The Effects of Implementing a Smartphone Application to Improve Asthma Self-Management in Adults: An EBP Project in Progress

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Significance
- Asthma is one of the most common chronic diseases, affecting 20.4 million adults, aged 18 and over in the United States (CDC, 2018).
- 44.9%, or 9.1 million adult patients with asthma, report having one or more asthma attacks every year (CDC, 2018).
- Patients with uncontrolled asthma are more likely to have missed days of work and school, as well as impaired quality of life, including: limitations in daily activities, decreased enjoyment of everyday life, increased feelings of frustration related to asthma symptoms, and decreased productivity at home, work and school (Marcano Belisario et al., 2013).
- Despite the strong evidence in support of self-management, most patients with asthma have not been provided with education on the importance of self-management, nor have they been provided a personalized asthma action plan (Pinnock & Thomas, 2014).
- In addition to education and asthma action plans, emerging research supports the use of mobile apps and digital media as an element of improved asthma control (Hui et al., 2017; Panzera et al., 2013).

PICOT Question
- Among adult patients in the family practice setting, (P) how effective is an intervention that includes asthma education and self-management techniques using digital asthma action plans and symptom tracking via mobile application (I), compared to the current standard of care which does not include any formal asthma education or asthma action plans (C) in improving quality of life (AIS-6), asthma control (ACT), and asthma literacy (O) over an eight-week period (T)?

Review of the Literature
- Key Terms: “asthma” AND (“manage**” OR “self-manage**” OR “action plan”) AND (“adhere**” OR “compliance”). Mesh headings were used in applicable databases for the heading “asthma” as both a major and minor heading. Within the National Guideline Clearinghouse and Joanna Briggs Institute, searches were performed for simply “asthma” due to the smaller number of sources within the databases.
- Limiters: (a) Scholarly (peer reviewed) journals, (b) published from 2013 to present, (c) English language
- Inclusion Criteria: (a) Studies that were focused specifically on patients’ self-management abilities within the primary care/office outpatient setting, (b) discussed asthma action plans and asthma education, (c) focused on the use of mobile technology to improve asthma control, (d) measured asthma control, asthma-related quality of life, and asthma literacy, (e) identified strategies to improve asthma self-management in adults, and (f) included patients 18 years and older.
- Exclusion Criteria: (a) published in any language other than English, (b) not scholarly (peer reviewed), (c) conducted in the emergency department or inpatient setting, (d) evaluated medication regimes/focused on pharmaceutical asthma management, (e) did not focus on self-management and improving patients’ ability to manage their condition independently, or (f) focused on population of children or adolescents 18 years and younger

Results of Literature Search

<table>
<thead>
<tr>
<th>Databases Searched</th>
<th>Number of Articles Yielded</th>
<th>Duplicate Articles</th>
<th>Articles Reviewed</th>
<th>Articles Accepted</th>
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<tbody>
<tr>
<td>CINAHL</td>
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<td>MEDLINE</td>
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<td>Total</td>
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<td>110</td>
<td>9</td>
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Appraisal of Evidence
- All evidence included in literature review was level I and II
- Quality: Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool was used to evaluate the quality of each piece of evidence, with ratings of:
  - (A) High quality
  - (B) Good quality
c- (C) Low quality
- All evidence included in literature review was high (A) or good (B) quality

Synthesis of the Evidence

- Appraisal of Evidence
- All evidence included in literature review was level I and II
- Quality: Johns Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal Tool was used to evaluate the quality of each piece of evidence, with ratings of:
  - (A) High quality
  - (B) Good quality
  - (C) Low quality
- All evidence included in literature review was high (A) or good (B) quality

Evidence Table

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Included</th>
<th>Quality of Evidence</th>
<th>Study Design</th>
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<tbody>
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<td>JBI Evidence Summaries (2) NGC Guidelines (1) Systematic reviews (3) Organizational Guidelines (2)</td>
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<td>Level II</td>
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<td>Randomized Controlled Trial (1)</td>
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<tr>
<td>Level IV</td>
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</tr>
<tr>
<td>Level V</td>
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</tbody>
</table>

Implementation
- Based on evidence that supports the importance of clinic-based education, use of asthma action plans (HHS, 2007), as well as evidence that demonstrated the effectiveness of using mobile apps for asthma self-management (Marcano Belisario et al., 2013).
- Population: Patients, 18 years of age and older, with an established diagnosis of asthma (who have been on medications in the last year) who have a smartphone.
- Setting: Primary care office with one NP and one physician located in NW Indiana
- Design: Pre-test, post-test design, repeated measures
  - Time: Rolling entry date with data collected at baseline, and again at 4 and 8-weeks post-intervention (Total length of the project was 8 weeks).
- Program intervention included:
  - 30-minute educational intervention utilizing a patient education guide published by the CHEST foundation, titled "Living Well with Asthma."
  - CHEST foundation booklet discussing the disease-process of asthma, how it impacts the body, asthma triggers, use of medications, inhalers and peak flow meters
  - Downloading free mobile application AsthmaMD and inputting personal information (height, weight) and medications, and instructing patients on use
- Theoretical Framework: Dorothea Orem’s Self-Care Deficit Theory
- Evidence-Based Practice Model: The Stetler Model
- Sample: (Implementation occurred October 4th - January 30th)
  - N=26
  - Male: 5; Female: 19
  - White: 20; Black: 3; Hispanic/Latino: 3
  - Age: Range 20-54 years; Mean Age: 37 years

Proposed Outcomes
- At the conclusion of this EBP project patients will have improved:
  - Asthma control
  - Asthma Control Test (ACT): Assesses frequency of shortness of breath and general asthma symptoms, use of rescue medications, effect of asthma on daily functioning, and overall self-assessment of asthma control
  - Asthma-related quality of life
    - Asthma Impact Survey (AIS-6): Assesses the impact of asthma on everyday functioning, performance in usual daily activities, social functioning, emotional functioning and productivity at work or home.
  - Asthma Literacy
    - Measured using a four-item questionnaire designed by the project manager

Best Practice Recommendations
- After introduction of the EBP project it is expected that:
  - Patients will report improved asthma control, quality of life, and literacy
  - Patients will demonstrate proficiency in using the mobile smartphone application and use it once daily for symptom tracking
  - Project manager will provide office staff with a sustainable way to promote asthma self-management with future patients with asthma

Acknowledgements
Thank you to my wonderful advisors, Dr. Zheng Li, PhD, MPH and Dr. Julie Koch, DNP, APRN, FNP-BC, FAANP for their patience and guidance through this EBP process. Thank you also to Lindsay Gordon, DNP, FNP-BC and Dr. Christina Huyhn, DO for their advice, guidance, and overwhelming support, and for allowing me to work with their patients.

Implications for Practice
- It is expected that after patients will report improved asthma control after implementation of the intervention, and will continue to utilize the benefits of the mobile smartphone application after the completion of the intervention.
- If successful, providers can continue to utilize this asthma education program and mobile application to improve asthma self-management in the future.