Library.

App Reviews by the Academy of Nutrition and Dietetics
- [http://www.eatrightpro.org/resources/media/trends-and-reviews/app-reviews](http://www.eatrightpro.org/resources/media/trends-and-reviews/app-reviews)

Dietitians Toolbox, MyDietitian, Healthie Mobile Apps

DASH Diet Food Tracker

App Quality Evaluation (AQEL)
- [https://illinoisaces.co1.qualtrics.com/jfe/form/SV_3gY2i3sP113ehAV](https://illinoisaces.co1.qualtrics.com/jfe/form/SV_3gY2i3sP113ehAV)

Diabetes Advanced Network Access (DANA)
Conclusions

• Apps show promise for:
  – Supporting nutrition education
  – Promoting behavior change
  – Improving health outcomes

• Careful evaluation and selection of apps is warranted before use
Questions
Justine’s References


Kristen’s References


