Mobile Applications and Other Patient-Centered Technologies for Use by Pharmacists to Advance Team-based Care

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Department of Pharmacy Practice

Learning Objectives

1) Identify different areas of patient care that mobile applications and other technologies might have an impact on clinical care.

2) List the ideal patient, provider, and site characteristics that can help decide which technologies are most likely adopted.

3) Describe examples of apps used by pharmacists in patient care environments.

4) Discuss the evidence supporting the use of different apps and technologies to support pharmacist care of patients.

Use of Mobile Applications & Other Portable Technologies

Learning Objective 1: Identify different areas of patient care that mobile applications and other technologies might have an impact on clinical care.

- Drug Information - Clinician, patient, caregiver
- Clinical monitoring - Clinician, patient, and caregiver
- Patient Behavior Change
- Clinician Behavior Change
- Data management
- Patient social support/networking and other resources
- Professional Meeting & CE management
- Others?

Information and Time Management / Communication

- Writing notes
- Recording audio
- Taking photographs
- Organizing information
- Accessing cloud drives
- Scheduling appointments

Examples: Dropbox, Google Drive

- Voice/Video calling
- Texting/E-mailing
- Social networking

Examples: Epic, PatientKeeper

Reference

- Medical journals
- New England Journal of Medicine, The Lancet and BMJ
- Literature search portals
- PubMed/MEDLINE
- Drug reference guides
- Lexicomp and UpToDate
- Other Examples: Epocrates, Skyscape Rx™, RxDrugs/Omnio, Micromedex, FDA Drugs and DrugDoses.net

Disclosures

Dr. Nathaniel Rickles has no actual or potential conflict of interest associated with this presentation.
Pause & Ponder

At your table and/or with the person next to you, please exchange with one another (5-10 min):

• (1) Who uses mobile apps and other portable technologies regularly for personal use?
• (2) What types of technologies do you use for personal use and why?
• (3) Who uses mobile apps and other portable technologies regularly for work?
• (4) What types of technologies do you use for work and why?
• If you said no to 1 and 3, please indicate reasons for resistance and explore what would help you use them for the personal or work purposes.

Assessment of Learning Objective 1

Epocrates and Skyscape Rx™ are examples of:

A. Patient disease state monitoring mobile applications
B. Clinician disease state monitoring mobile applications
C. Clinician drug information tools
D. Patient drug information tools
E. None of the above as I wasn’t paying attention

Patient Use of Information Technologies: Opportunities

Patient Use of Information Technologies: Challenges

Learning Objective 2: List the ideal patient, provider, and site characteristics that can help decide which technologies are most likely adopted. • Attitude toward adoption: perceived vulnerability/severity, other beliefs
• Smartphone ownership
• Patient-friendly interface
• Wi-fi availability
• Cost
• Physical dexterity
• Age
• Languages
• Literacy Level
• Convenience/Disruptive
• Support of Use

Clinician Characteristics Affecting Technology Adoption

• Clinician attitude toward technology
• Peer network and use of tools
• Organizational culture and expectations
• App reliability, accuracy and privacy
• Wi-fi availability
• Age
• Cost
• Physical dexterity
• Convenience/Disruptive
• Others?
Practice Site Characteristics Affecting Technology Adoption

- Internet connection
- HIPAA and HITECH compliance
- Protocols and policies on technology use
- Financial resources
- Integration with Electronic Medical Record
- Others?

Assessment of Learning Objective 2

- The following factors affecting the adoption of mobile applications are similar for patients and clinicians EXCEPT:
  A. Age
  B. WiFi Availability
  C. Cost
  D. Literacy level
  E. Attitudes toward adoption

Pharmacist Use of Mobile Technologies:

Learning Objective 3: Describe examples of apps used by pharmacists in patient care environments.

- Many apps available
- Need to try them out before recommendation (great student project) and confirm accuracy and if any costs
- Check to see if app is available for iPhone and/or Android before making recommendation

Highly Rated Medication Apps

Examples of Apps Used by Pharmacists – Diabetes

<table>
<thead>
<tr>
<th>Fooducate</th>
<th>My Net Diary Calorie Counter PRO</th>
<th>MySugr</th>
<th>BG Monitor Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

- Search foods to see calorie and sugar content
- Calorie counter with ability to track A1C, blood pressure, glucose levels and carb counts
- Syncs with glucose monitors and allows sharing with providers
- Log for blood glucose, insulin and carb intake, automatically calculating insulin

Examples of Apps Used by Pharmacists – Diabetes

<table>
<thead>
<tr>
<th>Health2Sync</th>
<th>BeatO</th>
<th>Diabetes Connect</th>
<th>Diabetes:M</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Diabetes log with sharing and communication features
- Connects to BeatO glucometer and identifies trends
- Tracks weight, blood glucose, meals, insulin and medications
- Features include test time reminder, nutrition log, fitness app sync, glucose trends
Examples of Apps Used by Pharmacists – Diabetes

<table>
<thead>
<tr>
<th>Beat Diabetes</th>
<th>Diabetic Diet</th>
<th>Sugar Sense Diabetes App</th>
<th>OneTouch Reveal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner-friendly app for newly diagnosed</td>
<td>Resources for healthy eating and weight loss</td>
<td>Easy to use tracker for blood glucose, weight, insulin, carbs and exercise</td>
<td>Syncs with OneTouch Verio Flex meters to identify trends</td>
</tr>
</tbody>
</table>

Examples of Apps Used by Pharmacists – Heart Disease

<table>
<thead>
<tr>
<th>Instant Heart Rate</th>
<th>PulsePoint Respond</th>
<th>Blood Pressure Monitor</th>
<th>Smart Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate monitor backed by researchers and cardiologists</td>
<td>Connects patient with CPR-trained individuals during a cardiac emergency</td>
<td>Tracks vital signs and medications to identify trends</td>
<td>Log of blood pressure, heart rate and weight</td>
</tr>
</tbody>
</table>

Examples of Apps Used by Pharmacists – Heart Disease

<table>
<thead>
<tr>
<th>iBP Blood Pressure</th>
<th>Cardio</th>
<th>CardioVisual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stores blood pressure and blood glucose taking into account stress levels</td>
<td>Fitness app that reads heart rate using finger sensors and the cameras</td>
<td>Health information resources for various heart conditions</td>
</tr>
</tbody>
</table>

Examples of Apps Used by Pharmacists – Adherence

<table>
<thead>
<tr>
<th>AsthmaCare</th>
<th>Asthmahero</th>
<th>EpApp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication reminders and asthma treatment plan</td>
<td>Medication reminders and adherence graphics</td>
<td>Medication reminders for epilepsy, seizure diary and seizure statistics</td>
</tr>
</tbody>
</table>

Assessment of Learning Objective 3

- Which of the following is an example of a diabetes mobile application that tracks blood sugar, diet, weight, exercise, and medication use?
  A. Sugar Sense
  B. Diabetes Connect
  C. Pulse Point Respond
  D. EpApp
  E. One Touch Reveal

Examples of App Use in Rickles et al. Pharmacy Project

- Learning Objective 4: Discuss the evidence supporting the use of different apps and technologies to support pharmacist care of patients.
  - Pilot/feasibility study
  - Intervention: Community Pharmacy Exercise and Health Promotion Program
  - 3-month randomized, controlled, multisite prospective study
  - Study Aims
    1. To measure the impact of CPEHPP among older adults on educational, behavioral, and self-efficacy outcomes.
    2. To evaluate the feasibility and acceptability of CPEHPP among older adults.
**Examples of App Use in Rickles et al. Pharmacy Project**

**Study Design**
All participants will have in person meeting with pharmacist
Received activity tracker
Discuss importance of exercise, exercise monitoring, setting goals, medication adherence
Calendar to log steps every day; End of every month upload activity tracker data
CPEHPP participants
30 minute in-person visit
Discuss exercise goals, barriers, motivators to exercise, exercise preferences & medication adherence
Weekly phone calls for 1st month, biweekly 2nd and 3rd

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**Rickles et al. Pharmacy Project: Eligibility Criteria**

**Requirements for Inclusion**

- 65-85 years of age
- Lack frequent exercise
- Take Medication(s) for: Hypertension, Diabetes, Cholesterol
- Fills prescription at Walgreens
- Physically capable of activity (Heart conditions)
- Mobility
- Read and understand English
- No significant memory loss

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**Rickles et al. Pharmacy Project: Recruitment**

**Recruitment Approaches**

- Flyer-based recruitment
- Profile-based recruitment: Pharmacist uses adherence call outreach and Medication Therapy Management lists
- Telephone contact with patient to confirm eligibility
- Enter information into Excel data sheet
- Name, Address, Phone, Email, Medications, Race/Ethnicity, Weight
- Package sent in mail
  - Cover letter, two copies of consent form, PAR-Q, baseline survey, pedometer

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**Rickles et al. Pharmacy Project: Results**

- Patients whose health limited them from completing activities had a lower activity level at baseline (<0.001)
- Patients with higher levels of activity had more positive attitudes toward exercise and health at baseline (0.049)
- Patients with a higher perception of their ability to exercise had more positive attitudes about exercise and health at baseline (0.012)
- Those with higher educational backgrounds rated their health status lower at baseline (0.008) and final (0.005)
- Patients with higher activity levels had higher perceptions of their ability to exercise at baseline (0.006) and at the end of the program (0.019)

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**Rickles et al. Pharmacy Project: Health Status (SF-36, Mental Health)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean (SD) Baseline</th>
<th>Mean (SD) Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>did you feel full of pep?</td>
<td>3.31 (1.324)</td>
<td>3.31 (1.436)</td>
</tr>
<tr>
<td>have you been a very nervous person?</td>
<td>2.69 (1.379)</td>
<td>2.35 (1.539)</td>
</tr>
<tr>
<td>you feel down in the dumps that nothing could 3.31 (1.324)</td>
<td>2.31 (1.490)</td>
<td>2.18 (1.015)</td>
</tr>
<tr>
<td>have you felt downhearted and blue?</td>
<td>2.00 (2.00)</td>
<td>2.00 (2.18)</td>
</tr>
<tr>
<td>did you have a lot of energy?</td>
<td>2.35 (1.498)</td>
<td>2.35 (1.539)</td>
</tr>
<tr>
<td>have you felt saturated and burned out?</td>
<td>2.35 (1.498)</td>
<td>2.35 (1.539)</td>
</tr>
<tr>
<td>did you feel worn out?</td>
<td>2.31 (1.490)</td>
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Perspectives

Examples of Apps Used by Pharmacists – Lark

Monitoring parameters for:

- Hypertension
- Diabetes
- Diabetes Prevention
- Wellness
- Behavioral Health

Literature Supporting Evidence for Apps: Clinician Perspectives

- Quicker and less error prone clinical decision-making
- Patient ownership and motivation
- Improved outcomes
- Further research is needed to validate the benefits of these technologies in order to better implement their use in pharmacy practice.
- Safety, reliability and accuracy

Rickles et al. Pharmacy Project: Step Data

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<thead>
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<th>Mean (SD)</th>
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</tr>
</thead>
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<tr>
<td>Control</td>
<td>3657.71</td>
<td>4252.26</td>
<td>3841.73</td>
</tr>
<tr>
<td>Intervention</td>
<td>3680.38</td>
<td>4278.08</td>
<td>3831.58</td>
</tr>
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Rickles et al. Pharmacy Project: Program Satisfaction

- Overall participants had positive opinions about the program
- Several participants at various sites continue to track steps after program completion (~8/9 patients)
- Patients feel accountable and gives them goals

ProHealth Physicians Lark Trial

- Lark trial started in April 2019.
- Use of Lark Smartphone App that provides daily guidance to make positive choices that influence health such as food, activity, sleep, and medication use. App connects with the device to provide personalized insights.
- Patients receive a device suited for their health: a Bluetooth scale, blood pressure cuff or glucose meter.
- Geek squad® support is available to help patients set up and use the device.
- Virtual Care Center: a care coach with diabetes expertise provides telephone-based education and motivation support and provides access to a pharmacist, physician, and other specialists as needed.
- Summary of data from device, care coach sessions and other supports are provided at the time of the patients office visits with prescribers.

Pause & Ponder: Your Perspectives

- Among those near you, please explore your own and others thoughts regarding the following:
  - What features would you most want from an app or technology and why?
  - When would you think of using the app or technology and why?
  - How would you integrate the app or technologies into your workflow or practice?
  - What are the facilitators and barriers to integrating these devices/tools into your pharmacy practice?
Assessment of Learning Objective 4

- 7 studies confirmed that the mobile app increased treatment adherence. In 5 of these, there were significant changes in adherence from baseline to the end of the trial. Patients reported adherence improvements of 7-40%.
- Users also reported the apps were easy to use and useful for managing their medication. Individuals reported high satisfaction with the apps with average scores of 8.1 out of 10.

Questions?

Please contact Nate Rickles with any questions or interests in research collaboration on any of the topics presented especially related to use of technologies to improve the patient experience and maximizing medication adherence.

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