Evaluating the Effect and Process of a school-Based Asthma Protocol to Improve Asthma Management in the School Environment.

Doreen C. Onyekelu

Lourdes University, College of Nursing

ACKNOWLEDGEMENTS

I want to acknowledge the support of some individuals that helped to make this project successful. I am grateful to Dr. Heidi Shank for believing in me and for her guidance at difficult junctures in this program and in the course of completing this project.

I want to acknowledge the encouragements of Dr. Adam Richardson- my Project Chair, he was very resourceful and always disposed to lend his professional guidance. To Dr. Angie Scardina, I owe you a debt of gratitude for your support and encouragement during my clinical rotation with you.

To the Principal and teachers at St. Aloysius Catholic Elementary School in Bowling Green Ohio, I am very grateful. This project will not be possible without your painstaking participation in the study irrespective of your busy schedule and challenges from the COVID -19 Pandemic.

I also want to appreciate my colleagues at Lourdes University, it has been a very wonderful experience learning and growing together with you all throughout this program.

To my wonderful and loving family, I am very thankful for your support and sacrifice through the course of this rigorous program. I appreciate the decorum you provided at home to enable me complete my assignments.

My husband - Dr. Matthew Onyekelu has been a supportive and caring study partner from the onset of my DNP journey, has always believed in me even when I doubted my abilities. I am undeniably loved by you and I cannot be more loved. Thank you my Pride for all the countless moments when you were tired or stressed out but did not hesitate to review my assignments or study with me. I know that with you by my side, I can achieve so many goals.

DEDICATION

I am dedicating this project to some of the significant people in my life and academic growth. My darling husband: Dr. Matthew Onyekelu for his unyielding support throughout my academic pursuits, for believing and trusting my abilities and putting up with my dramas when the roads were rough. Thank you my Pride for being a supportive husband and a wonderful father to our lovely children. My father: Late Mr. Thomas Chukwu Ude (Nwa Ogazi) for his selfless love, prayers and contributions in my academic journey. My mother: Mrs. Eucharia Eje Ude for her motherly love and comfort, and her babysitting service to the children while my husband and I work hard to provide for our young family. My loving mother in-law: Mrs. Augustina Chibumma Onyekelu for her undeniable loving support and prayers. Last but not the least, to my beautiful elder sister: Mrs. Gertrude Chris-Ukah I can never repay you for your love, support and primary contributions in my life and academic adventure.

TABLE OF CONTENTS

Abstract

Background: Asthma is described as a chronic inflammatory disease of the large and small airways with evident bronchial hyper-responsiveness, airflow limitation, airway remodeling, and increased mucus production. The cause of Asthma can be attributed to either environmental triggers or genetic factors. Factors such as poverty, environmental pollution, and illnesses have been noted to increase the prevalence of asthma exacerbation among children 5-14 years (Toole, 2013).

Problem: About 1 in 12 US school-aged children suffer from asthma, and on average, it is associated with >10 million missed school days annually. Asthma-related school absenteeism affects up to (59%) of children with asthma. The rate of school absenteeism goes higher for low-income minority children whose asthma is not well controlled (Hsu et al., 2016).

Methods: Pre and post-assessment questionnaires were given to teachers to ascertain their knowledge and preparedness to tackle asthma attacks and to find out if every child with asthma has an action plan and medication in the school for use during an asthma crisis.

Interventions: Participants completed anonymized pre and post educational intervention questionnaires used to evaluate the effectiveness of the asthma educational intervention.

Results: The educational intervention improved knowledge and increased participants' comfort level to safely and effectively assist a student having an asthma attack in the school environment by 100 percent

Conclusion: In this evidence-based project, the measurable outcome determined that intervention implemented increased confidence level in school teachers to take charge and safely manage asthma attacks in the school environment; reducing the need for emergency room visits.

Introduction

Asthma is described as a chronic inflammatory disease of the large and small airways with evident bronchial hyper-responsiveness, airflow limitation, airway remodeling, and increased mucus production. The cause of asthma can be attributed to environmental triggers or genetic factors. Factors such as poverty, environmental pollution, and illnesses have also been noted to increase the prevalence of asthma exacerbation among children 5-14 years (Toole, 2013). Asthma is one of the most common long-term conditions suffered by children worldwide. About 1 in 12 US school-aged children suffer from asthma, and on average, it is associated with >10 million missed school days annually. Asthma-related school absenteeism affects up to (59%) of children with asthma. The rate of school absenteeism goes higher for low-income minority children whose asthma is not well controlled (Hsu et al., 2016).

Childhood asthma morbidity is also associated with an increased risk of childhood obesity as a result of lack of physical activity and unhealthy food choices. The disease can affect a child's ability to socialize with peers, lead to increased hospitalization/ED visits, and poor school performance due to lack of quality night time sleep. Asthma burden affects the children as well as their parents and can lead to missed school and work respectively. Additionally, persistent asthma management can be expensive for families especially those already struggling to make ends meet (Toole, 2013).

According to Kew, Carr, Donovan & Gordon (2017) individuals from lower economic status are more likely to have more asthma related complications partly due to lack of Personalized Asthma Action Plan (PAAP). Children spend long hours in the school, it is therefore crucial that school staff are knowledgeable and skilled to assist a child in the event of a serious attack. It is also required that parents provide PAAP for every child with asthma, and

school teachers are to familiarize themselves with the asthma action plan to increase preparedness and improve asthma attack management.

Description of Clinical Issue

Evidence recognizes that children with asthma are better assisted during an attack if the school has a personalized asthma action plan for each child with asthma. Relying on school nurses alone to assist when an attack occurs puts the life of the child in danger especially when the school nurse is not available. Specifically, research has suggested that educating teachers to identify symptoms of a distressed child helps to facilitate faster response and subsequently result in improved outcome (Kew, Carr, Donovan & Gordon, 2017). Other researchers suggest eliminating exposure to things that can trigger an attack in the school environment as one of the major steps to ensuring a child's safety in the school. Hence, it is possible that a written out PAAP increases teacher involvement, and a safe school environment may improve asthma control and lead to fewer emergency room visits.

Prevalence and Significance

Despite advances and awareness on asthma symptoms and management, there is continued increase in lack of proper management related to cost of care and health literacy. The Centers for Disease Control and Prevention reports that in 2017 about 25 million (8%) people in the US had asthma compared to 20 million (7.3%) in 2001. Also, in 2017, 6.0 million children under the age of 18 were affected by asthma and the prevalence is the same for both boys and girls age 5 – 14 years. Moreover, data shows that although blacks are more likely to have asthma than whites and hispanics, the percentage has increased in all races (CDC, 2017).

In Ohio, asthma disproportionately (10.9%) affects children from poor socioeconomic background (family income of <$25K per year) compared to (6.4%) in children from families

that earn ($50K and above yearly). Although African American children account for about 18% of Ohio child population, about one half of childhood asthma emergency room visits and hospitalization in Ohio involves African American children. The disease as at 2018, affects 7.8 percent of Ohio children which is more compared to the national level (Ohio Department of Health, 2019). (See appendix 1).

The National Heart, Lung and Blood Institute (NHLBI) supports that schools develop and maintain specific policies on asthma management to help teachers in assisting students with asthma in the event of serious distress (NHLBI, 2014). According to Reznik & Haltermen (2016) this is mostly relevant in low-economic environments due to the increased number of children who have asthma and are less likely to have PAAP in the school record.

Purpose and Overall Aims

The purpose of this EBP project was to examine the PICO question: Among a local private elementary school teachers (K-8) (P), does asthma education program (I), compared to no asthma education (C), improve their confidence level in managing asthma symptoms in the school environment (O)? The aim of this project was to determine the effectiveness of introducing asthma education or in-service to school teachers to help improve basic asthma knowledge.

Evidence-Based Practice Model/Framework Guiding the Practice

The Stetler Model of Evidence-Based Practice was selected for this project because of its focus on critical thinking and use of research evidence to improve patient outcomes. Moreover, it is a practitioner-oriented model that provides a comprehensive process for assessing and implementing research findings to encourage safe and effective evidence-based practice. Dang, Melnyk, Fineout-Overholt, Yost, Cullen, Cvach, Larabee, Rycroft-Malone, Schultz, Stetler, &

Stevens (2019), Stetler Model of Evidence-Based Practice was originally developed in 1976 and was named the Stetler/Marram Model of Research Utilization. The model was revised again in 1994, and in 2001, the model was updated and named the Stetler Model of Evidence-Based Practice. The model consists of five phases: preparation, validation, comparative evaluation/decision making, translation/application, and evaluation (Dang et al., 2019).

Schaffer, Sandau & Diedrick, (2013) stated that each phase is planned to facilitate critical thinking about the practical application of research findings, promote the use of evidence in the daily practice, and reduce the incidence of errors in the decision-making process. Phase I: This is the preparation phase which consists of the definition of the purpose, definition of the desired/measurable outcomes, sourcing for relevant evidence, and contextual assessment of the evidence. Phase II: Validation requires critical analyses of the source of evidence to determine its level of credibility. This phase is important because even lower levels of evidence can still provide valuable report that could help clinicians in practice. Dang et al. (2019) the process could end in this phase if the researcher has insufficient amount of credible external evidence that meet the need of the project. Schaffer et al. (2013) Phase III: Comparative Evaluation/Decision-Making requires an evaluation of the feasibility of the project, the substantiating evidence and the current practice. Also, during this phase, the evidence obtained is summarized, critiqued, synthesized, and a decision to use it or not is made with the external and internal evidence in mind. Dang et al. (2019) Phase IV: Translation/Application requires articulation of how to use the obtained finding in the practice; a stepwise approach of how project will be implemented and goals formulated in phase II achieved. Lastly, Phase V: Evaluation involves the evaluation of plan and actions to note the degree at which the practice

change was implemented and checking to see if goals are met. After evaluation of the project outcome, a decision to use the findings in practice is then considered.

In conclusion, the Stetler Model of EBP is selected for the project because of its stepwise process which offers a clear understanding of how to implement an EBP project as an individual as well as a group. Following the model will ensure that each phase of the project will be carefully analyzed, and consideration given to external and internal factors. Furthermore, selecting this evidenced-based practice model to guide practice change helps to provide clarity and simplicity to the complex processes of changing practice standards in an organization. The DNP as a change agent plays an important role in assisting an organization to evaluate current practice and identify areas of needed change. (See appendix 2).

Review of the Literature

Conducting a comprehensive literature review follows a step-wise approach which includes firstly identifying the practice outcome to evaluate, and formulating a PICO question to enable the researcher focus on literature applicable to the chosen topic. For this quality improvement project, a systematic review of the literature was conducted utilizing the above mentioned PICO question to aid the researcher in selecting relevant evidence related to asthma management in the school environment. Second step was to evaluate the level of evidence and thirdly, identify the keywords associated with the topic (Mazurek-Melnyk & Fineout-Overholt, 2015).

Assessment of current evidence indicates that a vast majority of researchers recommend the use of PAAP in elementary schools as a way of improving asthma management. Further examination of research reports revealed that asthma is incurable but with proper management, asthmatic individuals can lead a normal, healthy and active life. Researchers urge schools to

adopt School-Based Asthma Management Program (SAMPROTM) which provides educational materials and guide to both teachers and students on the basic pathophysiology and quick treatment of acute asthma attack (Ohio Department of Health 2018 & Carvalho Coelho, Cardoso, Souza-Machado, & Adelmir Souza-Machado, 2016).

A randomized controlled trial by Kawafha & Tawalbeh (2015) conducted to examine the effect of an asthma education on schoolteachers' knowledge reports that teachers who were given asthma education displayed a higher level of knowledge with regards to asthma care than those who were not given asthma education. Study was conducted in the north of Jordan. It used pre-test–post-test experimental randomized controlled design. Sample included 74 primary school teachers who were randomly assigned to either experimental or control groups. The experimental group had 36 participants while the control group had 38 participants. Three public primary schools were selected using a multistage-cluster sampling technique. This study shows that a great number of the participants had limited asthma knowledge prior to the asthma education. It therefore prompted the need to include asthma education as an in-service for primary school teachers.

A systematic review conducted by Carvalho Coelho et al., (2016) on the impact of educational asthma intervention in the school suggests that educational interventions are able to improve the level of knowledge of asthma disease among school-age children and their teachers. The authors reported a drop in the "number of missed school days among school-age children at 6 and 12 months after the intervention, with an average reduction of up to 4.38 days". As stated by the authors, one of the most important benefits of educating teachers and students on asthma disease is to help identify symptoms and aid in early diagnosis and consequently improve

outcomes (Carvalho Coelho et al., 2016). This information supports the PICO question regarding asthma education to help improve teachers' asthma management comfort level.

Other researchers also deduced in their works that proper management of asthma reduces unnecessary hospital bills and stress on both patients and parents. Asthma does not only affect the child but also affects the community at large. It affects physical activity, learning, socialization, growth, mental and physical development of the asthmatic child. (Kew, Malik, Aniruddhan, & Normansell, 2017).

Research conducted by Major, D. A., Clarke, S. M., Cardenas, R. A., Taylor-Fishwick, J. C., Kelly, C. S., & Butterfoss, F. D. (2006) shows that lack of education was one of the four major barriers to proper asthma management listed by the 32 elementary school nurses surveyed in Virginia. The study reveals that due to lack of asthma education for parents and caregivers, school nurses are either not informed about a child's asthma diagnosis or they are not provided with PAAP and proper medication to use in the throes of an asthma attack. The nurses reported that their only recourse when PAAP is not available was to call an ambulance for assistance. Few other nurses reported that in the face of an emergency, they went as far as risking their careers by using another child's rescue medications to save the life of a child in respiratory distress who had no inhaler at school. Educating parents to be familiar with their children's treatment regimen is critical in the management since this is solely the channel through which school nurses and other staff learn about the student's health care needs. For successful management of asthma in the school environment, these nurses stressed the importance of collaboration between school teachers, parents, health care providers and school nurses. Teachers do not recognize that an asthma attack is occurring and often wait until the child is in serious distress before seeking the help of a school nurse (Major, D.A. et al, 2006).

Getch and Neuharth-Pritchett (2009) conducted a randomized sampling of 2,000 public school teachers in Georgia. Of these, 593 teachers responded, including 291 elementary and 302 middle-school teachers to explore teachers' knowledge of asthma and its management. The study proved that teachers who had asthma were more knowledgeable about asthma management than those without the disease. Although few of the teachers stated that they received asthma specific education through in-service training, the overall level of asthma knowledge was insignificant.

A cross-sectional study conducted by Lucas, T., Anderson M. A & Hill P. D (2012) which included 38 elementary school teachers (30 classroom teachers, 4 special education teachers, 2 physical education teachers, 1 music teacher, and 1 art teacher) revealed that majority of the participants were never offered formal training on asthma disease and management. Again, more than half of the participants demonstrated low levels of confidence in asthma management which further supports the idea of conducting asthma in-service for teachers prior to school reopening.

A systematic review carried out by Jaramillo & Reznik in 2015 to assess teachers' knowledge of the NHLBI guidelines on asthma management in the classroom indicates that school teachers are not familiar with the policies and procedures of asthma management. The review included nine articles written in English language and published in the United States. The articles were selected based on their relevance to the topic. The authors state that teachers relied heavily on school nurses to handle medical issues such as asthma and also noted that lack of full-time school nurses was a barrier to asthma management in schools. This study along with other reputable researches buttressed the importance of training teachers to perform asthma care in schools when a school nurse is not available.

A review of studies carried out by McClure et al. 2018 involved 90 elementary school students, 12 teachers and 1 parent. The study was a 4-month small group education session to teach students and teachers to identify asthma symptoms by Asthma Action Plan (AAP) zones and actions for each zone to increase daily asthma symptom self-assessments of elementary school students. The result shows increased teacher asthma knowledge and increased identification of asthma symptoms, asthma action plan zone and action steps by students. Again, this finding reinforces the importance of involving not only the teachers in the education but also the children but due to limited interaction allowed by the school due to the pandemic, this scholarly project does not involve children.

A literature review conducted by Hanley Nadeau & Toronto (2016) was also chosen for critical appraisal. The review reports that six themes emerged after a thorough review of 7 articles on barriers to asthma management for school nurses. Themes include: lack of resources and support, insufficient time, communication challenges, limited knowledge, and lack of awareness of school nurses' expertise. These themes are critical in managing asthma and supports the objective of this quality improvement project; providing education to teachers and other school staff to promote asthma knowledge and care in the school.

Search Strategies

Keywords searches of *Asthma education, Asthma, Children, Teachers-knowledge, Nurse* AND *absenteeism* were effective at generating applicable articles. Additional keyword searches include *asthma triggers in the school, School school-based asthma policy, action plan* AND *teachers' lack of knowledge* also provided useful articles that added to the content of this project. CINAHL, EBSCO and other search engines were used to search for articles covering from 2006-2020. The search was focused on titles and abstracts relevant to the research question and

published within a 14-year period. Inclusion criteria involved (1) Articles written in English language, (2) peer-reviewed empirical research articles, (3) Research conducted in the United States and outside the US, and (4) Articles on asthma management of school-age children (5-14 yrs.) by teachers/other school nurses in the school environment, (5) Randomized study design. Exclusion criteria included (1) Adults with asthma, (2) other language, and (3) Non-research articles (See appendix 3).

Critical Appraisal and Synthesis of the Body of Evidence

The findings from keeper articles were systematically reviewed for validity, reliability and relevance to the topic using the rapid critical appraisal questions for randomized clinical trial (RCTS)(Fineout-Overholt & Melnyk, 2005) and the Johns Hopkins critical appraisal tool (Nursing Evidence-Based Practice: Evidence level and quality guide). The level of evidence of the studies ranged from level 1 to level 5. (See appendix 4).

Implications for Practice

Use of EBP has been noted in practices to improve patient outcomes, reduce cost, eliminate errors, and save time. Implementing a personalized asthma action plan empowers students and teachers to effectively identify asthma symptoms and manage attacks in the school environment. Schools that adopted asthma policy as well as asthma educational material for their teachers and students recorded less missed school days than those who did not (Carvalho Coelho et al., 2016). Other researchers endorse the shared-decision making as a way to improve both communication, patient-provider relationship and thus empower patients to efficiently manage their conditions (Kew, Malik, Aniruddhan, & Normansell, 2017).

The data from this project shows aptitude in improving asthma knowledge and care in the school through basic asthma education for the school teachers. The clinical and financial

implications of uncontrolled asthma and lack of basic asthma knowledge can result in a devastating outcome for both asthmatic children, parents and the school itself. It is therefore imperative that basic asthma education for the school teachers remains an irrefutable priority for schools.

Methods: Implementation and Evaluation Plan

Project Setting and Population

The project was conducted at the selected private elementary school in a suburban area. Student population is not more than 170 with at least 15 teachers not including the principal and other office staff. Teachers are mostly Caucasian females and a few Hispanics. Students are predominantly Caucasians from educated, middle income families.

Action Plan

The DNP student conducted a pretest assessment with a modified questionnaire (How asthma friendly is your school) from NHLBI to determine if the school has asthma policy and to assess the teachers' preparedness in handling asthma attacks confidently when the school nurse is not available. Same questionnaire was further modified to capture relevant questions pertinent to this project to determine if the asthma presentation provided to the school teachers improved their asthma knowledge and confidence in assisting during an asthma attack. Asthma education was provided via PowerPoint presentation and emailed to the school principal who in turn, shared it with the school teachers. The content of the asthma education program consisted of the following topics: General information about asthma, asthma burden and statistics, etiology, pathophysiology, signs and symptoms, asthma attack triggers, management of asthma using inhaled medication with and without a spacer, how to use a peak flow meter, and asthma and sports. (See tables for sample questionnaires 1 and 2)

Implementation Process

Institutional Review Board for expedited review was applied for and approval received to carry out this study. The school principal and school nurse were informed about the study's aim; designed to improve asthma understanding and care among school teachers. It is a quality improvement project to evaluate current asthma policy at the school and introduced asthma educational materials to participants using evidence-based practice model. Permission was granted by the principal to conduct the study. Each participant was given a letter of informed consent before participation and told that completion of the questionnaires was considered a written consent for their participation. Also, the letter of informed consent given to the participants included the study's purpose. All questionnaires were printed and given to the school principal to distribute to participants. Results were collected and returned to the researcher by the school principal. Anonymity of the participants was maintained as no name or personal descriptive information was written on the questionnaires. Participants were not exposed to any harm and participation was voluntary.

Timeline

This quality improvement project took about 1 to 2 months to be completed. The student worked with the school principal to develop a timeframe that will work for the participants.

Economic Evaluation

The benefits of the project outweighs the minute financial risks if any associated with the implementation of a school-based asthma policy. The project was carried out in a cost-effective way and no participants were asked for monetary contribution.

Outcomes of Project

Overall outcomes of the project relates to evaluating the effects and process of a school-based asthma protocol to improve asthma management in the school environment. Adopting EBP for asthma management will enhance care outcomes, improve the child's asthma management in the school and reduce classroom interruptions and stress on the teachers and students. The goal of this quality improvement project was to determine if the asthma education provided to the participants helped to improve their confidence level to ultimately improve asthma care in the selected elementary school. The target school has about 15 teachers with majority being full-time employees. 14 of these teachers participated in this study (n=14) and this represents 93% of the total anticipated participants. The school lost a few teachers who decided to resign their positions due to concerns related to the covid-19 pandemic. Majority of the participants were females (n= 13, 93%), and only one male participant. Most participants had 10 or more years of teaching experience. Participants are all Caucasians, well in between 40 to 50 years old (n=9, 64%), only (n=3, 21%) participants in the 50 to 60 years age range and (n=2, 14%) were between 30 and 40 years old. It is quite impressive to know that majority of the participants obtained a bachelor's degree (n=10, 71%) and (n=4, 28%) indicated that they have master's degree. Written comments were provided by only two participants (n=2, 14%) which were positive. In the comment section, they stated that they have family members with asthma and believe that this educational intervention answered some of the questions they would have asked the doctor, recommended sharing the educational intervention with new teachers. (See appendix 5, tables 3 & 4 below for results).

Discussion of Future Recommendations and Conclusions

Although Ohio has more number of asthmatic children compared to the US child asthma record, Wood county was not listed as one of the priority counties; places with higher prevalence

of asthmatic children such as Lucas and Cuyahoga (ODH, 2019). Therefore, due to the location and limited sample size in this project, it is recommended that future works include larger population size, lower income localities and asthma priority counties for more generalizable findings. Furthermore, the majority of the participants were females, it will be interesting to see other findings that will include more men. Many researchers have shown that asthma knowledge level among school teachers are low and many schools do not offer asthma education for the teachers despite high prevalence of the disease among children. It has been shown that asthma education for the teachers improves teachers comfort level in managing an asthma attack in the school and thus the education should be offered to teachers as in-service.

Strengths and Limitations

There is a large body of evidence with high quality that supports this project and the need to use PAAP for better health outcomes and to reduce school absenteeism. The use of Stetler Model of EBP implementation made this project's implementation easy to understand, and follow. Using a validated questionnaire and references from randomized control trials further strengthened the finding in this study and pleaded the case to educate the teachers on asthma management.

There are few limitations with this study. First limitation is the small sample size; participants in this study were few and mostly Caucasians. Another limitation has to do with the school location. The school is located in a more affluent environment which makes it less likely to see similar results provided in other articles or to generalize the findings. Also, administrative barriers impacted the timeline and success of this project. Due to the current covid-19 pandemic, some of the school teachers resigned their positions which further reduced the sample size of the participants.

Summary

Childhood asthma is a growing health issue around the world. Asthma is a chronic lung disease that causes episodes of wheezing, increased mucus production and bronchoconstriction making it hard to breathe. Depending on the degree of airway limitation, asthma symptoms range from mild to severe or even fatality in the worst case scenarios. It is also recognized by many articles as the leading cause of school absenteeism among school-age children. Asthmatic children can still live a healthy life and partake in sports activities when symptoms are properly controlled. "Schools with asthma-friendly policies and coordinating services among health care providers, school personnel and families support students with asthma by providing a healthy learning environment" (ODH, 2018). Asthma triggers in the school environment create an unpleasant learning environment. The cost of uncontrolled asthma affects both asthmatic children, their families and the whole society. According to Major et al. (2006), pediatric asthma treatment in the United States, including days lost from work, amounts up to $11.3 billion yearly. Studies indicate that teachers are not well prepared to handle asthma related emergencies and one of the ways to reduce asthma related fatalities in the school is to provide asthma in-service or online education that can help prepare teachers to assist children in respiratory distress.

Based on the findings of this quality improvement study, asthma education in-service is an easy and cost effective way to improve elementary school teachers' asthma confidence level and care knowledge.

References

Carvalho Coelho, A. C., Barretto Cardoso, L. S., de Souza-Machado, C., & Souza-Machado, A. (2016). The impacts of educational asthma interventions in schools: A systematic review of the literature. *Canadian Respiratory Journal*. https://doi.org/10.1155/2016/8476206

Centers for Disease Control and Prevention (2017). Asthma prevalence in US. Retrieved from https://www.cdc.gov/asthma/asthmadata.htm

Dang, D., Melnyk, B. M., Fineout-Overholt, E., Yost, J., Cullen, L., Cvach, M., Larabee, J. H., Rycroft-Malone, J., Schultz, A. A., Stetler, C. B. & Stevens, K. R. (2019). Models to guide implementation and sustainability of evidence-based practice. In B. Melnyk & E. Fineout-Overholt (eds), *Evidence-based practice in nursing and healthcare. A guide to best practice*. 4th ed. (Pp.378-389). Philadelphia, PA: Wolters Kluwer.

Fineout-Overholt, E., Levin, R. F., Melnyk, B. M. (2005). Strategies for advancing evidence-based practice in clinical settings. *Journal of the New York State Nurses Association.* (Pp. 22-32). Retrieved from: https://pdfs.semanticscholar.org/4595/f9185c35c9167de08a0acf6899fdddbcfd57.pdf

Getch, Y. Q & Neuharth-Pritchett, S. (2009). Teacher characteristics and knowledge of asthma. *Public Health Nursing, 26* (2), 124–133. Retrieved from https://onlinelibrary-wiley-com.lc.opal-libraries.org/doi/full/10.1111/j.1525-1446.2009.00763.x

Hanley Nadeau, E., & Toronto, C. E. (2016). Barriers to asthma management for school

nurses. *Journal of School Nursing, 32*(2), 86–98. https://doi.org/10.1177/1059840515621607

Hsu, J., Qin, X., Beavers, S. F., & Mirabelli, M. C. (2016). Asthma-related school absenteeism, morbidity, and modifiable factors. *American Journal of Preventive Medicine, 51*(1), 23–32. doi:10.1016/j.amepre.2015.12.012xc

Jaramillo, Y., & Reznik, M. (2015). Do United States' teachers know and adhere to the national guidelines on asthma management in the classroom? A systematic review. *Scientific World Journal*. https://doi.org/10.1155/2015/624828

Kawafha, M. M., & Tawalbeh, L. I. (2015). The effect of asthma education program on knowledge of school teachers: A Randomized Controlled Trial. *Western Journal of Nursing Research*, 37(4), 425-440. doi:10.1177/0193945914528070

Kew, K. M., Malik, P., Aniruddhan, K., & Normansell, R. (2017). Shared decision-making for people with asthma. *The Cochrane database of systematic reviews, 10*(10), CD012330. https://doi.org/10.1002/14651858.CD012330.pub2

Lucas, T., Anderson, M. A., & Hill, P. D. (2012). What level of knowledge do elementary school teachers possess concerning the care of children with asthma? A pilot study. *Journal of Pediatric Nursing, 27*(5), 523–527. https://doi.org/10.1016/j.pedn.2011.07.004

Major, D. A., Clarke, S. M., Cardenas, R. A., Taylor-Fishwick, J. C., Kelly, C. S., & Butterfoss, F. D. (2006). Providing asthma care in elementary schools: Understanding barriers to determine best practices. *Family & Community Health, 29*(4), 256–265. https://doi.org/10.1097/00003727-200610000-00004

McClure, N., Seibert, M., Johnson, T., Kannenberg, L., Brown, T., & Lutenbacher, M. (2018).

Improving asthma management in the elementary school setting: An education and self management pilot project. *Journal of Pediatric Nursing, 42*, 16-20. doi:10.1016/J.PEDN.2018.06.001

Melnyk, B.M., & Fineout-Overholt, E. (2015). Evidenced-based practice in nursing & healthcare: A guide to practice. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins.

National Institutes of Health. National Heart, Lung, and Blood Institute (NHLBI, 2014). Managing Asthma: A guide for schools. Retrieved from http://www.nhlbi.nih.gov/files/docs/resources/lung/NACI_ManagingAsthma-508%20FINAL.pdf

Ohio Department of Health (2018). Asthma Management. Retrieved from https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/asthma-program/asthma-manage/

Ohio Department of Health, (2019). Asthma Program: burden of asthma in Ohio. Retrieved from file:///C:/Users/ugo/Downloads/Asthma+Burden+Report.pdf

Reznik, M., & Halterman, J. S. (2016). School asthma policies and teachers' confidence and attitudes about their role in asthma management. *Annals of allergy, asthma & immunology: official publication of the American College of Allergy, Asthma, & Immunology, 116*(5), 473–475. https://doi.org/10.1016/j.anai.2016.03.005

Schaffer, M.A., Sandau, K.E. & Diedrick, L. (2013). Evidence-based practice models for organizational change: Overview and practical applications. Journal of Advanced Nursing 69(5), 1197–1209. doi: 10.1111/j.1365-2648.2012.06122.x

Toole, K.P. (2013). Helping children gain asthma control: Bundled school-based

interventions. *Pediatric Nursing*, *39*(3), 115-124. Retrieved from https://www.pediatricnursing.net/ce/2015/article3903115125.pdf

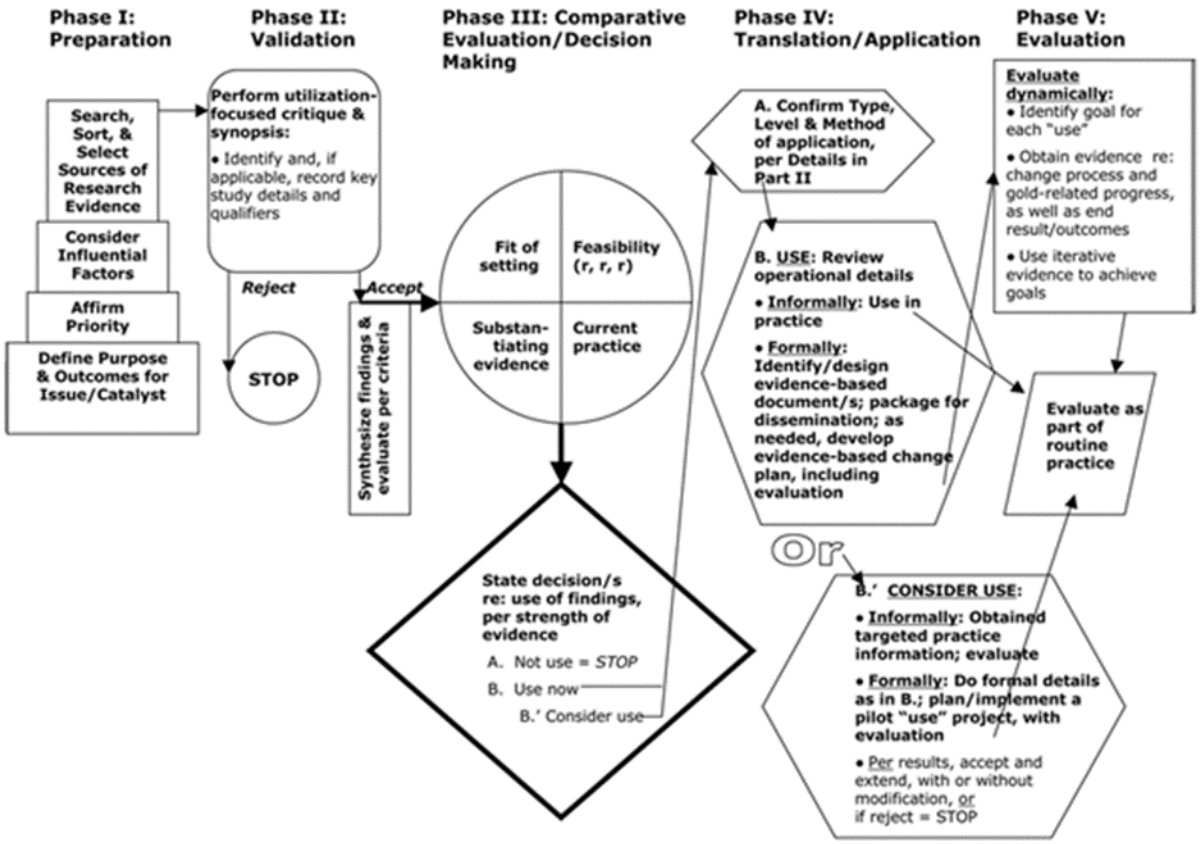
Appendix A:

Prevalence of Asthma in Ohio and the U.S.

Figure 1. Asthma Prevalence Among Children in Ohio and the U.S., 2012-2018.

Sources: CDC, Behavioral Risk Factor Surveillance System Survey Data, 2012-2018

Appendix B: The Stetler Model of EBP



Appendix C: There are 8 keeper articles. Search Strategies for Review of the Literature

317 Reviewed

8 Keeper Articles

Included (2006-2020)

RCT (2)

Systematic Review (4)

Cross-sectional

sampling (1)

Non RCT (1)

Databases searched:

CINAHL

PubMed

EBSCO

Keywords:

Asthma

Children

Teachers

knowledge

Nurse

Asthma-education

Absenteeism

School

Excluded articles:

Non-English language

Not involve children

and school teachers

Appendix D

Keeper Studies for Inclusion Examining Level of Evidence and Quality of Evidence

			Level of Evidence							Quality of Evidence		
Author(s)	**Year**	**#**	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**High**	**Good**	**Low**
Hanley et al.	2016	1		X							X	
McClure et al.	2018	2		X							X	
Reznik et al.	2015	3	X							X		
Lucas et al.	2012	4				X					X	
Getch et al.	2009	5	X							X		
Clarke et al.	2006	6			X						X	
Carvalho et al.	2016	7	X								X	
Kwafaha et al.	2015	8	X							X		

Appendix E: Survey Result

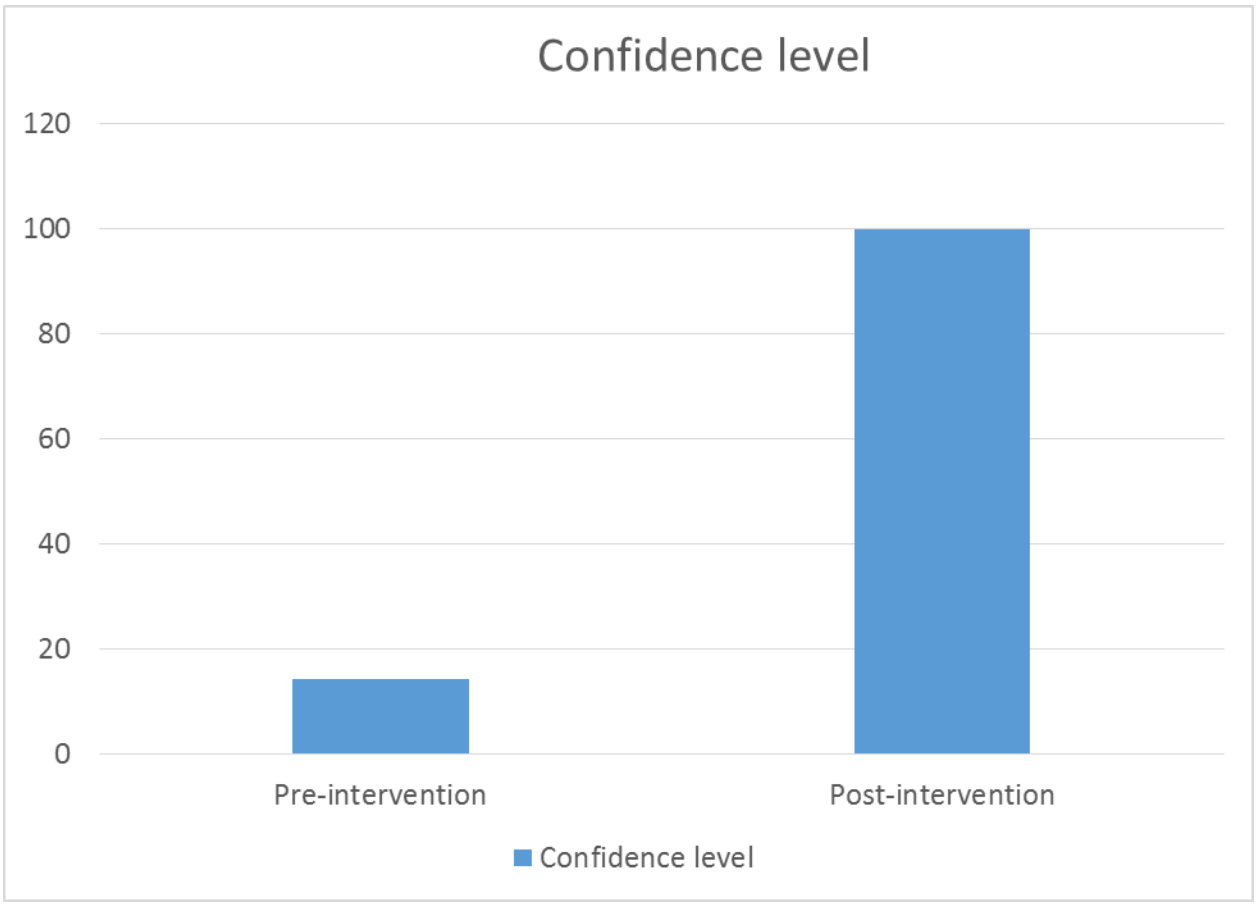


Table 1: Asthma awareness pretest questions for school teachers

Yes	No	
		I have less than 5 years of teaching experience
		I have more than 5 but less than 10 years of teaching experience
		I have 10+ years of teaching experience
		I have experience with asthma and its medications
		I feel confident in assisting a student during an asthma attack
		I have previously received an asthma education
		Does your school have a written emergency plan for staff to follow to care for a student who has an asthma attack?
		Does your school have a policy that allows students to carry their own asthma medicine?
		Do you have any student with asthma in your classroom?
		Is there a school nurse in your school building always during school day?
		Are you a full-time teacher at this school?

Please circle the appropriate response below

1. Gender: Male Female Other
2. Age Range: 20 - 30 40 - 50 60 and above
3. Race: White African American Hispanic Native American Other

4. Level of education: High School Associate Degree Bachelor's Degree Master's Degree Doctoral Degree

Table 2: Asthma education post-test questions.

Please answer the following questions:

Yes	No	
		I have previously received an asthma education through this school.
		The asthma education provided by Lourdes University student was clear and understandable.
		The asthma education was a good refresher course for me.
		This is my first asthma education course.
		I feel more comfortable now in taking care of a student with asthma than before.
		The asthma education did not help me.
		I believe that this presentation can help other teachers become more confident in caring for students with asthma.

Please add any additional comments you have regarding this presentation:

Table 3: Asthma awareness pretest questions for school teachers

Question Number	Survey Questions	N0 of participants that answer **YES**	% of participants that answered yes	N0 of participants that answer **NO**	% of participants that answered No	Total number of Participants
1	I have less than 5 years of teaching experience	2	14.3	12	85.7	14
2	I have more than 5 but less than 10 years of teaching experience	2	14.3	10	71.4	14
3	I have 10+ years of teaching experience	10	71.3	4	28.6	14
4	I have experience with asthma and its medications	9	64.3	5	35.7	14
5	I feel confident in assisting a student during an asthma attack	2	14.3	12	85.7	14
6	I have previously received an asthma education	4	28.6	10	71.4	14
7	Does your school have a written emergency plan for staff to follow to care for a student who has an asthma attack?	1	7.1	13	92.9	14
8	Does your school have a policy that allows students to carry their own asthma medicine?	7	50	7	50	14
9	Do you have any student with asthma in your classroom?	5	35.7	9	64.3	14
10	Is there a school nurse in your school building always during school day?	10	71.4	4	28.6	14
11	Are you a full-time teacher at this school?	10	71.4	4	28.6	14

Table 4: Asthma education post-test questions.

Please answer the following questions:

No	Survey Questions	N0 of participants that answer **YES**	% of participants that answer YES	N0 of participants that answer **NO**	% of participants that answer NO	Total Participants
1	I have previously received an asthma education through this school.	2	14.3	12	85.7	14
2	The asthma education provided by Lourdes University student was clear and understandable.	14	100	0	0	14
3	The asthma education was a good refresher course for me.	13	92.9	1	7.1	14
4	This is my first asthma education course.	8	57.1	6	42.9	14
5	I feel more comfortable now in taking care of a student with asthma than before.	14	100	0	0	14
6	The asthma education did not help me.	0	0	14	100	14
7	I believe that this presentation can help other teachers become more confident in caring for students with asthma.	14	100	0	0	14