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Creating Healthy Work Environments 2019

The Effects of Implementing a Smartphone Application to Improve Asthma Self-Management in Adults

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Abstract

Purpose: Asthma is one of the most common chronic diseases, affecting 20.4 million adults aged 18 and over in the United States (CDC, 2018b). Though patients are generally able to manage asthma with maintenance medications, they often experience exacerbations that may worsen without proper management (Gatheral et al., 2017). Alarming, 44.9%, or 9.1 million adult patients with asthma, report having one or more asthma attacks every year (CDC, 2018a). 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). The U.S. Department of Health and Human Services ([HHS], 2007), and Global Initiative for Asthma (GINA, 2018) recommend patient education and clinician follow-up, as well as the use of asthma action plans as strategies to improve patients' ability to self-manage their asthma. 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, 2015). 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). The purpose of this project was to improve asthma control through the use of education and the implementation of a mobile application.

Sample: Implementation of the project occurred at a primary care office in Northwest Indiana, staffed by one nurse practitioner and one physician. Criteria for participation included patients with a diagnosis of asthma, who have had medications prescribed for asthma within the last 12 months. Participants were asked about their asthma diagnosis and whether it was recent, whether they were currently using any medications for asthma, and whether they felt like they had ongoing issues with asthma. This clarification was made in order to prevent the inclusion of patients who may have been either erroneously diagnosed with asthma many years ago or as a child, or who do not currently utilize any form of asthma treatment. Patients who have asthma listed as a diagnosis in their medical charts, but deny ever being diagnosed with asthma will be excluded and encouraged to have further discussion with their primary care provider. Additional inclusion criteria included English speaking and in possession of and able to use a smartphone. Exclusion criteria included pregnant women and those diagnosed with dementia or significant cognitive impairment that would prevent the patient from accurately tracking symptoms or independently managing their health conditions.

Methods: The intervention was based on evidence that supports the importance of clinic-based education (HHS, 2007), as well as evidence regarding the use of mobile apps for improved asthma self-management (Marcano Belisario et al., 2013). The first component of the intervention included a 30-minute one-on-one asthma education session utilizing a patient education guide published by the CHEST foundation, titled "Living Well with Asthma." This education guide was provided to the patient at no cost, and the content included topics such as: the disease-process of asthma and how it impacts the body, asthma triggers and solutions, following an asthma action plan, understanding asthma medications, inhalers and peak flow meters, and what to do in case of asthma attack. In addition to reviewing each page in the "Living Well with Asthma" booklet, patients were also encouraged to ask any questions they may have regarding the management of their asthma. The second component of the intervention included the use of a mobile application for asthma management. Patients downloaded a free smartphone application, AsthmaMD, onto their mobile phone. The project manager assisted the patient in entering

their personal data such as height, weight and age, as well as inputting their maintenance and rescue medications as applicable. From this information, a digital asthma action plan was created by the mobile application. Patients were instructed on entering symptoms into the symptom tracker, setting up medication reminders, and following their asthma action plan if symptoms arise. Patients were instructed to log into the app and record their symptoms once per day. This included entering symptoms if they experienced any, or lack of symptoms if they didn't, into the symptom tracker, tracking if they took asthma medications, and setting medication reminders if needed.

EBP Outcomes: In order to gauge improvement in asthma management, three outcomes were measured. Patient-reported asthma control were measured using the Asthma Control Test (ACT), which 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. Patient-reported asthma-related quality of life was measured using the Asthma Impact Survey (AIS-6) which 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 was measured using a four-item questionnaire designed by the project manager, aimed to evaluate patients' knowledge of asthma and confidence in using an inhaler, identifying personal asthma triggers, and utilizing an action plan. Data was collected at baseline, and again four and eight weeks post-intervention to determine if the use an educational intervention coupled with the use of a mobile application and digital asthma action plan successfully improved patients' asthma management.

Nursing Implications: There is a need for improved asthma self-management in the primary care setting. Providers can improve asthma self-management and therefore asthma control and asthma-related quality of life, by promoting education, written or digital asthma action plans, and the use of a mobile application for symptom tracking and medication reminders. As the use of technology increases especially in healthcare, the use of a mobile application can improve the way that healthcare professionals encourage patients to take control of managing their asthma symptoms.

Conclusions: EBP project is in progress, however improved asthma control, asthma-related quality of life, and asthma literacy is anticipated. If the use of an educational intervention in conjunction with the implementation of a mobile application improves asthma outcomes, primary care providers should utilize this method to improve their patients' asthma self-management and control in order to prevent future exacerbations.

Title:

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Keywords:

asthma, mobile and self-management

References:

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Abstract Summary:

This project assessed the effectiveness of an intervention that incorporated a 30-minute asthma-focused education session, and the use of a mobile application which included a symptom tracker, medication reminders, and a digital asthma action plan, in order to improve patients' overall asthma control, quality of life, and asthma literacy.

Content Outline:

1. **Introduction**
2. **Statement of Problem:** Asthma is one of the most common chronic diseases, affecting 20.4 million adults, aged 18 and over in the United States (CDC, 2018), and 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). The U.S. Department of Health and Human Services, (2007), recommends patient education and clinician follow-up, as well as the use of asthma action plans as strategies to improve patients' ability to self-manage their asthma. 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, 2015).
3. **PICOT:** 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)?”
4. **Theoretical Framework**
5. **Theory:** Project guided by Dorothea Orem's Self-Care Deficit Theory

6. **EBP Model:** The Stetler Model

III. Review of Literature

1. **Systematic Search:** Search included 5 databases: (CINAHL, Cochrane Library, Joanna Briggs Institute, MEDLINE and National Guideline Clearinghouse).
 1. Key search terms
 2. Limiters
 3. Inclusion and exclusion criteria
 4. **Appraisal of Evidence**
 5. **Level of Evidence:** Evaluated and categorized using the Melnyk & Fineout-Overholt (2015) Hierarchy of Evidence
 1. All evidence included in literature review was level I and II
 2. **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
 3. (A) High quality, (B) Good quality, or (C) Low quality
 4. All evidence included in literature review was high (A) or good (B) quality
 5. **Decision to Change Practice**
 6. Discussion of current evidence warranting a change in practice
 7. **Implementation of Practice Change**
 8. **Program intervention included**
 9. 30-minute educational intervention lead by project manager utilizing a patient education guide published by the CHEST foundation, titled "Living Well with Asthma."

CHEST foundation booklet discusses the disease-process of asthma and how it impacts the body, asthma triggers, understanding asthma medications, inhalers and peak flow meters.

1. Downloading free mobile application AsthmaMD and instructing patients on use of symptom tracker, medication reminders, and digital asthma action plan
2. **Targeted Outcomes**
3. Asthma control:
Asthma Control Test (ACT)
4. Asthma-related quality of life:
Asthma Impact Survey (AIS-6)
5. Asthma Literacy: Measured using a four-item questionnaire
6. **Implications for Nursing**

First Primary Presenting Author

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Professional Experience: 2011: Bachelors of Science in Nursing, Grand Valley State University 2011-present: Several jobs working as a registered nurse including hematology/oncology/BMT, Intensive Care Unit, home hospice care, and urgent care. Doctor of Nursing Practice student at Valparaiso University, Valparaiso, IN Experience with asthma includes a personal and family history of asthma, as well as current employment as an urgent care nurse seeing many patients with acute asthma exacerbations

Author Summary: Lindsay Humpfer is a Doctor of Nursing Practice student at Valparaiso University. She obtained her BSN from Grand Valley State University in Grand Rapids, Michigan in 2011, and she has been working as an RN for the last seven years. Her experience includes oncology, hospice, ICU and urgent care. Lindsay was diagnosed with asthma as a young child, and her interest in improving asthma control and self-management stems from her own experiences with managing asthma.