

SCHOOL NURSE-LED ASTHMA INTERVENTION FOR ELEMENTARY SCHOOL-
AGE CHILDREN LIVING WITH ASTHMA

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DEDICATION

I dedicate this dissertation, first to the almighty God, who is the most gracious and the most merciful. After that, I want to dedicate this work to my husband, Ismet Sean Isik, to my daughter, Baycha Emine Isik, and to my son, Fikret Selim Isik. I am grateful to have you as my family. You have made my life wonderful.

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ABSTRACT

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SCHOOL NURSE-LED ASTHMA INTERVENTION FOR ELEMENTARY SCHOOL- AGE CHILDREN LIVING WITH ASTHMA

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The purpose of this study was to examine the effectiveness of a theoretically based school nurse-led asthma intervention on symptoms, asthma self-management with peak flow meter usage, daily activities, and school absences in elementary school age children between the ages of seven and twelve. A randomized controlled, two-group, repeated measures design (pre-test, post-test, and follow-up test) was used. This study was conducted from September 2018 to June 2019 in eight public primary schools. A computer-generated randomization process was used to assign 73 subjects to the treatment or control group. The treatment group participated in a school nurse-led asthma intervention program comprised of six weekly 30-minute group lessons. The control group continued to receive usual asthma care. Data collection for both experimental and control group occurred at three time points: at baseline, 6 weeks, and 12 weeks. The treatment group had statistically significant differences in reported symptoms ($p < .001$), asthma control with a peak flow meter usage ($p < .001$), and fewer interruptions in their daily activities ($p < .001$) immediately post-intervention at 6 weeks and at 12 weeks in comparison to the control group. Although school absences were not statistically significant, the treatment group missed fewer school days than the control group. The

school nurse-led asthma intervention for elementary school-age children was effective to increase asthma self-management with peak flow meter usages, to decrease interruptions in daily activities, and to improve symptom management. This study supports the notion that elementary school-age children should have the opportunity to practice self-monitoring and setting goals for asthma self-management with the guidance of school nurses. Self-management is a complex process, especially for children, that necessitates professional contribution and guidance. School nurses can provide essential learning steps and continuity of care for school children. The study findings have the potential to motivate school health leaders and nurses to replicate studies and seek evidence to translate research into practice.

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CHAPTER I

INTRODUCTION

Asthma is a chronic respiratory disease common in children and adults. Asthma is characterized by inflammation of the lungs, bronchospasm, cough, chest tightness, chest pain, difficulty breathing, restlessness, irritability, nocturnal coughing, and wheezing (Asthma and Allergy Foundation of America [AAFA], 2015). In 2016, the National Center for Health Statistics reported 26.5 million people diagnosed with asthma and of those 6.1 million are children under 18 years of age in the United States (Centers for Disease Control and Prevention [CDC], 2018). Moreover, 3.2 million children experienced an exacerbation of asthma symptoms in 2016 (CDC, 2018). Despite advancing medical knowledge, asthma prevalence and exacerbation rates among children continue to rise as time passes. Asthma prevalence rates were 24 million (of which 6.3 million were children) in 2014, 24.6 million (of which 6.1 million were children) in 2015, and 26.5 million (of which 6.1 million were children) in 2016 (CDC, 2018). Furthermore, approximately 3 million children experienced asthma exacerbation in both 2014 and 2015, and about 3.3 million children in 2016 (CDC, 2018). The most recent National Asthma Data indicates that asthma disease affects both children and adults (CDC, 2018); thus, asthma self-management should be prioritized as a strategy to prevent asthma exacerbations and promote healthy active living.

Problem of Study

Asthma is a chronic disease that can be managed. Knowledge and skills are crucial elements to manage chronic diseases symptoms, including asthma. Symptoms and specific triggers must be known and recognized to eliminate concomitant asthma exacerbations, school and work absenteeism, disruption of daily activities, ambulance calls, emergency room visits, hospitalizations, and even death (Francisco, Rood, Nevel, Foreman, & Homan, 2017; Isik & Isik, 2017). Asthma is the main reason for school absences. Asthma related missed school days were 12.4 million in 2003, 10.4 million in 2008, and 13.8 million in 2013 (CDC, 2016). Student absences impact school budgets, particularly when funding is based on attendance rates (Harris et al., 2015). The financial impact of missed school and caregiver workdays is about \$5.9 billion (AAFA, 2015). The National Center for Health Statistics reported that 3,518 people died of asthma related causes in 2016 (CDC, 2018). Asthma related deaths can be prevented with effective asthma management (AAFA, 2015).

Asthma can manifest at any life stage; therefore, all individuals who live with asthma should have basic knowledge and skills to manage their asthma symptoms. Asthma affects the individual, their family, and the community. When asthma symptoms are managed effectively, children experience improvement in their quality of life, daily activities, sleep, and school attendance (Choong, Tsafnat, Hibbert, Runciman, & Coiera, 2015). Children, as well as adults, may not realize that asthma is a lifelong disease that must be controlled (American Lung Association [ALA], 2018). Parents of children diagnosed with asthma may think that their child no longer has the condition when

asthma symptoms are well controlled or do not present (ALA, 2018). Children with asthma can have normal days without breathing problems with good management, and this may lead to the misconception that the condition is cured. (U.S. Department of Health and Human Services [HHS], National Heart, Lung, and Blood Institute [NHLBI], 2013). Implementing a school nurse-led asthma intervention beyond the hospital setting will increase opportunities for learning about the condition and asthma self-management for children.

Rationale for the Study

The latest National Asthma Education and Prevention Program (NAEPP) guidelines emphasize that an effective asthma management plan should include educating school-age children about the disease (National Institute of Health [NIH], 2012). Asthma management programs for school-age children living with asthma have been studied in the literature (van Bragt et al., 2015). Several asthma education programs were designed to increase children's knowledge about asthma (Grover et al., 2016; Horner, Brown, Brown, & Rew, 2016; Kintner et al., 2015; Payroovee, Kashaninia, Mahdaviani, Rezasoltani, 2014; Suwannakeeree, Deerojanawong, & Prapphal, 2016). These interventions reported increased prevention behaviors, fewer emergency room visits, decreased hospitalization admissions, improved medication adherence, improved quality of life, and self-efficacy related to asthma management (Fiks et al., 2015; Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015). However, the aforementioned studies mostly focused on educating parents/guardians and addressed only the adults' concerns about asthma management (Fiks et al., 2015, Grover et al., 2016; Payroovee et al., 2014;

Suwannakeeree et al., 2016). There are scant studies on school-based asthma interventions targeting elementary school-age children or giving voice to the children's concerns (Rasberry et al. 2014; van Bragt et al., 2015). The available studies reported in the literature are descriptive studies. Best, Oppewal, and Travers (2018) emphasized the necessity of using stronger research methods, such as experimental and quasi-experimental designs related to asthma management for school-age children.

School-based asthma interventions are often conducted by researchers, who are not employed in the school settings where the programs are implemented. The National Institute of Health (2012) suggested increasing asthma education programs for asthma self-management beyond primary health clinics to include schools and community settings. School nurse-led asthma interventions conducted in school settings can focus on school-age children to develop successful asthma self-management strategies (Isik, Fredland, & Freysteinson, 2019; Kieckhefer et al., 2014; Suwannakeeree et al., 2016).

Theoretical Framework

Orem's self-care theory guided this study. Orem's theory consists of three correlated parts: theory of self-care, theory of self-care deficit, and theory of nursing system (Orem, 2001). Orem's self-care theory centers on individuals' self-care knowledge and skills. The theory posits that individuals should know and perform self-management activities to maintain and promote optimum health. Orem (2001) defined self-care as performing the needed actions in a timely fashion to protect, maintain, and promote wellbeing. Individuals can engage in self-care activities for self-management of

the disease based on their age, cognitive ability, experiences, culture, and available resources. Major assumptions of this theory are:

- Individuals are distinct, and self-care for health and well-being is a developmental process.
- Engaging in self-care basics is a vital element for self-management of the diseases, conditions, and for optimal wellbeing.
- Individuals should be as independent as possible, and accountable for their health maintenance in conjunction with family caregivers.
- If there is a disproportion between self-care needs and self-care abilities for self-management of health, individuals would benefit from nursing intervention.
- Individuals must have knowledge of present and potential health conditions to promote self-care behaviors.
- Self-care and dependent care are activities embedded in a social and cultural environment (Orem, 2001).

Self-care practices include three types of procedures: a) estimative that infers acknowledgment of the condition, b) transitional that infers knowing what to do in specific situations, and c) productive that implies performing and evaluating the needed action (Moore et al., 2009). Self-care may be more important to individuals who have a chronic illness. Self-care management requires knowledge of the condition and symptoms as well as the desire to attain the skills to perform needed actions to control symptoms (Kouba et al., 2013; Riegel, Jaarsma, & Strömberg, 2012). Orem's theory has been used to direct health promotion efforts and encourage patients to be more

independent in their daily lives. Historically, the nursing profession supports interventions that boost patients' self-confidence and health behaviors (National Institute of Nursing Research [NINR], 2016). There is a trend among nurse researchers for transitioning self-management from the family level to the individual level (Blok, 2017). Self-management is a priority in nursing research, especially as it relates to chronic diseases, such as asthma (Grady & Gough, 2014).

Orem's self-care theory asserts the importance of the child's awareness of asthma symptoms and the need to acquire the self-skills necessary to manage asthma for daily living. School nurse-led asthma intervention programs should be considered a part of routine care for school children living with the asthma. The school nursing community can play a fundamental role in adding to research evidence related to teaching school age children self- management practices by involving both researchers and clinicians in this effort (Best et al., 2018). Thus, nurses are ideally positioned to explore ways to increase individuals' knowledge and teach skills that enhance self-management of chronic diseases, such as asthma. Studies related to self-management behaviors based on Orem's self-care theory ensure that these behaviors will improve health outcomes (Blok, 2017; Mersal, & El-Awady, 2017).

Assumptions

This study was based on the following assumptions.

1. Children of elementary school age are individuals and can be accountable for their health maintenance.

2. Individuals must have knowledge about their present and potential health conditions; thus, it is essential to deliver age-appropriate health interventions that increase awareness on self-management.
3. Elementary school children can recognize disease symptoms, know what to do, and perform actions to manage their condition and promote their wellbeing.
4. When children actively participate in managing their condition's symptoms effectively, they are more likely to experience a healthy and active life.
5. Engaging in self-care basics for disease management reduces emergency room and hospital visits.

Hypotheses

The purpose of this study was to examine the effectiveness of a theoretically based school nurse-led asthma intervention on symptoms, asthma self-management, peak flow meter usage (PFM) to assess their pulmonary function, interruption of daily activities, and school absences in a sample of elementary school-age children between the ages of seven and twelve.

Specific Aim 1: To determine the relationships between exposure to a nurse-led asthma intervention and asthma self-management.

H1: Children living with asthma, who have participated in the nurse-led asthma intervention, will report fewer asthma symptoms as measured by Pediatric Asthma Quality of Life Questionnaire with standardized activities (PAQLQs) than children who received usual asthma care.

H2: Children living with asthma, who have participated in the nurse-led asthma intervention, will report better asthma self-management as measured by the Asthma Control Questionnaire (ACQ) with higher mean number of usages of PFM as recorded on PFM charts than children who received usual asthma care.

Specific Aim 2: To determine the relationships between exposure to a nurse-led asthma intervention and participation in daily activities and school absences.

H1: Children living with asthma, who have participated in the nurse-led asthma intervention, will report fewer interruptions of daily activities as measured by PAQLQs than children who received usual asthma care.

H2: Children living with asthma, who have participated in the nurse-led asthma intervention, will have less school absences than children who received usual asthma care.

Definition of Terms

Terms for this study are defined as follows:

1. Children living with asthma: Asthma is a chronic lung disease that affects children's lungs. Children may experience wheezing, breathing difficulty, chest tightness, and nocturnal or daytime coughing by hyper-responsiveness, inflammation, and muscle spasm. Asthma symptoms can be managed by adhering to the medicine regimen and controlling the triggers that can lead to an exacerbation (AAFA, 2015; CDC, 2018). Parents who reported that their child has been diagnosed with asthma were recruited for this study.

2. Usual care: The routine care provided by healthcare providers for treatment of the condition symptoms (Harlapur & Shimbo, 2013). Operationally, usual care consists of obtaining the prescribed medicines and asthma action plan written by the child's physician.
3. Nurse-led asthma intervention: A nurse delivered the asthma education classes for the treatment group consisting of six weekly 30-minute group class sessions.
4. Asthma symptoms: Scaling is a 7-point Likert scale with one indicating the symptom is severe and seven indicating the symptom is not present. A higher mean score indicates there are fewer asthma symptoms reported.
5. Self-management: The responsibilities and care that a person needs to carry out for daily living with a chronic condition (Johnston, Rogerson, Macijauskiene, Blaževičienė, & Cholewka, 2014; Orem, 2001).
6. Asthma self-management: The optimization of asthma control through the minimization of asthma symptoms, activity limitation, bronchoconstriction, and exacerbations (NIH, 2012). Asthma self-management was measured by ACQ and PFM usage as indicated by the participant's peak flow chart. Scaling is a 7-point Likert scale, and zero indicates good asthma management, while six indicates poor management. A lower mean score indicates a good asthma management.
7. School absence: A student is considered absent if they are not at school for a whole day. School absences were tracked numerically using the school absentee records.
8. Daily activities: The children's daily activities in and out school including physical education class, recess, going upstairs, or any other extracurricular physical activity

such as swimming and soccer (Juniper, Guyatt, Feeny, Griffith, & Ferrie, 1997). The PAQLQs items 1, 2, 3, 19, and 22 measured daily activities. Each participant selects three activities in which they are involved frequently and in which asthma affects their ability to participate in the activities. Scaling is a 7-point Likert scale, and one indicates severe interruption in daily activities, and seven indicates a child can actively participate in the activities without interruption. Higher mean scores indicate fewer interruptions in daily activities.

Limitations

Limitations of this study were: the sample was drawn from one geographic area in southwestern United States, the subjects' age, cognitive abilities, and experiences may influence the understanding of the concepts, and parents' thoughts and experiences were not included.

Summary

Educating young children about managing their asthma condition has the potential to increase their understanding of their own self-care responsibilities for wellbeing. When children learn how to manage their symptoms, they become confident in the management of their own condition; they are more active in their daily lives; and, they are more likely to have better school attendance. Participating in a school nurse-led asthma intervention at an early age is a good strategy to increase awareness of asthma self-management in young children. Being equipped with knowledge and skills enables a smoother transition to higher grade levels. Orem's self-care theory recommends educating individuals to acquire the knowledge and skills necessary for disease self-management. This study

demonstrates to school nurses the importance of teaching asthma self-management to elementary school-age children and may inspire school nurses and school health leaders to ramp up efforts to educate children as well as other stakeholders in their respective school communities.

CHAPTER II

REVIEW OF THE LITERATURE

School and Community-based Nurse-led Asthma Interventions for School-aged Children
and Their Parents: A Systematic Literature Review

A Paper Published in the

Journal of Pediatric Nursing in 2019

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ABSTRACT

Problem: Asthma is one of the most prevalent chronic diseases in the world. Lack of asthma knowledge can lead to asthma exacerbations, more emergency room visits, school absences, and decreased quality of life. This systematic review examines the effectiveness of educational intervention programs on asthma management for children and their parents beyond inpatient clinic settings.

Eligibility Criteria: Educational asthma interventions for school-aged children and their parents with comparison with usual asthma care and the outcome related to asthma management. Studies included were peer-reviewed and published in English within the last five years.

Sample: The eight study articles were identified in ProQuest, Medline, CINAHL, and PubMed databases.

Results: The review demonstrated that educational asthma interventions for children and their parents significantly improved knowledge and skills related to asthma self-management.

Conclusions: School and community-based asthma educational intervention programs are key components for good management of asthma condition. Well-planned education programs are valuable and should go beyond inpatient clinic settings for promoting and maintaining health for children with asthma and their parents.

Implications: School nurses are well-positioned to assume a more prominent role in asthma care to improve child health and academic outcomes. School nurses have an opportunity to establish a trusting relationship that is foundational for collaborating with parents and students for better asthma management.

Keywords: Asthma intervention, School-aged children, Parents, School nurse, Community-based asthma intervention

Introduction

Asthma is one of the most prevalent chronic diseases in the world (Harris et al., 2015). The Center for Disease Control (CDC) reported about 6.2 million children in the United States have asthma and 3.3 million children experienced an exacerbation of asthma symptoms based on 2016 National Health Interview Survey (NHIS) data (Centers for Disease Control [CDC], 2018). Uncontrolled asthma often leads to premature death (Asthma and Allergy Foundation of America [AAFA], 2015). In 2016, 3,518 people died of asthma related causes (CDC, 2018). Many asthma exacerbation deaths can be prevented with proper asthma management (AAFA, 2015). When asthma symptoms are not effectively managed, children can experience numerous asthma exacerbations and nocturnal coughing, which results in school absences, restriction from school activities, emergency room (ER) visits, and hospitalizations (Francisco, Rood, Nevel, Foreman, & Homan, 2017; Isik & Isik, 2017). Children living with asthma are at increased risk of disability, emotional problems, and lower academic achievement (Cicutto, To, & Murphy, 2013; Nurmagambetov, Kuwahara, & Garbe, 2018).

Asthma affects the lives of the parents or guardians as well as children (Heyduck, Bengel, Farin-Glattacker, & Glattacker, 2015). During an asthma episode, parents may need to stay at home with their child thereby missing work (Engelke, Swanson, & Guttu, 2014; Suwannakeeree, Deerojanawong, & Prapphal, 2016). Parents must not only worry about controlling their child's asthma but also the financial burden and stress the chronic illness adds to the family situation. Parents' knowledge about asthma severity and asthma management determines help seeking behaviors to manage their child's asthma

(Archibald, Caine, Hartling, & Scott, 2015). Parents' beliefs about asthma management, medication routines, and adverse side effects, impact asthma-related decisions and results in consequences for the individual, the family, and in turn, is likely to affect the quality of life and academic performance (Engelke et al., 2014; Heyduck et al., 2015). Therefore, it is crucial that most child health asthma education programs should include parents and focus on both the parents' and children's skillset and learning levels with the aim of developing successful asthma management strategies (Kieckhefer et al., 2014; Suwannakeeree et al., 2016). School nurses can implement nurse-led asthma education programs to develop successful asthma management strategies based on the National Asthma Education and Prevention Program (NAEPP) guidelines and National Association School Nurses (NASN) Framework recommendations for students and their parents (NASN, 2016).

Exploring different strategies beyond the inpatient clinic setting is key for successful asthma management. School nurses have an integral role in understanding the meaning parents assign to the asthma management to achieve better outcomes for children with asthma (Lemanske et al., 2016). Listening to the parents' experiences and understanding of asthma can lead to increased cooperation between parents and nurses and enhance asthma management. Parents may adopt a more positive approach when nurses value the parents' knowledge and involve them in establishing asthma management strategies for their children (Engelke et al., 2014). School nurses are in an advantageous position to manage asthma while creating a safe, healthy, and ready to

learn environment for all students (Friend & Morrison, 2015; Maughan, Duff, & Wright, 2016).

The NAEPP guidelines emphasize that an effective asthma management plan should educate school-aged children and their parents about the disease (National Institutes of Health [NIH], 2012). The NIH (2012) suggested increasing asthma education programs for self-management beyond primary health clinics to schools and community settings. School nurses are proponents of asthma education and can be resources for students and their parents by communicating and accessing available community resources such as the Environmental Protection Agency (EPA) for indoor air quality (NIH, 2012). The purpose of this systematic review is to explore school- and community-based educational intervention programs for school-aged children and their parents and to examine the effectiveness of the programs in asthma management. This review may ramp up school nurses' efforts to deliver asthma educational programs for their respective school communities. The systematic literature review aims to synthesize primary, peer-reviewed experimental and quasi-experimental studies.

Method

This systematic review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). The PRISMA guidelines are the studies' population, intervention, comparison, and outcomes (PICO) elements, and while identifying the eligibility of potential study articles, the PICO elements were employed to schematize the process for verifying eligible articles for this systematic review (Joanna

Briggs Institute, 2011). In regard of PICO methodology, the target population is school-aged children between 5 and 18 years old and their parents, the intervention is educational asthma interventions for children and/or their parents, the selected studies should have comparisons with the usual asthma care and educational asthma intervention, and the outcome interest should be related to asthma knowledge and skills needed to manage asthma; thus, lessening emergency room visits, hospitalizations, unscheduled physician visits, and missed school/work days.

Study Selection and Search Strategy

The literature review was conducted after a consultation with the university librarian. The databases searched for this review were ProQuest Nursing and Allied Health, Medline with full text (EBSCO), Cumulative Index of Nursing and Allied Health Literature (CINAHL) Complete, and PubMed Remote. The combinations of MeSH search terms were *asthma*, *students*, *parents*, *asthma management*, *educational intervention*, and *school*. The search was limited to human subjects, published between 2013 and 2018 in English, and peer reviewed. We searched the articles published in the past five years to include current information and to eliminate overlap from an earlier review that examined school- and community-based educational intervention programs for school-aged children and/or their parents. There are few systematic reviews on school health services that address the needs of students with chronic diseases and asthma programs effects on quality of life (Leroy, Wallin, & Lee, 2017; Walter et al., 2015). To our knowledge, there is no systematic review of nurse-led interventions for promoting asthma management. The aforementioned PICO elements formulated for the inclusion

criteria. Excluded criteria were a) study intervention programs not focused on asthma, b) asthma interventions for only adults (not related to their children), and c) non-experimental studies, qualitative studies, and dissertations.

Data Extraction

The search strategy resulted in 845 articles. The CINAHL search resulted in 19 citations, ProQuest resulted in 792, Medline located 14, and PubMed resulted in 20 citations. One researcher reviewed each abstract for inclusion. A stepwise progression of choosing and evaluating articles for synthesis was followed. Seven hundred and seventeen articles were excluded for the following reasons: not original research studies (i.e., guidelines, reviews, policy briefs, and commentaries $n = 487$); not experimental studies ($n = 126$); and duplicated items ($n = 104$). Primarily, 128 abstracts met screening criteria for a full, complete review. One reviewer performed full-text review with confirmation of the appropriateness to include into the review by other reviewers. After the full review, 120 articles were excluded for the following reasons: interventions were not school- or community - based interventions ($n = 111$); children were less than five years of age or older than 18 ($n = 7$); or the outcomes measured were not related to asthma management ($n = 2$). Consequently, eight articles were identified, and reference lists of retrieved articles were examined; however, the hand search did not uncover additional eligible articles (see Figure 2.1.).

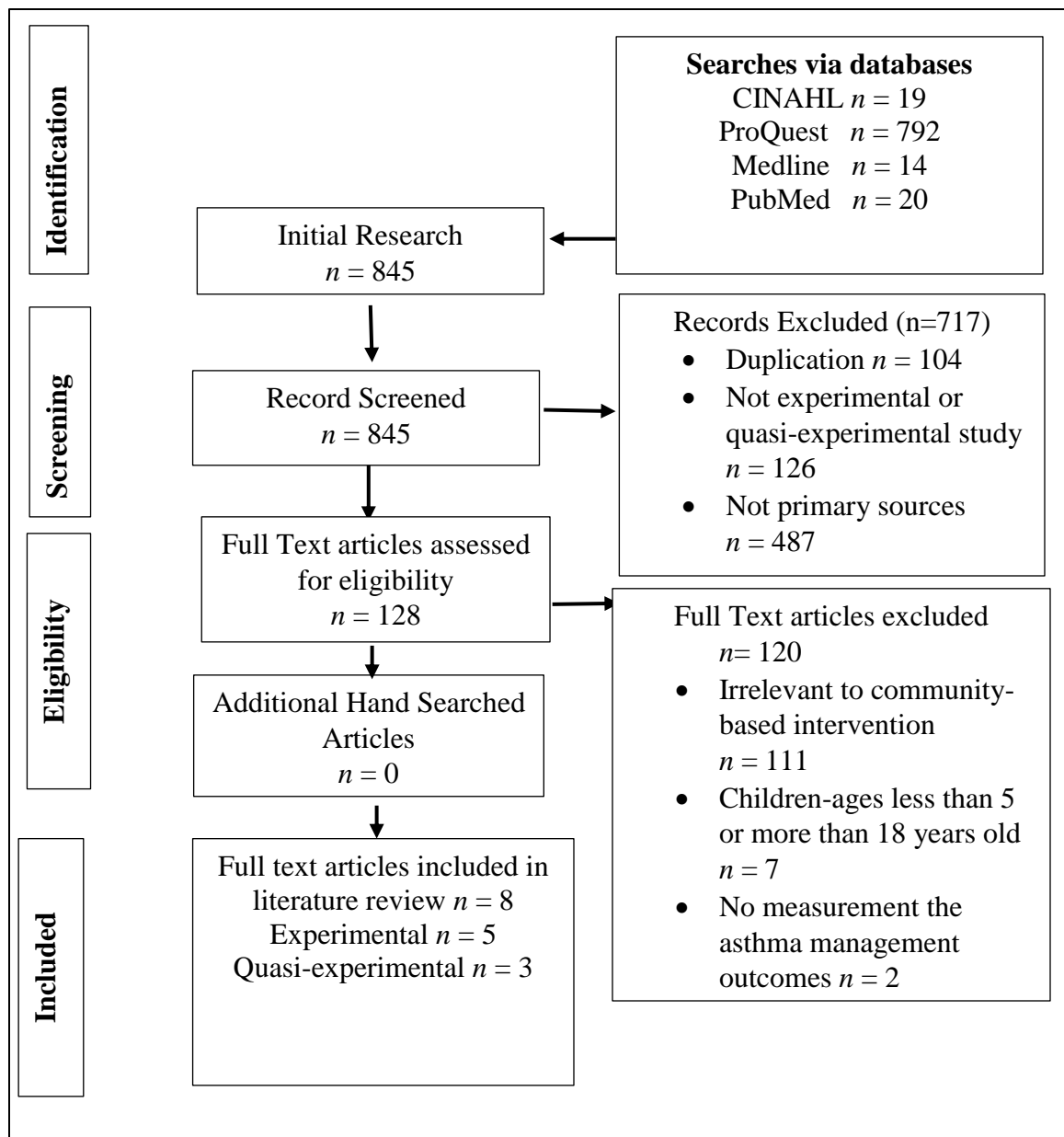


Figure 2.1. Flow Chart of Search and Screening Process

Quality Appraisal

The John Hopkins Nursing Evidence-Based Practice (JHNEBP) rating scale was used to assess the methodological strength of the evidence (Newhouse, Dearholt, Poe, Pugh, & White, 2005). In this systematic review, the data obtained from experimental studies/randomized controlled trials (RCT) were rated as a Level I study, and the data obtained from quasi-experimental studies were rated as Level II based on the JHNEBP rating scale and confirmed by the all three reviewers (Newhouse et al., 2005). Random sequence generation, allocation concealment, blinding of participants, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias were examined based on the Cochrane Collaboration's tool used for assessing risk of bias (Higgins & Green, 2011).

Results

There were five Level I studies and three Level II studies. The five studies were conducted in the United States, one Level II study was conducted in Iran, another was conducted in Netherlands, and the last was conducted in India. All eight selected studies were examined for potential bias by using Cochrane Collaboration's tool. Random sequence generation and allocation concealment were stated in all eight studies. Fiks et al.'s (2015) and Horner, Brown, Brown, and Rew's (2016) studies were double blinded. Kintner et al.'s (2015) and van Bragt et al.'s (2015) studies were single blinded. The other four studies did not mention blinding (Grover et al., 2016; Payroovee, Kashaninia, Mahdavian, & Rezasoltani, 2014; Rasberry et al., 2014; Suwannakeeree et al., 2016). All studies have complete outcome data for each main outcome. However, one study did not

show a significant result due to inadequate sample size (van Bragt et al., 2015). All studies reported the selective outcomes. Other sources of bias were not found in the studies. All studies included in the systematic review were compiled into a data extraction matrix that included author/year, the study purpose/question, sample size/country, method & measurement tool, and findings (see Table 2.1.).

The eight studies combined represented 1,108 school-aged participants, ranging from 6 to 18 years of age. Sample sizes ranged from 24 (Grover et al., 2016) to 456 (Rasberry et al., 2014). Six studies used a child-parent dyad as the unit for the sample (Fiks et al., 2015, Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015; Payroovee et al., 2014; Suwannakeeree et al., 2016), and parents sample size represented 381. Two studies used only children as the sample (Rasberry et al. 2014; van Bragt et al., 2015). Suwannakeeree et al. (2016) included five teachers, 47 students with asthma, and 14 parents. The intervention programs were primarily conducted in school settings. Local church community halls and public conference rooms were also used in addition to school settings for asthma intervention programs. Fiks et al. (2015) used electronic health records linked to patient portals to enable mutual goal settings with children and the parents for asthma management. Grover et al. (2016) recruited children and their parents from an outpatient clinic. Horner et al. (2016) delivered two modes of an educational intervention for second through fifth-grade students and their parents. The intervention components are listed in Table 2.2. Socioeconomic status was not consistently documented, but three articles mentioned most of the participants had a lower socioeconomic level (Horner et al., 2016; Rasberry et al., 2014; Suwannakeeree et al.,

2016). All the studies clearly stated they used the reliable measurement tools for measuring the outcomes.

Table 2.1

Studies Included in the Literature Review

Author/Year	Purpose/Question	Sample/ Country	Method & Measurement Tool	Findings
Level 1 Studies				
Fiks et al. (2015)	To assess the feasibility, suitability, and effect of MyAsthma an electronic health record linked patient portal supporting shared decision making for children with asthma.	Convenience sampling 60 families, 30 in intervention and 30 in control group. USA	Randomized Controlled Trial & Integrated Therapeutics Group Child Asthma Short Form to measure asthma-related quality of life, Parent Patient Activation Measure, and the Asthma Control Tool (ACT).	Intervention group reported fewer ER visits, asthma specialist visits, and hospitalization over six months compared to control group. The children had a less frequency of asthma exacerbations. Parents' knowledge has been increased about asthma, and they missed fewer days of work due to asthma compared to usual care group ($p = .001$).
Grover et al. (2016)	To progress, apply, and assess the effectiveness of culturally applicable asthma education intervention program for children with asthma and their parents.	Convenience sampling 40 parent-child pairs 24 pair in intervention	Randomized Controlled Trial & Pediatric Asthma Caregiver Quality of Life (PACQL).	Significant improvement in the dependent variables including asthma control ($p < .01$), asthma knowledge ($p < .001$), written asthma action plan, medication use ($p < .001$), and quality of life

		and 16 pair in control group. India		in the intervention group compared to usual care group.
Horner, Brown, Brown, and Rew (2016)	To examine the impacts of two methods of providing an asthma education program in two different settings; a school setting and a community setting on condition outcomes and asthma self-management in elementary students in the countryside.	Stratified sampling 33 elementary school in 5 rural school districts 238 second through fifth grade students. USA	Randomized Controlled Trial & Asthma Inventory for Children and Severity of Chronic Asthma Scale.	Participants in the two intervention groups resulted in fewer doctor visits ($p = .048$) for asthma symptoms, ER visits ($p < .001$), and severity of asthma ($p = .004$) than the attention- control groups.
Kintner et al. (2015)	To explore the efficacy of the SHARP program for fourth and fifth-grade students and their parents on increasing active asthma self-care behaviors.	Convenience sampling 205 students ages between 9 and 12 years and their parents. USA	Cluster Randomized Controlled Trial & Asthma Health Behaviors (AHB) Survey and General Health History Survey.	Asthma episode management ($p = .006$) and risk- reduction/prevention behavior were significant ($p < .001$), and health advancement behaviors remained same.

van Bragt et al. (2015)	To explore the efficiency of the individualized self-management care on health-related quality of life (HRQL) in elementary school-aged children with asthma compared to enriched usual care.	33 children; 18 in the enhanced usual care, and 15 in the intervention group. Dutch	Cluster-Randomized Controlled Trial & Paediatric Asthma Quality of Life Questionnaire with standardized activities (PAQLQ(s))	HRQL improvement seen in both groups (intervention group 33% and enhanced usual care 57%).
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Level II Studies

Payroovee, Kashaninia, Mahdavian, and Rezasoltani, (2014)	To evaluate the effect of family empowerment on the quality of life of school-aged children with asthma.	Convenience sampling 45 children ages between 7 and 11 years old and their parents. Iran	Two group, Quasi-experimental study & Paediatric Asthma Quality of Life Questionnaire with standardized activities (PAQLQ(s)).	Family-based asthma-empowerment interventions support children with asthma and their parents to gain knowledge and skills about asthma disease and asthma management effectively ($p < .001$).
Rasberry et al. (2014)	To explore whether students in the asthma program demonstrated better asthma control than students in a comparison school district, and students in the asthma program demonstrate signs of progress in asthma	2 school district, 5 schools, 456 students. USA	Two group, Quasi-experimental, cross-sectional design & Asthma Control Questionnaire (ACQ).	Students with asthma in the intervention school district demonstrated significantly superior asthma management than students with asthma in the comparison district ($p = .0085$). Students with poorly controlled asthma at baseline demonstrated

	control between the starting point and follow-up.			that they had significantly greater FEV1 scores at follow-up.
Suwannakeeree, Deerojanawong, and Prapphal, (2016)	To evaluate the efficiency of school-based asthma instructive interventions on asthma outcomes and asthma management in school-aged children.	47 students ages between 7 and 15 years old, 14 parents, and 5 teachers. USA	Repeated quasi-experimental study & International Study of Asthma and Allergies in Childhood (ISAACS) questionnaires and Paediatric Asthma Caregiver's Quality of Life Questionnaire (PACQL).	Asthma management level was improved among children and their parents. They reported lessening ER visits ($p = .002$), hospitalization rates, nighttime asthma symptoms ($p = .02$), and school absenteeism ($p = .01$) at six month's post-intervention time. Teachers' asthma knowledge significantly increased.

Level I Studies

Fiks et al. (2015) expressed that the reason for asthma office visits can vary, and asthma status can change between visits; further, limited time for office visits may not be enough to recognize parents' concerns and knowledge of asthma management behaviors. The study aimed to assess the feasibility, suitability, and effectiveness of the MyAsthma electronic health record linked to patient portals, supporting shared decision making for children with asthma. MyAsthma tracks parents' concerns and goals, asthma treatment for the children, children's asthma symptoms, medication adherence, and it also provides decisional support for parents on the asthma management. Shared Decision Making (SDM) includes active participation of healthcare professionals and parents in management choices, information exchange, communication preferences, and mutual agreement of the purpose of an asthma management plan. The SDM method is related to increased knowledge, improved awareness of condition risk, and enhanced agreement of choices with subjective values. Stata version 13 (Stata Corp) were used for the analysis, but there was not an information which test(s) was used to analyze the data. The intervention group parents reported fewer ER visits, asthma specialist visits, and hospitalizations over a six-month period compared to the control group. The intervention group parents also reported that the children had fewer asthma exacerbations and their own knowledge of the asthma disease process had increased. The study results showed missed work and school days significantly decreased ($p = .001$) in the intervention group compared to usual care group.

Grover et al. (2016) designed a study to develop, apply, and assess the effectiveness of a culturally relevant asthma education intervention program for children with asthma and their parents in India. The key principles for the intervention were meaningful learning, art therapy, problem-based learning, and goal setting. Power point presentations, children's workbooks, age-appropriate graphically appealing activities, and open-ended communications were used for the intervention. At baseline, there was no difference between the usual and intervention group. Repeated measure ANOVA demonstrated a statistically significant improvement in the dependent variables, including asthma control ($p < 0.01$), asthma knowledge ($p < .001$), inhaler technique ($p < .001$), and quality of life ($p < 0.001$) in the intervention group compared to the usual care group. At the beginning of the study, none of the participants had a written asthma action plan in either group. All participants in the intervention group had a written asthma action plan ($n = 24$) at the end of the study. The study findings indicated that an intensive, culturally appropriate, multi-component, individualized intervention program was effective. Goal setting procedures with parents and children helped to achieve goals and enhance the self-efficacy of children and parents to effectively manage asthma.

Horner et al. (2016) stated that rural area populations encounter considerable obstacles related to asthma care, including lower financial status, more uninsured residents, and fewer healthcare professionals to meet population needs. Healthcare services usually are not as available, and patients are required to travel longer distances and spend more time to access and receive care. The study aimed to examine the impact of two methods of providing an asthma education program in two different settings: (a)

the school setting and (b) the community setting. Two modes of delivering a nurse-led asthma intervention program included an asthma class in school and an asthma day camp held on Saturdays. The latent growth curve modeling in SAS 9.3 were used for each group data analyzing. The asthma day camp intervention demonstrated more significant results with fewer ER visits ($p < .001$) and hospitalization ($p = .13$) compared to asthma class in school and compared to both attention control groups. Moreover, the asthma class in the school setting demonstrated a significant decrease in asthma severity ($p = .004$) and unscheduled doctor visits ($p = .048$) compared to the asthma day camp and both attention control groups. However, the findings supported that participants in the both intervention groups resulted in better selected health outcome variables, including fewer doctor visits for asthma symptoms, fewer ER visits, and improved asthma symptoms compared to the attention-control groups. Moreover, students' asthma self-management performance improved significantly over time for all the students in the study.

Kintner et al. (2015) suggested state achievement tests are used to measure academic outcomes; therefore, school superintendents/principals may be hesitant to adopt non-academic programs. For that reason, the Staying Healthy–Asthma Responsible and Prepared (SHARP) program is designed to improve academic performance by incorporating better self-management asthma techniques within the school curriculum (Kintner et al., 2015). SHARP is designed for middle and high school students to educate them as well as community populations, including parents, family members, teachers, and peers about asthma and self-management. Kintner et al. (2015) explored the

effectiveness of the SHARP program for fourth and fifth-grade students and their parents. Within SHARP, successful self-care behaviors were a goal, and it is categorized as asthma episode management, risk-reduction/prevention, and health advancement activities. The school intervention module entailed ten 50-minute sessions. The community intervention module is a 90-minute session incorporated into an asthma health fair for parents and students with a collaborative information and sharing exhibition. Various statistic tests were used for analyzing the data including inferential and descriptive statistic, the R Amelia package were completed as justification for missing data, and sensitivity analysis was used to check outcomes. The study findings demonstrated statistically significant improvement in asthma episode management ($p = .006$). The risk-reduction/prevention behaviors were significantly improved ($p < .001$), while health advancement behaviors remained the same.

van Bragt et al. (2015) used a cluster randomized controlled trial with a nine month follow-up to explore the effectiveness of individualized self-management care on health-related quality of life (HRQL) in Netherland elementary school-aged children with asthma compared to enriched usual care. The individualized self-management program addressed the unique needs of each child. Enriched usual care entailed an evaluation of symptoms, medication adherence, and experience managing asthma triggers. A multi-level analysis technique was used for the study. At the end of the study, improvement was seen on HRQL in both groups. The improvement in both groups could have been a result of either the enhanced usual care for the control group, the inadequate sample size,

or the Hawthorne effect meaning that the adjustment of actions by participants increased self- management.

Three studies used a randomized control group design (Fiks et al., 2015; Grover et al., 2016; Horner et al., 2016), and two studies used a cluster randomized controlled trial (Kintner et al., 2015; van Bragt et al., 2015). All study participants were randomly assigned to an intervention or control group. Nurses led the asthma intervention programs in the three studies. The participants' asthma severity ranged from mild (55%) to moderate (37%) and severe (8%) (Kintner et al., 2015). Fiks et al. (2015) and van Bragt et al. (2015) determined the participants' asthma severity ranged from moderate to severe persistent asthma. Grover et al. (2016) determined the study subjects' asthma severity as mild to moderate persistent asthma. Horner et al. (2016) did not specify the asthma severity level of the participants. The aforementioned studies were conducted to implement educational intervention programs for successful asthma management behaviors and reduce asthma exacerbations, unscheduled doctor visits, missed school days, and restricted daily activities. The study findings were consistent, and four studies demonstrated that the study subjects' asthma knowledge increased and their ability to manage asthma improved (Fiks et al., 2015; Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015). Furthermore, risk reduction/prevention behaviors were significant (Kintner et al., 2015) and ER visits, asthma specialist visits, and hospitalization rates decreased (Fiks et al., 2015; Horner et al., 2016). There were fewer work and school missed days (Fiks et al., 2015), and greater reports of medication adherence, quality of

life, written asthma action plans, asthma goals, and self-efficacy on asthma management (Grover et al., 2016).

Level II Studies

There were three quasi-experimental design studies in the Level II category. Payroovee et al. (2014) stated that when children are younger, parents usually take care of children and manage the asthma for the children. As the child with asthma matures, managing asthma can become the responsibility of the child under the supervision of parents. The purpose of the study was to evaluate the effect of family empowerment on the quality of life of school-aged (7 - 11-year-old) children. The study was a two-group quasi-experimental design with an experimental and control group. The findings indicated that educational family-based empowerment interventions could help children with asthma and their parents gain knowledge and skills about asthma disease processes and asthma management effectively ($p < .001$). This intervention was a nurse-led, family-based empowerment intervention. Children received a colorful booklet and parents received a practical asthma guide card and educational pamphlet at the end of the intervention. All questions asked by parents or children were answered during the intervention.

Rasberry et al. (2014) used a quasi-experimental, cross-sectional design to explore (a) whether students in the asthma program demonstrated better asthma control than students in a comparison school district and (b) whether students in the asthma program demonstrated signs of progress in asthma control between the starting point and follow-up. The study used the all-inclusive model which consisted of joint education for students

with asthma, educating the school staff, making home visits, training parents of students with asthma, and connecting the students with community-based healthcare professionals. One-way ANOVA and post-hoc analyses were used. McNemar's chi-square test and t-test were used for post-hoc analyses. Students with asthma in the intervention school district demonstrated more statistically significant asthma management than students with asthma in the comparison district ($p = .008$). Students with poorly controlled asthma at baseline demonstrated that they had significantly greater peak expiratory flow rate scores at follow-up. The study findings indicated that the comprehensive school-based asthma management programs led to improvement in asthma management for students, particularly those with poorly controlled asthma. Rasberry et al. (2014) expressed that school-based asthma management programs are essential to help the students with asthma to make certain they have knowledge and skills to manage asthma and sustain asthma management.

Suwannakeeree et al. (2016) used one group in a repeated measure quasi-experimental study. The study aimed to evaluate the efficiency of school-based asthma instructive interventions on asthma outcomes and asthma management. Gaining knowledge of asthma among parents has been demonstrated to reduce asthma exacerbations and increase asthma management in school-aged children. The intervention consisted of training the schoolteachers/staff and the parents on asthma knowledge and educating the children to make them aware of asthma severity, occurrences, and management. The Statistical Package for Social Sciences (SPSS) package was used for descriptive and compared *t*-test to analyze the data. The study results indicated that

asthma management behaviors were abysmal in the pre-test before the intervention. However, significant progress on asthma management behaviors were identified at three- and six-month's post-intervention time. The participants' knowledge of asthma significantly increased with the intervention. Teachers' knowledge of asthma was greater than other participants which was believed to help the students in school manage their asthma symptoms. The pulmonary functions did not change the participants who already had normal range pulmonary function levels. However, 18 children had pulmonary functions less than 80% at the beginning of the program. Their pulmonary function levels improved significantly at six month's post-intervention time ($p = .01$). Asthma management also improved for children and their parents. The research study resulted in fewer ER visits ($p = .002$), reduced nighttime asthma symptoms ($p = .02$), and less school absenteeism ($p = .01$) at six month's post-intervention time. The study findings indicated that asthma self-management should be examined periodically from time to time to ensure maintain good asthma management.

All three Level II studies were quasi-experimental design. Rasberry et al. (2014) and Suwannakeeree et al. (2016) study populations were from low socio-economic populations, and the studies were conducted in the United States. Payroovee et al. (2014) did not specify the socio-economic level of participants, and the study was conducted in Iran. The purpose of these studies was to increase intervention programs beyond inpatient clinic settings to increase successful asthma management behaviors and decrease undesired conditions. All Level II study results demonstrated that the subjects gained knowledge and skills to manage asthma (Payroovee et al., 2014; Rasberry et al., 2014;

Suwannakeeree et al., 2016). Moreover, ER visits, hospitalization rates, nighttime asthma symptoms, and school absenteeism were reduced (Suwannakeeree et al., 2016), and greater FEV1 scores were observed in one study (Rasberry et al., 2014).

Table 2.2

Intervention Components

Author & Year	Intervention Components
Fiks et al., 2015	MyAsthma an electronic health record linked patient portal supporting shared decision making for children with asthma <ul style="list-style-type: none"> • mutual goal choices for asthma control, • information exchange, • communication, • enriching the subjects' knowledge of asthma
Grover et al., 2016	Culturally relevant asthma education intervention program <ul style="list-style-type: none"> • meaningful learning, • age appropriate art therapy, • problem-based learning, • goal setting, • open-ended communications
Horner et al., 2016	Asthma class in school and an asthma day camp <ul style="list-style-type: none"> • asthma disease and its pathophysiology, • learning symptoms, • severity, • medications, • risk reduction/prevention behaviors, • assessing the study participants' understandings of asthma management
Kintner et al., 2015	The Staying Healthy–Asthma Responsible & Prepared (SHARP) <ul style="list-style-type: none"> • asthma disease and its pathophysiology, • learning symptoms, • severity,

	<ul style="list-style-type: none"> • medications, • risk reduction/prevention behaviors, • training how to use and read of a peak flow meter • assessing the study participants' understandings of asthma management
Payroovee et al., 2014	<p>Family-based empowerment interventions</p> <ul style="list-style-type: none"> • support children with asthma and their parents to gain knowledge and skills about asthma disease and asthma management effectively
Rasberry et al., 2014	<p>All-inclusive model</p> <ul style="list-style-type: none"> • identification of students with asthma, • asthma education for students with asthma, • case management for students with asthma, • consisted of joint education for students with asthma, • educating the school staff, making home visits, • training parents of students with asthma, • asthma training for staff • connecting the students with community-based healthcare professions
Suwanakeeree et al., 2016	<p>School-based asthma instructive interventions</p> <ul style="list-style-type: none"> • asthma education, • practical trainings on metered dose inhaler performances, • training how to use and read of a peak flow meter • breathing exercises, • using asthma diaries, • self-management plans
Van Bragt et al., 2015	<p>Individualized self-management</p> <ul style="list-style-type: none"> • training how to use and read of a peak flow meter • address the necessities of each child

Discussion

Lack of asthma knowledge, underestimating the severity of the asthma symptoms, and having limited access to healthcare facilities can lead to asthma exacerbations, more ER visits, unscheduled doctor visits, school absences, poor quality of life, and death (AAFA, 2015; Suwannakeeree et al., 2016). Several studies indicated that the factors associated with poor asthma management in children were related to a lack of asthma knowledge on the part of the children and their parents (Fiks et al., 2015, Grover et al., 2016; Horner et al., 2016; Payroovee et al., 2014; Suwannakeeree et al., 2016). Poor asthma management can reflect a lack of knowledge, including underestimation of the asthma severity or overestimation of the degree of asthma symptoms.

The National Heart, Lung, and Blood Institute (NHLBI) and the NAEPP rigorously stress educating children with asthma and their parents in asthma management (NIH, 2012; van Bragt et al., 2015). Successful asthma self-management requires knowledge of asthma including the facts and symptoms of asthma, triggers, and right technique of medication use (Horner et al., 2016; Payroovee et al., 2014). Nurses can play an integral role in empowering children and their parents to improve asthma management through education, advising, and direct care (van Bragt et al., 2015). School- and community-based asthma education programs should be developed by interdisciplinary professionals to address the mental, psychological, behavioral, and social features of living with asthma (Kintner et al., 2015). School-aged children are capable of learning how to manage their asthma through proper age-appropriate education and support (Payroovee et al., 2014). School nurses can plan intervention that are age-appropriate,

hands-on, problem-based that enhance learning. When children learn how to manage the asthma symptoms, they are more confident in managing their condition under the supervision. Keeping school-aged children responsible for asthma management is important for healthy development that supports a sense of control and ability over the asthma condition (Payroove et al., 2014; van Bragt et al., 2015). Families are important as the first responders, and they need effective interventions that support their knowledge and skills to manage asthma (Fiks et al., 2015, Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015; Payroove et al., 2014; Suwannakeeree et al., 2016). Asthma education programs are likely to strengthen the empowerment of the children and their parents in managing asthma.

The synthesis of the review demonstrated that there is a necessity to use present applicable, student-friendly educational interventions focusing on asthma control approaches that meet the students' and parents' needs. Asthma educational intervention programs beyond inpatient clinic settings can improve asthma knowledge and skills, asthma management, school attendance, and quality of life for children with asthma and their parents. School- and community -based asthma intervention programs enable access to healthcare and better asthma management for all populations, including rural and low socio-economic populations (Kintner et al., 2015, Suwannakeeree et al., 2016). The intervention programs must be culturally relevant as well as age-appropriate and designed to meet both children and parents' needs for optimum effectiveness (Grover et al., 2016). In sum, effective asthma management at school can increase school attendance and school performance, while reducing ER visits, hospitalization rates, and unplanned doctor

visits (Fiks et al., 2015; Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015; Rasberry et al., 2014; Suwannakeeree et al., 2016).

All studies reported the sample size, design, inclusion/exclusion criteria, intervention components, intervention duration, pretest and posttests timeline, measurement tools, statistical analyzing, and results. Overall, the systematic literature review demonstrated that educational asthma interventions significantly improved knowledge and skills of self-management behaviors in studies' participants. Evidence exists in the literature that asthma educational interventions are effective beyond the doctor offices and hospital settings. Knowledge can be increased and sustained over time; however, the practice should be repeated for maintenance based on the synthesis found in this systematic review. School nurses can plan small presentations and health fairs for students and their parents and at the same time use case management methods to follow students' progress. Moreover, follow-up periods can be advantageous to include as well as periodic course revision (Suwannakeeree et al., 2016).

Strengths and Limitations

There were several limitations in this review. Articles published only in English were searched and retrieved. There may be some articles relevant to this systematic review that were not included due to searching four databases or human filter. Family households were not identified such as single mother or father, grandparent as a primary caregiver, or foster family. On the other hand, despite these limitations, the implications for nurses are remarkable and equivalent to NIH (2012) and NAEPP guidelines and

recommendations related to educating school-aged children and their parents in an effort to improve knowledge and skills to manage asthma.

Implications for School Nurses

School nurses are in a good position to manage chronic diseases, and to create a safe, healthy, ready to learn environment for all students (Friend & Morrison, 2015; Maughan et al., 2016). School nurses are well-positioned to support students in managing chronic conditions such as asthma (Rasberry et al., 2014). Educating about asthma self-management takes considerable time and dedication on the part of the nurse, child, and family member. School nurses must assume a more prominent role in asthma care to improve child health and academic outcomes. It is essential that nurses assess students for sufficient sleep, nutrition, and involvement in appropriate school activities to promote and maintain the students with asthma health and well-being (Kintner et al., 2015).

School nurses have an opportunity to establish a trusting relationship that is foundational for collaborating with parents and students for better asthma management. Such strategies will result in better attendance and improved school performance (American Academy of Pediatrics [AAP], 2014). National Association of School Nurses' (NASN) Framework for 21st Century School Nursing Practice highlights individual-centered care and posits that school-based asthma intervention programs can be developed using the framework for achieving the desired outcomes of the student with asthma population (Cowell, 2015; NASN, 2016). The CDC (2016) recommends coordinated care for the students, families, and the communities to increase asthma management and in turn reduce school absences. School nurses can plan asthma care

coordination interventions that connect the school, the family, and community-based healthcare professionals for managing asthma successfully (AAP, 2014). The best interventions not only provide education, but also support students in gaining access to needed clinical care, ensure students use the right medications, offer care coordination, and collaborate directly with students' parents to increase knowledge and sustain improved asthma management (Rasberry et al., 2014).

Conclusion

School- and community -based asthma educational intervention programs are key components of asthma management. Well-planned asthma education programs are valuable and should go beyond inpatient clinic settings for promoting and maintaining health for children with asthma and their parents. The systematic review indicated that community-based, particularly school-based asthma educational interventions, resulted in greater improvements in asthma management knowledge and skills, and fewer undesired outcomes such as ER visits, hospitalizations, unscheduled doctor visits, missed school and workdays. School-based programs may be one of the best options to deliver asthma educational interventions for students, parents, and the school community. Principals, school administrators, teachers, and school staff can join with nurses, who work in school and community settings to implement effective asthma management programs. More research studies to inform practice are warranted.

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CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This study aimed to evaluate the impact of a school nurse-led asthma intervention on elementary school-age children's asthma self-management. An experimental method was used for this study, applying a randomized, two-group repeated measures design as pre-test, post-test, and follow-up test. The independent variable was time as time-1 (baseline), time-2 (completion of the intervention at 6 weeks), and time-3 (follow up at 12 weeks). The dependent variables were asthma symptoms, self-management with peak flow meter usage, daily activities, and school absences. The randomly assigned treatment group participated in a school nurse-led asthma intervention program comprised of six weekly 30-minute group lessons based on Orem's self-care theory. The randomly assigned control group continued to receive their usual asthma care. Previous studies indicated that elementary school children have not been involved in managing their self-care needs for asthma (Sleath et al., 2017). A few experimental research studies report the efficacy of asthma self-management interventions led by school nurses for elementary school-age children (Best et al., 2018). This chapter explains the research methodology, including setting, sampling methods, and instruments, as well as data collection methods, and analysis of preliminary study data and supports the full study.

Setting

The setting of the study was a public Independent School District in the southwestern United States serving a diverse population. The school district reported the enrollment around 214,000 for the last few school years. The student population in the district approximately consists of 62% Hispanic American/Hispanic, 24% African American/Black, 9% White American/White, and 5% Asian American/Asian students. Three-fourths of the student population are economically disadvantaged.

Population and Sample

The population consisted of elementary school-age children living with asthma. The students at eight selected schools were invited to participate in the study. The inclusion criteria were English speaking children diagnosed with asthma aged 7 to 12 years, who assented to participate, and whose parents gave consent. Exclusion criteria were children with other disabilities or comorbid medical conditions that may limit participation in the intervention and affect outcomes, such as severe cerebral palsy, oxygen dependent conditions, and cystic fibrosis. A computer-generated randomization process was used to assign each participant to the treatment or control group. The researcher chose a mild effect size of 0.30 with the power of 0.80 and alpha level of 0.05 based on previously published meta-analysis and statistician consultation. Based on G-power analysis, 62 participants were required for the repeated measures analysis of variance (ANOVA; Cohen, 1988). The sample size was increased by 15% to account for attrition, requiring a total sample of 71 participants.

Protection of Human Subjects

The study protocol was approved by the Texas Woman's University Institutional Review Board (IRB), and permission was also obtained from the school district's Office of Research and Accountability as well as the administrators of the selected schools. The study adhered to the Family Educational Rights and Privacy Act of 1974, which protects the privacy of students' educational records. Confidentiality has been protected to the extent required by law. The signed consent forms and the completed demographic data forms have been maintained in a double locked cabinet in the researcher's home office. Coded data do not contain any identifying information. Only aggregate data was reported in the dissemination of findings. Upon completion of the study, the data will be erased from the computer, and papers will be shredded no later than December 21, 2022.

Instruments

Demographic Questionnaire

The demographic questionnaire asked about gender, age, ethnicity, grade level, household number, current housing situation, and any known health problems other than asthma.

Asthma Control Questionnaire

The Asthma Control Questionnaire (ACQ) instrument is a 7-item questionnaire that measures the sufficiency of asthma control and variation in asthma control, that happens spontaneously or as a consequence of treatment (Juniper, O'Byrne, Ferrie, King, & Roberts, 2000). The ACQ is a valid and reliable tool. Intra-class correlation coefficient (ICC) reported ranging from 0.79 to 0.90 (Juniper, Gruffydd-Jones, Svensson 2010;

Rasberry et al., 2014). The tool development began with a list of all asthma-related symptoms and was compiled and sent to 100 asthma clinicians and members of the NAEPP guidelines committees in 18 countries. Ninety-one clinicians and NAEPP committee members scored each symptom for its significance. The tool was validated for children 6 years of age and older, including adults (Juniper et al., 2010). Scaling used a 7-point Likert scale, and was weighted equally. All items were scored from zero to six with a score of zero indicating good control and six indicating poor control (see Appendix A). Five questions related to symptoms, including nocturnal symptoms, morning symptoms, restriction of daily activities, shortness of breath, and wheezing were included; one question was related to quick-relief medication use, and the last question addressed pulmonary function using forced expiratory volume in one second (FEV₁) or peak expiratory flow rate (PEFR; Juniper et al., 2000).

The Paediatric Asthma Quality of Life Questionnaire with Standardized Activities

The Paediatric Asthma Quality of Life Questionnaire with Standardized Activities (PAQLQs) is a widely used 23-item tool measuring quality of life in children with asthma, ages 7 to 17. It measures three domains: symptoms, activity limitation, and emotional function. The PAQLQs has ten questions related to symptoms: eight questions related to the psychological function and five questions related to the activities. Each participant selects three activities they frequently engage in and in which asthma sometimes affects their ability to participate. The total PAQLQs scale was used for the statistical analysis. In addition to the total questionnaire usage, the symptoms and activity limitation subscales were used separately to examine the hypotheses questions related to

symptoms and activity limitation. The questionnaire is a valid and reliable tool. The ICC is reported ranging from 0.89 to 0.96 (Juniper et al., 1997; Wing et al., 2012). Scaling is a 7-point Likert-type scale weighted equally. All items are scored from 1 to 7 with a score of seven indicating no impairment, and one indicating severe impairment (see Appendix B). The questionnaire takes about 10-15 minutes to complete the first time, and seven minutes at follow-up (Juniper et al., 1997).

Validity and Reliability

ACQ and PAQLQs have been validated in many previously reported studies and both questionnaires have been thoroughly established for use with pediatric populations (Cicutto et al., 2013). The instruments were examined to ensure adequate reliability for the pilot study. The Cronbach alpha scores were 0.85 for the ACQ and 0.96 for the PAQLQ(s) for this study.

Methods

The principal investigator (PI) implemented the following procedure in each of the selected schools:

1. The PI and school nurses in the eight school sent the recruitment flyer home with the school newsletter.
2. The PI posted flyers on the school websites and prominently around the school buildings.
3. Once a parent/guardian contacted the PI informed him/her about
 - a) the purpose of the study,
 - b) the inclusion criteria,

- c) the voluntary nature of participation,
 - d) requirements for participants,
 - e) possible risks and benefits,
 - f) availability of study outcomes,
 - g) the intervention times and duration, and
 - h) the data collection periods.
4. The PI answered parents' and children's questions before obtaining informed consent and assent.
 5. The PI sought written informed consent from parents of participants and written assent from all children prior to enrollment in the study.
 6. The PI, who is also a school nurse, implemented all intervention sessions in all eight schools.

All subjects in the experimental group received a PFM with peak flow chart and a spacer. The subjects in the control group did not participate in the intervention program during the study, nor did they receive the asthma management tools associated with the intervention program. The participants who missed the intervention class(es) were required to attend scheduled make-up sessions. If a subject missed three or more intervention classes and did not attend the make-up sessions, they were excluded from this study. The PI offered the same intervention program for the control group subjects at the completion of this study.

Data Collection

Data collection for both the experimental and control group occurred at three time points: before the intervention at baseline, immediately post intervention at six weeks, and follow up at 12 weeks. Data collection happened in the arranged school settings. The researcher explained clearly that there are no right or wrong answers and that everyone must answer the questions objectively based on their own experiences. The researcher read the questions out loud to ensure that the subjects understood the items and the response scales. ACQ and PAQLQs questionnaires were used for asthma control and symptom management using frequency of PFM use, and daily activities for the study from each participant. Missed school days were tracked numerically for the treatment and control groups. Both groups received a \$10 Wal-Mart gift card after completing posttest questionnaires at six and again at 12 weeks to compensate for their time.

Pilot Study

A pilot study was conducted in the fall of 2018 to test the feasibility and acceptability of the proposed study. Following IRB approval, the PI sent a recruitment flyer home with the school newsletter and the flyers were placed around the school building. Once a parent/guardian contacted the researcher, the PI informed her/him on the purpose of the study, the inclusion criteria, the voluntary nature of participation, what is required of a participant, possible risks and benefits, the intervention session times and duration, and the data collection periods. The PI answered the parents' and children's questions before obtaining an informed consent and assent. A written informed consent was obtained from parents/guardians and assent was obtained from children for the

enrollment in the study. A sample of 16 children, ages 7-12, were obtained from one elementary school in a large metropolitan school district in the southwest. A computer-generated randomization process was used to assign each participant to a treatment or control group. A randomized controlled trial was used for the pilot study to determine the effectiveness of school nurse-led asthma intervention program on subjects' asthma control, symptom management, PFM usages, missed school days, and daily activities.

The school nurse-led asthma intervention consisted of six weekly 30-minute group lessons about how best to manage asthma for the treatment group. Topics in the session were: 1) asthma disease and pathophysiology; 2) peak flow meter, method of measurement, and the utility of PFM use; 3) identification of asthma symptoms and implementation of an Asthma Action Plan (AAP); 4) asthma medicines for managing asthma symptoms, demonstrating correct techniques for using medicines and spacers; 5) recognition and control of asthma triggers and helpful breathing exercises; and 6) discussion of individualized choices and establishment of goals for self-management. Makeup sessions were arranged for the subjects who missed any intervention session. Hands-on experiences, problem-based learning techniques, role playing, case studies or real life scenarios, storytelling, classroom discussion, colorings/drawings, and exercises to manage asthma symptoms were used to enhance class interaction and learning. The researcher, who is also a school nurse, implemented all the intervention sessions.

Demographic questionnaires, the ACQ, and the PAQLQs were used to obtain the data for this study. The demographic questionnaire was used only at baseline. The ACQ and PAQLQs questionnaires were used at three data collection times: at baseline, six

weeks, and 12 weeks. Data collection occurred at the scheduled times in the arranged school setting. The researcher explained that there are no right or wrong answers and that everyone must answer the questions objectively based on their own experiences. The researcher read the questions aloud to ensure that the subjects understood the items and the response scales. The ACQ and PAQLQs questionnaires were used to measure asthma symptom management, nocturnal coughing, using frequency of PFM, and daily activities for each participant. Missed school days were tracked numerically for the treatment and control groups.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics included frequency distributions, mean, and standard deviations for demographic data. Repeated measures ANOVA was used to examine the hypotheses and outcome changes over six weeks of intervention and follow-up at 12 weeks. Randomization was effective in equalizing baseline variables between the experimental and control groups. Analysis of the demographic characteristics indicated that the groups were comparable at baseline.

Statistical analysis for the proposed hypotheses found a statistically significant effect on asthma symptoms for time in the experimental group compared to the control group, Wilk's Lambda = 0.43, $F(2, 13) = 8.31$, $p = .005$, multivariate partial eta squared = 0.56. This analysis did not indicate a statistically significant effect for nocturnal coughing ($p = .057$), but it demonstrated that the school nurse-led asthma intervention made differences in nocturnal coughing scores between groups and time periods. Both group's nocturnal coughing declined after the intervention. The control group score went

down .125 ($M = 1.125$, $SD = .38$), and the experimental group's score also went down .375 ($M = .62$, $SD = .38$) at time-2. However, the control group's nocturnal coughing scores at the time-3 ($M = 1.50$, $SD = .53$) indicated worsening compared to time-1 and time-2. The experimental group's nocturnal coughing scores went down, which indicated improvement ($M = .37$, $SD = .53$).

Before the intervention, none of the subjects in either group used a PFM tool. After the intervention, all subjects in the experimental group reported that they used a PFM every day and recorded their peak expiratory flow rate to determine their pulmonary function level. They provided their daily peak flow chart, and the researcher estimated their personal best peak flow rate based on the chart. This pilot study demonstrated that the school nurse-led asthma intervention program had a significant effect on the use of a PFM as an asthma management tool. There was a statistically significant effect on activity limitation scores for time in the experimental group compared to the control group, Wilk's Lambda = .54, $F(2, 13) = 5.56$, $p = .018$, multivariate partial eta squared = .46. The missed school days were tracked for the groups as a numerical measure. The control group missed more school days than did the experimental group during the 12 weeks of the study. The control group ($n = 8$) missed an average of 10 days, and the experimental group ($n = 8$) missed an average of seven days. The findings supported three of the four hypotheses that subjects in the experimental group experienced statistically significant improvements. Only nocturnal coughing showed no statistically significant difference between treatment and control groups.

This study has a few limitations: 1) The sample was drawn from one school in one school district in the region, which limits generalizability; 2) The subjects' age range variability, cognitive ability, and experiences may influence the understanding of the concepts; and 3) The subjects' parents' thoughts and experiences were not assessed. The strength was in the randomized control study design with repeated measures.

Data Analysis

Data were analyzed using the SPSS version 25. Descriptive statistics included frequency distributions, mean, and standard deviations for demographics and comparatively between control and treatment groups. The PAQLQs was used to measure symptoms and activity limitation. The ACQ was used to measure asthma management. Repeated measures ANOVA was used to examine the outcome changes including asthma management, symptoms, and activity limitation over six weeks of the intervention and follow-up at 12 weeks post intervention. The subjects' peak flow chart demonstrated the usage of PFM frequency. School absences reported one time at the end of 12 week by schools' attendance clerk and analyzed by the independent *t*-sample test.

Summary

An experimental two-group pre-test, post-test, and follow-up test study was used to assess the impact of a school nurse-led asthma intervention on elementary school-age children's asthma self-management, nocturnal coughing, PFM usages as asthma management tools, school absences, and participation in daily activities. Informed parental consents and participants' assent were required for the study. Risks to participants were minimal, and all identifying information was removed from printed and

electronic materials. Data analysis occurred using repeated measures ANOVA with an alpha level of 0.5. Potential benefits of study participation include an increase in asthma knowledge and the skills for managing asthma symptoms, as well as increases in daily activities and school attendance.

CHAPTER IV

MANUSCRIPT

This manuscript was submitted to the Journal of School Nursing (see Appendix K)

A School Nurse Led Asthma Intervention for School-Age Children: A Randomized Clinical Trial to Improve Self- Management

Elif Isik, PhD, Nina M Fredland, PhD, Anne Young, EdD, and Rebecca J. Schultz, PhD

Abstract

Asthma is a common disease in children and obtaining basic knowledge and skills to manage asthma symptoms is critically important. This study examined the effectiveness of a theoretically based school nurse-led asthma intervention on asthma symptoms, self-management, PFM usage, daily activities, and school absences in children 7 to 12 years old. A randomized controlled, two-group, repeated measures design was conducted in eight public schools. Data collection occurred at three time points. The treatment group had statistically significant differences in reported symptoms ($p < .001$), asthma control with a peak flow meter usage ($p < .001$), and daily activities ($p < .001$) at 6 weeks and at 12 weeks. Although school absences were not statistically significant, the treatment group missed fewer school days than the control group. Self-management is a complex process, and school nurses can provide essential learning steps and continuity of care for school-age children living with asthma.

Keywords: asthma, school-age children, school nurse intervention, asthma self-management, randomized controlled trial

Asthma is a complex chronic respiratory disease common in children and adults (Global Initiative for Asthma [GINA], 2019). Asthma is characterized by inflammation of the lungs, bronchospasm, cough, chest tightness, chest pain, difficulty breathing, wheezing, restlessness, irritability, nocturnal coughing, and wheezing (Asthma and Allergy Foundation of America [AAFA], 2015; GINA, 2019). In 2016, 26.5 million people had been diagnosed with asthma and of those 6.1 million are children under 18 years of age in the United States (Centers for Disease Control and Prevention [CDC], 2018). Despite advancing medical knowledge, asthma prevalence and exacerbation rates continue to persist among children (GINA, 2019). Symptoms and specific triggers must be known and recognized to eliminate concomitant asthma exacerbations, school and work absenteeism, disruption of daily activities, ambulance calls, emergency room visits, hospitalizations, and even death (Francisco, Rood, Nevel, Foreman, & Homan, 2017; Isik & Isik, 2017). Since asthma affects both children and adults, self-management should be prioritized as a strategy to promote positive health outcomes and reduce asthma exacerbations; thus, supporting healthy active lives should begin in childhood (Isik & Isik, 2019).

Background

Asthma is a chronic disease that can be managed through a combination of medical intervention and patient self-care. Asthma can manifest at any life stage, so all individuals who live with asthma should obtain basic knowledge and skills to manage their asthma symptoms. Children and even adults are often unaware that asthma is a lifelong disease (American Lung Association [ALA], 2018). Children with asthma can

have normal days without breathing problems with good management, and this may lead to the misconception that the condition is cured rather than well managed or asymptomatic at the time (U.S. Department of Health and Human Services, National Institute of Health [NIH], National Heart, Lung, and Blood Institute [NHLBI], 2013).

There is support for implementing an effective asthma management plan for school-age children in school settings (NIH, 2012). Asthma management programs for parents of school-age children living with asthma have been studied in the literature (van Bragt et al., 2015). Several asthma education programs are designed to increase the study subjects' knowledge of asthma (Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015; Payroovee et al., 2014; Suwannakeeree et al., 2016). These intervention programs reported increased prevention behaviors, fewer emergency room visits, decreased hospital admissions, more medication adherence, improved quality of life, and self-efficacy related to asthma management (Fiks et al., 2015; Grover et al., 2016; Horner et al., 2016; Kintner et al., 2015). However, those studies focused on parents/guardians and addressed only their concerns about asthma management (Fiks et al., 2015, Grover et al., 2016; Payroovee et al., 2014; Suwannakeeree et al., 2016). There are scant studies on school-based asthma interventions targeting elementary school-age children (Rasberry et al. 2014; van Bragt et al., 2015). The available studies were mostly descriptive studies. Best, Oppewal, and Travers (2018) emphasized the necessity of using experimental and quasi-experimental designs related to children living with asthma. School nurse-led asthma interventions can focus on school-age children for the purpose of developing successful asthma self-management strategies (Isik, Fredland, & Freysteinson, 2019;

Suwannakeeree et al., 2016). School-based asthma interventions are often conducted by researchers who are not employed in the school settings where the programs are implemented. Implementing school nurse-led asthma intervention programs beyond the hospital setting will increase opportunities for learning about the condition and developing self-management skills.

Orem's self-care theory was used to guide this study. Orem's self-care theory centers on individuals' self-care knowledge and skills. The theory posits that individuals should know and perform self-management activities to maintain and promote their health. Self-care is reasonably more important to individuals with a chronic illness, and self-care management requires acknowledgment of the condition, symptoms, and having the skillset to perform needed actions (Kouba et al., 2013). The individuals can be involved in activities for self-management based on their age, cognitive ability, experiences, culture, and available resources. Major assumptions of this theory are:

- Individuals are distinct, and self-care for health and well-being is a developmental process.
- Engaging in self-care basics is a vital element for self-management of diseases, conditions, and for optimal wellbeing.
- Individuals should be as independent as possible, and accountable for their health maintenance in conjunction with family caregivers.
- If there is a disproportion between self-care needs and self-care abilities for self-management of health, individuals would benefit from nursing intervention.

- Individuals must have knowledge of present and potential health conditions to promote self-care behaviors.
- Self-care and dependent care are activities embedded in a social and cultural environment (Orem, 2001).

Orem's self-care theory asserts the importance of the child's awareness of asthma symptoms and acquiring the skills necessary to manage asthma in daily life. The theory has been used to direct health promotion efforts and encourage patients to be more independent in their daily lives. Studies related to self-management behaviors based on Orem's self-care theory have shown that these behaviors improve health outcomes (Blok, 2017; Kouba et al., 2013; Mersal, & El-Awady, 2017).

Purpose of the Study

The purpose of this study examined the effectiveness of a theoretically based school nurse-led asthma intervention on symptoms, asthma self-management with PFM usage, interruption of daily activities, and school absences in a sample of elementary school-age children between the ages of 7 and 12.

1. Hypothesis 1: Children living with asthma, who participate in a nurse-led asthma intervention, will report fewer asthma symptoms as measured by PAQLQs than children who receive usual asthma care.
2. Hypothesis 2: Children living with asthma, who participate in a nurse-led asthma intervention, will report better asthma self-management as measured by the ACQ and will demonstrate a higher mean number of usages of PFM as recorded on PFM charts than children who receive usual asthma care.

3. Hypothesis 3: Children living with asthma, who participate in a nurse-led asthma intervention, will report fewer interruptions of daily activities as measured by PAQLQs than children who receive usual asthma care.
4. Hypothesis 4: Children living with asthma, who participate in a nurse-led asthma intervention, will have less school absences than children who receive usual asthma care.

Methods

Design

A randomized controlled, two-group, repeated measures design (pre-test, post-test, and follow-up test) was used in eight public schools between September 2018 and June 2019. Subjects were randomly allocated to receive school nurse-led asthma intervention (treatment) or usual care (control). The CONSORT flow chart is shown in Figure 4.1. The independent variable was time as time-1 (baseline), time-2 (a completion of the intervention at 6 weeks), and time-3 (follow-up at 12 weeks). The dependent variables are symptoms, self-management with peak flow meter usage, daily activities, and school absences.

Participants

Subjects were recruited from eight primary schools in a diverse, urban public independent school district in Southwestern United States. The inclusion criteria consisted of English-speaking children diagnosed with asthma, 7 to 12 years old. Children with other disabilities or comorbid medical conditions including severe cerebral palsy, oxygen dependent conditions, and cystic fibrosis were excluded.

The students at eight selected schools were invited to participate in the study. The Principal Investigator (PI), who is also a school nurse, collaborated with the eight school administrators and nurses to send the recruitment flyer with the school newsletter. Flyers were posted on the school websites and prominently around the school building. Once a parent/guardian contacted the PI, they were informed about a) the purpose of the study, b) the inclusion criteria, c) the voluntary nature of participation, d) requirements for participants, e) possible risks and benefits, f) availability of study outcomes, g) the intervention times and duration, and h) the data collection periods. The PI answered parents' and children's questions before obtaining informed parental consent and children assent. The PI obtained written informed consent from parents/guardians and assent from child participants prior to enrollment in the study.

A mild effect size of 0.30 with the power of 0.80 and alpha level of 0.05 based on a previously published meta-analysis and statistical consultation was chosen (Kew, Carr, Donovan, & Gordon, 2017; McCallum, Morris, Brown, & Chang, 2017; Peytremann-Bridevaux, Arditi, Gex, Bridevaux, & Burnand, 2015). Based on G-power analysis it was determined that 62 participants were needed for the study. The PI increased the sampling size by 15% to allow for attrition, resulting in a final sample of 71 participants. The sample size was 73 at study initiation with the loss of one member from the control group and one from the treatment group by the final measure for 71 participants.

Data Collection

Data collection occurred from September 2018 through June 2019. An initial sample of 76 children, ages 7-12, attending eight elementary schools was obtained. Three

children were excluded based on eligibility criteria. Two children were not able to speak and understand English, and another child was less than seven years old. A computer-generated randomization process assigned 73 subjects to the treatment or control group. There were 37 participants in the treatment group and 36 participants in the control group at the beginning of the study. The randomly assigned treatment group participated in a theoretically based school nurse-led asthma intervention comprised of six weekly 30-minute group lessons. Topics in the session: 1) asthma disease and pathophysiology; 2) PFM, method of measurement, and the utility of PFM use; 3) identification of asthma symptoms and implementation of an Asthma Action Plan (AAP); 4) asthma medicines for managing asthma symptoms, demonstrating correct techniques for using medicines and spacers; 5) recognition and control of asthma triggers and helpful breathing exercises; and 6) discussion of individualized choices and goal setting for self-management. Hands-on experiences, problem-based learning techniques, role playing, case studies, storytelling, classroom discussion, colorings/drawings, and exercises to manage asthma symptoms were used to enhance class interaction and learning.

Data collection for both treatment and control groups occurred at three time points as baseline, 6 weeks, and 12 weeks at the arranged school settings. All subjects in the treatment group received a PFM with personal peak flow chart and a spacer. The subjects in the control group continued to receive usual asthma care. Subjects in the treatment group were offered a make-up session if they missed a class session. Both groups received a \$10 gift card after completing post-test questionnaires at 6 and 12 weeks to compensate for their time.

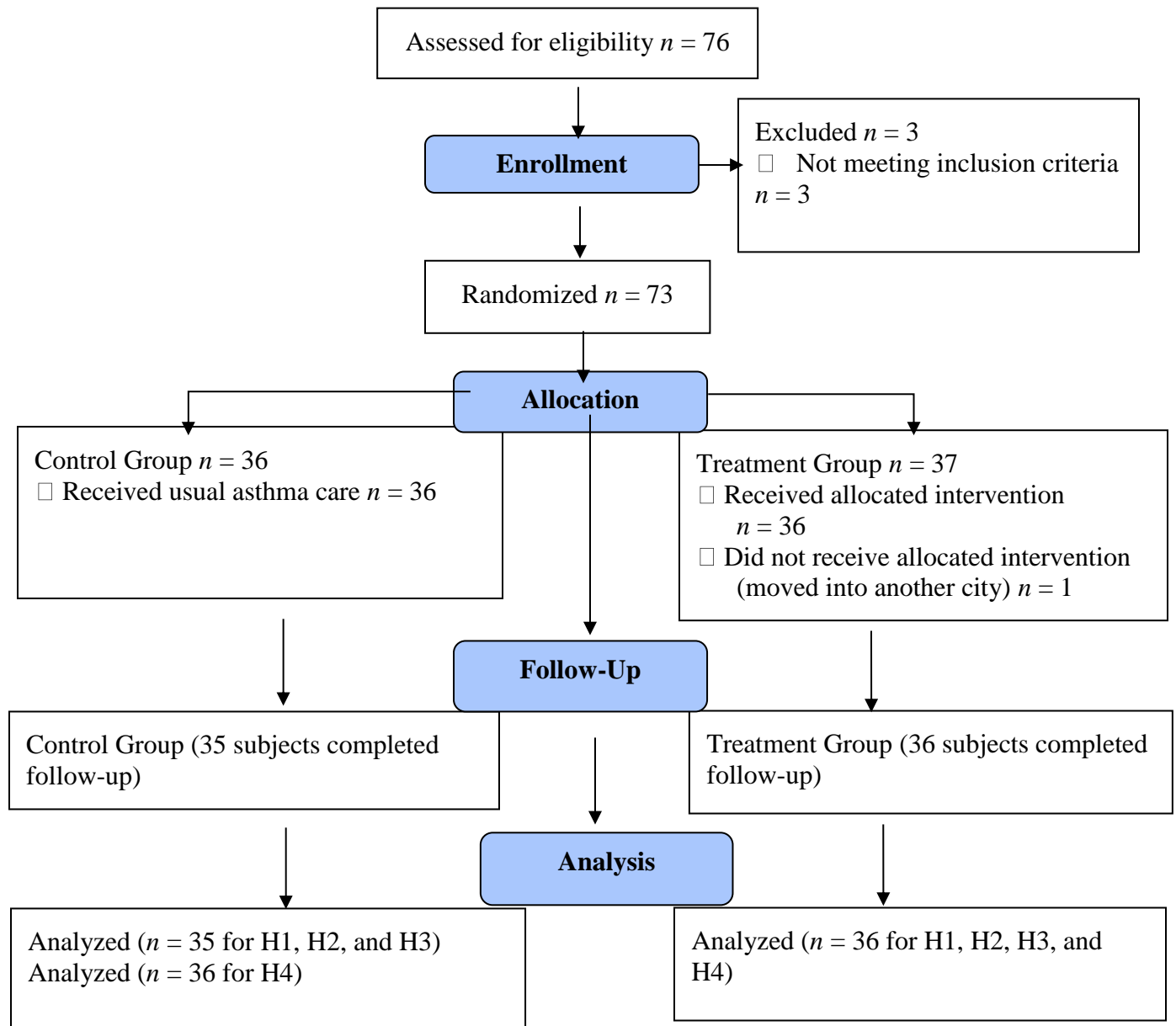


Figure 4.1. CONSORT Flow Chart

Instruments

The ACQ and the PAQLQs were the instruments. A demographic questionnaire assessed gender, age, ethnicity, grade level, household number, housing, and any known health problems other than asthma at baseline.

The ACQ, a 7-item instrument, measures the sufficiency of asthma control and variation in asthma control on a 7-point Likert-type scale (Juniper et al., 2000). Five questions related to symptoms were included; one question covers quick-relief medication use, and the last question addresses pulmonary function (Juniper et al., 2000). The ACQ is a reliable tool with Cronbach's alpha reported ranging from 0.79 to 0.90 (Juniper et al., 2010; Rasberry et al., 2014). The ACQ Cronbach's alpha for this study was 0.809.

The PAQLQs is a widely used 23-item tool measuring quality of life in children with asthma ages 7 to 17. Three domains measure symptoms, activity limitations, and emotional functioning. The questionnaire is a reliable tool with Cronbach's alpha reported ranging from 0.89 to 0.96 (Juniper et al., 1997; Wing et al., 2012). Scaling is a 7-point Likert-type scale weighted equally. Both questionnaires have been thoroughly established for use with pediatric populations (Cicutto et al., 2013). For this study Cronbach's alpha was 0.957 for the overall PAQLQ(s), 0.908 for symptom subscale, 0.819 for activity subscale, and 0.917 for emotional scale.

Ethical considerations

The study was approved by the Texas Woman's University Institutional Review Board (IRB). An approval was also obtained from the school district's Office of Research

and Accountability as well as the administrators of the selected schools. The study adhered to the Family Educational Rights and Privacy Act of 1974. Confidentiality was protected as required by the law.

Data Analysis

Data were analyzed using the SPSS version 25. Descriptive statistics were used for demographic data. Hypotheses One, Two, and Three that related to symptoms, asthma self-management with PFM usages, and activity interruption were analyzed using repeated measures ANOVA for 71 subjects; the treatment group ($n = 36$) and control group ($n = 35$). The fourth hypothesis related to school absences, which were reported at the end of twelve weeks, and was analyzed by using an independent samples t -test for 72 subjects; the treatment group ($n = 36$) and control group ($n = 36$). Descriptive analysis was used for the demographic questionnaire that was completed by 73 participants.

Results

One participant from the treatment group moved into another city's school district after the first session and did not complete the study. One participant from the control group did not come the 12th week for the follow up test questionnaire at the scheduled time or at the make-up session time. Approximately 63% of the total sample was comprised of females with 67.6% females in the treatment group and 58.3% of females in control group. Participant's ages ranged from 7 to 12 years, with a mean age of 9.29 ($SD = 1.67$) years. The treatment group mean age was 9.49 ($SD = 1.75$), and the control group mean age was 9.08 ($SD = 1.59$). The grade level median was 4.00 for this study. The Hispanic population comprised the largest ethnic group representing 48% of all subjects

in this study. The treatment group consisted of 40.6% Hispanic subjects and control group of 55.6%. The second greatest ethnic population in this study was African American representing 23.2% of participants with African Americans composing 27.0% of the treatment group and 19.4% of the control group. White participants represented 12.3% of the total group. The treatment group was 13.5% White and the control group was 11.1% White. Asian students composed 6.9% of the total sample with a representation of 5.4% in the treatment group and 8.3% in the control group. Only one subject (1.4% of all subjects) was American Indian and was assigned to the treatment group. There were six students (8.2 % of all subjects) from other ethnic groups that subjects did not identify, with four (10.8% of unknown-ethnicity subjects) in the treatment group and two (5.6% of unknown-ethnicity subjects) in the control group. The mean number of members living in a household was 4.38 ($SD = 1.421$) for the treatment group and 4.06 ($SD = 1.120$) for the control group. Over 93% of participants ($n = 68$, 93.2%) lived in a house or apartment; one (1.4%) subject from the treatment group who lived in a house or apartment did not have running water or electricity, one (1.4%) subject from the control group lived in a shelter, and one (1.4%) subject from the treatment group lived in a car, and three (4%) subjects from the control group lived with another family in a house or apartment. Only four subjects (5.5%), two from the treatment group and two from the control group had other health problems that did not affect asthma or participation in intervention (see Table 4.1.). Analysis indicated that the groups were well-balanced and comparable.

Table 4.1.

Sample Demographic Characteristics

Variable	Control n=36	Treatment n=37	Total N=73
Gender			
Male	15 (41.7%)	12 (32.4%)	27 (37.0%)
Female	21 (58.3%)	25 (67.6%)	46 (63.0%)
Ethnicity			
Hispanic	20 (55.6%)	15 (40.6%)	35 (47.9%)
African American	7 (19.4%)	10 (27.0%)	17 (23.3%)
White	4 (11.1%)	5 (13.5%)	9 (12.3%)
Asian	3 (8.3%)	2 (5.4%)	5 (6.8%)
American Indian	0 (0.0%)	1 (2.7%)	1 (1.4%)
Other	2 (5.6%)	4 (10.8%)	6 (8.2%)
Grade level			
First	5 (13.9%)	8 (21.6%)	13 (17.8%)
Second	5 (13.9%)	1 (2.7%)	6 (8.2%)
Third	9 (25.0%)	5 (13.5%)	14 (19.2%)
Fourth	7 (19.4)	6 (16.2%)	13 (17.8%)
Fifth	5 (13.9)	10 (27.0%)	15 (20.5%)
Sixth	5 (13.9)	7 (18.9%)	12 (16.4%)
Housing situation			

Apt/house	32 (89%)	36 (97.3%)	68 (93.2%)
Shelter	1 (2.8%)	0 (0%)	1 (1.4%)
With another family	3 (8.3%)	0 (0%)	3 (4.1%)
Car/outside	0 (0%)	1 (2.7%)	1 (1.4%)

Hypothesis One

Symptoms (coughing, feeling tired, asthma attacks, wheezing, tightness in chest, shortness of breath, waking up during the night, out of breath, difficulty taking a deep breath, and trouble sleeping at nights) were measured by PAQLQs items 4, 6, 8, 10, 12, 14, 16, 18, 20, and 23. There was a statistically significant difference in mean symptom scores for the treatment group when compared to the control group throughout three time points, $F(2,138) = 29.83$, $p < .001$, partial eta squared = .302. Statistical power was adequate and equal to 1.000. A post-hoc test was used for multiple comparisons by using Least Significant Difference (LSD) comparisons. There was no significant difference at baseline between the two groups ($p = .056$). Subjects in the treatment group reported significantly higher symptom scores suggesting that they had less asthma symptoms than the students in the control group at 6 weeks (see Figure 4.2.). The symptom scores further increased from 6 weeks to 12 weeks. The mean score for the treatment group demonstrated a statistically significant effect from baseline to 6 weeks ($p < .001$, $SD = 1.97$), baseline to 12 weeks ($p < .001$, $SD = 2.15$), and 6 weeks to 12 weeks ($p = .002$, $SD = 1.41$). The control group symptoms did not significantly improve. The mean score for the control group significantly decreased, which indicates subjects' asthma symptoms

increased from baseline to 6 weeks ($p = .005$, $SD = 1.99$) and baseline to 12 weeks ($p = .027$, $SD = 2.18$). The mean score did not significantly change from 6 weeks to 12 weeks ($p = .552$, $SD = .1.43$).

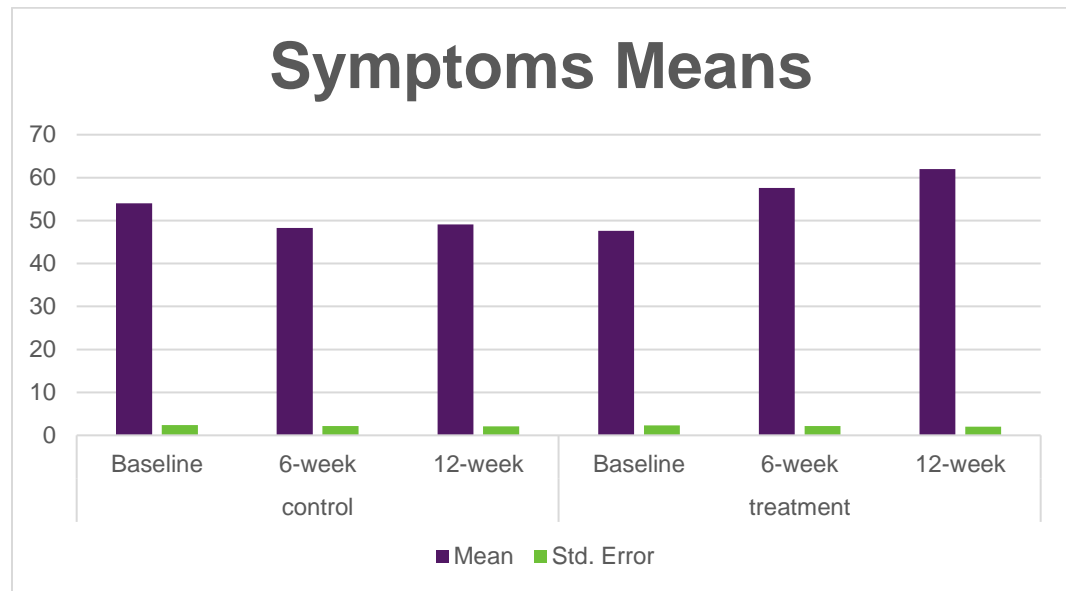


Figure 4.2. Asthma Symptoms

Hypothesis Two

There was a statistically significant difference in mean ACQ scores in the treatment group compared to the control group from baseline to 6 weeks and baseline to 12 weeks, $F(2,138) = 16.62$, $p < .001$, partial eta squared = .194. Statistical power was adequate and equal to .999 (see Table 4.2.). A post-hoc test was used for multiple comparisons using LSD comparisons. No significant differences between the two groups were found at baseline ($p = .524$). Subjects in the treatment group reported a comparatively lower score, suggesting that they had better asthma management than the students in the control group at both 6 weeks and 12 weeks. The mean score for the

treatment group demonstrated a statistically significant effect on time between baseline to 6 weeks ($p < .001$, $SD = .98$), baseline to 12 weeks ($p < .001$, $SD = 1.02$), and from 6 weeks to 12 weeks ($p = .03$, $SD = .73$). There were no statistically significant differences in the control group asthma self-management scores over time. The mean score for the control group did not show a statistically significant effect from baseline to 6 weeks ($p = .33$, $SD = 1.00$), from baseline to 12 weeks ($p = .35$, $SD = 1.04$), and from 6 weeks to 12 weeks ($p = 1.00$, $SD = .73$).

Table 4.2.

Asthma Management: Tests of Within-Subjects Effects

					Partial Eta Squared	Observed Power ^a
Source		df	F	Sig.		
Time	Sphericity Assumed	2	8.466	.000	.109	.963
	Greenhouse-Geisser	1.743	8.466	.001	.109	.943
	Huynh-Feldt	1.811	8.466	.001	.109	.949
	Lower-bound	1.000	8.466	.005	.109	.818
Time * group	Sphericity Assumed	2	16.624	.000	.194	1.000
	Greenhouse-Geisser	1.743	16.624	.000	.194	.999
	Huynh-Feldt	1.811	16.624	.000	.194	.999
	Lower-bound	1.000	16.624	.000	.194	.980

There was a statistically significant effect on the usage of PFM frequency treatment group compared to the control group over time, $F(2,138) = 162.04$, $p < .001$, partial eta squared = .701. Statistical power was adequate and equal to 1.00. A post-hoc test was used for multiple comparisons using LSD comparisons. Before the intervention, none of the subjects in the treatment group used a PFM tool ($\mu = 0.00$, $SD = .000$). At the end of the intervention at 6 weeks, 32 subjects (88.9%) in the treatment group reported that they used the PFM five or more times per week and record their peak expiratory flow rate to monitor their pulmonary function level, three subjects (8.3%) reported they used a PFM two times weekly, and one subject (2.8%) did not use a PFM ($\mu = 4.61$, $SD = 1.153$). During the 12th week, 17 subjects (47.2%) in the treatment group reported they used a PFM five or more times per week, two subjects (5.6%) reported PFM use four times per week, four subjects (11.1%) used a PFM three times per week, eight subjects (22.2%) used a PFM two times per week, four subjects (11.1%) used a PFM once a week, and one subject (2.8%) did not use the PFM tool ($\mu = 3.47$, $SD = 1.647$). Only one subject (2.8%) in the control group reported PFM use 2 times per week ($\mu = 0.06$, $SD = .333$) at baseline. All subjects in the control group reported they did not use the PFM ($\mu = 0.000$, $SD = .000$) at 6 weeks, and only one subject (2.8%) reported PFM use two times per week at 12 weeks ($\mu = 0.06$, $SD = .338$; see Table 4.3.). PFM usages significantly increased for assessing pulmonary function in the treatment group following the intervention.

Table 4.3.

PFM Report

		PFM at baseline	PFM at 6-weeks	PFM at 12-weeks
Control	Mean	.06	.00	.06
	N	36	36	35
	Std. Deviation	.333	.000	.338
Treatment	Mean	.00	4.61	3.47
	N	37	36	36
	Std. Deviation	.000	1.153	1.647

Hypothesis Three

There was a statistically significant difference on mean interruption of daily activities scores in the treatment group compared to the control group, $F(2,138) = 14.15$, $p < .001$, partial eta squared = .170. Statistical power was adequate and equal to .998. A post-hoc test was used for multiple comparisons using LSD comparisons. There was no statistically significant difference at baseline between the two groups ($p = .350$). Subjects in the treatment group reported a significantly higher score, suggesting that they had fewer interruptions in their daily activities than the students in the control group at 6 weeks and 12 weeks. The mean score for the treatment group demonstrated a statistically significant effect between baseline to 6 weeks ($p < .001$, $SD = 0.988$), and from baseline to 12 weeks ($p < .001$, $SD = 1.029$). There was no statistically significant effect between

6 weeks to 12 weeks ($p = .420$, $SD = .728$). The mean score for the control group did not show a statistically significant effect between baseline to 6 weeks ($p = .193$, $SD = 1.002$), baseline to 12 weeks ($p = .885$, $SD = 1.043$), or 6 weeks to 12 weeks ($p = .104$, $SD = .738$; see Table 4.4.).

Table 4.4.

Activity Interruption

	time	time	Std. Error	Sig.
Control	Baseline	6-week	1.002	0.193
	Baseline	12-week	1.043	0.885
	6-week	12-week	0.738	0.104
Treatment	Baseline	6-week	0.988	0.000
	Baseline	12-week	1.029	0.000
	6-week	12-week	0.728	0.420

Hypothesis Four

School absences were measured for 12 weeks over the duration of study and reported as a frequency. An independent samples t -test was used to test this hypothesis. There were no statistically significant differences in mean absences between the treatment group ($\mu = 1.33$, $SD = 1.57$) and the control group ($\mu = 1.83$, $SD = 1.54$; $t(70) = 1.35$, $p = .179$). However, the treatment group missed fewer school days than the control group over the 12 weeks. As shown in Figure 4.3., the treatment group ($n = 36$) missed

42 days total (ranging from 0- 8 per subject), and the control group ($n = 36$) missed 66 days total (ranging from 0- 7 per subject) throughout the study. Specific causes for the missed school days were not determined.

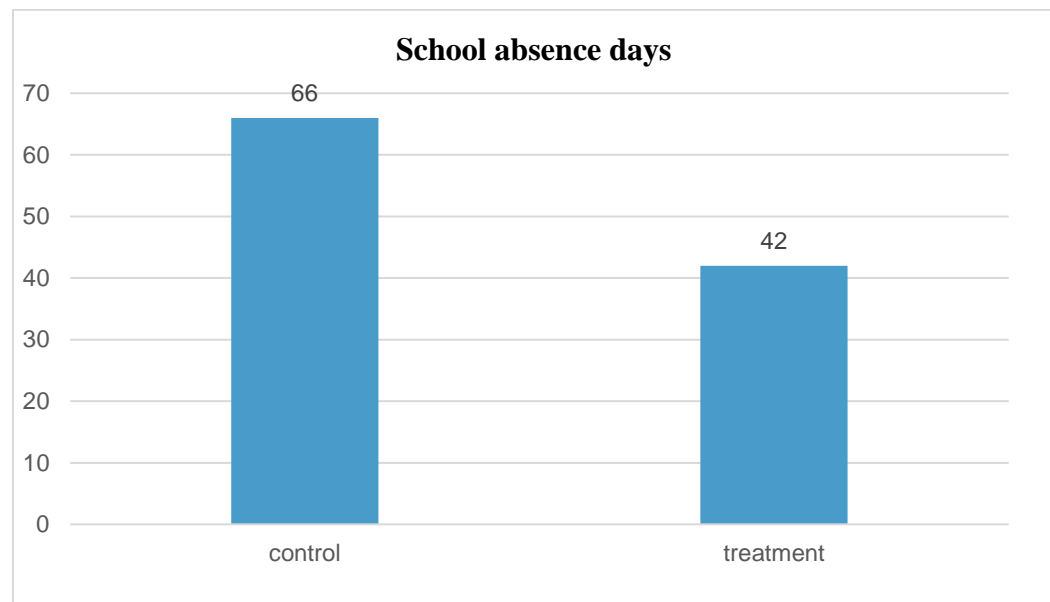


Figure 4.3. School Absences

Total PAQLQ scores were also analyzed using repeated measures ANOVA to determine the significance of the relationships between participating in a nurse-led asthma intervention and the children's quality of life. There was a statistically significant difference on the quality of life scores in the treatment group compared to the control group, $F(2,138) = 20.66, p < .001$. Post-hoc testing for multiple comparisons using LSD comparisons was performed. There was no statistically significant difference at baseline between the two groups ($p = .160$). Subjects in the treatment group reported significantly higher scores, suggesting that they had better quality of life in their daily lives than the students in the control group at 6 weeks and 12 weeks. The mean score for the treatment

group demonstrated a statistically significant difference from baseline to 6 weeks ($p < .001$, $SD = 4.34$), baseline to 12 weeks ($p < .001$, $SD = 4.97$), and 6 weeks to 12 weeks ($p = .016$, $SD = 3.00$). The mean score for the control group decreased significantly, indicating poorer quality of life between baseline and 6 weeks ($p = .018$, $SD = 4.40$). There was no significant change for the control group from baseline to 12 weeks ($p = .182$, $SD = 5.04$), or from 6 weeks to 12 weeks ($p = .213$, $SD = 3.04$). The analysis demonstrated that children living with asthma, who participated in the nurse-led asthma intervention reported better quality of life as measured by higher PAQLQs scores than children, who received usual asthma care.

The treatment group had statistically significant differences in reported symptoms, ACQ scores with PFM usage, and interruptions in daily activities immediately post-intervention at 6 weeks and again at 12 weeks in comparison to the control group. Although school absences were not statistically significantly different, the treatment group missed fewer school days. The repeated measures ANOVA were also used to test the overall quality of life, and there was a statistically significant difference on the quality of life between the treatment and control groups between baseline, 6 weeks, and 12 weeks.

Discussion

The study was conducted to determine the effectiveness of participating in a school nurse-led asthma intervention on symptoms, asthma self-management with PFM usages, daily activities, and school absences. This study's results were consistent with previous studies, which found that children who participated in asthma programs had

fewer asthma symptoms (Fiks et al., 2015; Grover, et al., 2016; Horner et al., 2016, Kintner et al., 2015; Lv et al., 2019; Payroovee et al., 2014; Rasberry et al., 2014; Suwannakeree et al., 2016), increased their knowledge and skills about asthma management (Fiks et al., 2015; Grover, et al., 2016), used the PFM more often (Suwannakeeree et al., 2016), missed less school days (Fiks et al., 2015; Suwannakeeree et al., 2016), and they reported better quality of life (Grover et al., 2016).

When children are accountable for their own health, they may feel more responsible and ready to manage their own health, which may lead to a smoother transition into puberty and adulthood. Orem's self-care theory was foundational throughout the study, including preparation of the intervention topics and how to deliver the intervention sessions to the subjects. Orem's self-care theory has three main processes that were considered to increase children's knowledge and skills to manage their asthma. The three processes are estimative process, transitional process, and productive process. Estimative process refers to having knowledge of the condition, transitional process infers knowing the specific situations of the condition and having skills appropriate for the present situation, and productive process relates to using knowledge and skills to manage the condition and to evaluate results. These three processes were critical in this study and should be considered when implementing interventions related to managing chronic conditions for all individuals, including children. Kouba et al. (2013) conducted a study to examine the effectiveness of the *I Can Control Asthma and Nutrition* (ICAN) intervention program for school children. Orem's self-care theory served to guide this

study, and it demonstrated that the subjects' asthma knowledge, quality of life, asthma self-care, and self-efficacy increased after the intervention (Kouba et al., 2013).

This study demonstrated that individuals, including children, must know their own health condition; therefore, offering an age-appropriate health intervention is essential to increase awareness and self-management of health. Children, who actively participate in managing their asthma symptoms effectively, are more likely to experience a healthy and active life. Children living with asthma should be educated to help them acquire skills for managing their asthma in daily life leading to fewer exacerbations and interruptions in activities and better school attendance. The recent reviews support implementing an asthma self-management education program for school age children, their parents, and school personnel (Isik et al., 2019; Kew et al., 2017; McCallum et al., 2017; Peytremann- Bridevaux et al., 2015). This study demonstrated that a school nurse-led asthma intervention was a supportive program that increased awareness of asthma management techniques and self-care abilities.

Limitations

The outcomes were measured for a 12-week period. It would be important to capture the long-term retention and self-care ability at three, six, and 12 months. There may be some benefit to implement booster sessions that extend learning and reinforces the skills to manage asthma successfully. The subjects' age, cognitive ability, and experiences may influence the understanding of the concepts. Furthermore, the sample was drawn from one urban school district of the region, which limits generalizability. The study was limited by the school schedules, rules, and regulations including the time and

place of the intervention program. Another limitation is that the parents' thoughts and experiences were not included in this study.

Conclusion

This study supports the benefits of implementing an ongoing school nurse-led asthma intervention program for improved asthma self-care practice among elementary school-age children. Self-management is a complex process, especially among children, which necessitates professional contribution and guidance. School nurses can provide essential learning steps and continuity of care for school children.

This study's findings indicated that elementary school-age children are quite capable of taking responsibility for managing their asthma, and that school nurses are critical in the process of increasing children's awareness, knowledge, and skills for managing asthma. Orem's self-care theory is sustained in that the child's awareness of asthma symptoms and self-skill to manage asthma for normal daily life is enhanced. The findings indicated that Orem's self-care theory supports education programs for school-age children to learn and adapt skills for asthma self-management. Nurses routinely explore ways to support and promote people's knowledge and teach skills that enhance individuals' self-management of chronic disease such as asthma.

Elementary school-age children should have the opportunity to practice self-monitoring and goal setting for asthma self-management with the guidance of school nurses. This study has the potential to motivate school nurses and health leaders to implement school nurse-led interventions for chronic diseases such as asthma; thus,

empowering children with knowledge and skills for optimal well-being. Further research studies with high school students in various geographic locations is also warranted.

Implications for School Nursing Practice

1. School nurses are strategically placed in school settings to deliver essential learning steps and provide continuity of care for elementary school children. School nurses have a unique opportunity to establish a trusting relationship with students, foundational for better asthma management-and likely to improve health outcomes.
2. Nurses who take a prominent role in fostering self-management skills in children living with asthma under their care will be instrumental in improving health outcomes for the children, such as quality of life, sleep, school attendance, and in turn school performance.
3. School nurses can deliver age-appropriate positive messages that convince children that they have the capability to manage their condition independently. Thus, enhancing self-efficacy and transitioning care to the individual level.
4. If school nurses intervene early in elementary school years, children will have the knowledge, skills, and confidence to allow for a smoother transition to higher grade levels.
5. Successful asthma self-management requires knowledge of asthma facts and symptoms, triggers, and correct medication techniques. School nurse-led asthma intervention programs should be periodic and reinforce learning, while providing opportunities to practice self-monitoring and goal setting for asthma

self-management with the guidance of school nurses. Nurses have the experience to determine if the children have acquired asthma self-management knowledge and skills.

6. Nurse researchers can partner with school nurses and other school professionals in school settings to conduct, implement, and replicate studies designed to improve the health and wellbeing of children of all ages with chronic conditions in the school setting.

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CHAPTER V

SUMMARY OF THE STUDY

This quantitative study explored the effectiveness of a school nurse-led asthma intervention program on children living with asthma. The purpose of this randomized controlled study was to determine the effectiveness of a theoretically based school nurse-led asthma intervention on symptoms, asthma self-management with PFM usage, participation in daily activities, and number of school absences in a sample of elementary school children between the ages of 7 and 12. Informed parental consent and participants' assent were required for the study. Risks to participants were minimal, and all identifying information was removed from printed and electronic materials. Neither participants nor the selected schools were identified in published research. This chapter provides a succinct summary of the study and synthesizes the previous chapters' information as a conclusion and discusses future implications.

Summary

The study was a randomized controlled trial with two groups. The subjects ($N = 73$) were randomly allocated to the treatment ($n = 37$) or the control group ($n = 36$). The treatment group subjects received six weekly 30-minute group nurse-led asthma intervention sessions. The control group continued to receive usual asthma care. Usual care refers to obtaining and administering the prescribed medicines according to the asthma action plan written by the child's physician. The treatment group subjects

reported higher mean symptom scores signifying that they experienced fewer asthma symptoms. They reported better asthma control scores with higher PFM usages and fewer interruptions in daily activities than the control group subjects at 6 weeks and again at 12 weeks. Repeated measures ANOVA were used to analyze these three outcomes and the results were statistically significant. The independent *t*-samples test was used to analyze school absences. The treatment group school absences were lower than the control group absences, but the result was not statistically significant.

Discussion of Findings

The incidence of asthma has increased despite the advancement of accurate diagnosis and treatment approaches (GINA, 2019). Asthma is usually characterized by persistent coughing, wheezing, trouble sleeping, shortness of breath, and chest tightness (ALA, 2018). Poorly managed asthma symptoms can lead to asthma exacerbations that cause interruptions in or inability to participate in physical activity, as well as increased school absences, and progressively declining pulmonary function (GINA, 2019; Isik et al., 2019; McGeachie et al., 2016; Rasberry et al., 2014).

Asthma burdens families and society. Lack of asthma self-management knowledge and skills can lead to exacerbations, poor quality of life, school absences, and emergency department visits (AAFA, 2015; Suwannakeeree et al., 2016). Sleath et al. (2017) stated that elementary school children have not been involved in managing their asthma routinely. Fostering responsibility for managing asthma in school-age children to the extent of their developmental and cognitive ability is important to empower them for healthy development that supports a sense of control and ability over the asthma

condition (Payroovee et al., 2014; van Bragt et al., 2015). A well-designed intervention has the potential to improve children's daily life and reduce economic burdens caused by school absences and parental work loss (Lv et al., 2019). School-based interventions for elementary school-age children should give direct and simple messages that enhance children's learning, skills, and confidence to manage their conditions.

This study comprised of a theoretically-based school nurse-led asthma intervention program focused on providing the following messages to the study subjects:

- Asthma is a manageable, chronic disease, and children living with asthma can have a normal life.
- Using a PFM is important to measure the asthma severity level-and school-age children are capable of using a peak flow meter to monitor their personal peak expiratory flow rate with guidance.
- Asthma symptoms must be recognized early on for better self-management.
- Types of asthma medicines and how they work as well as using the right techniques for administration is vital for effective asthma management.
- Identifying asthma triggers and recognizing how to avoid them decreases asthma symptoms.
- Breathing exercises should be practiced and have the potential to reduce asthma symptoms.

- Goal setting is an essential program component to manage asthma and improve quality of life. Students should have the knowledge and confidence to manage their asthma.

This study examined the hypotheses that children living with asthma who have participated in the nurse-led asthma intervention: a) will report fewer asthma symptoms as measured by PAQLQs; b) will have better asthma management, as measured by the ACQ with PFM usage recorded on PFM charts; c) will have fewer interruptions in daily activities as measured by PAQLQs; and, d) will have fewer school absences, as measured by school attendance records, than children who received usual asthma care. There were statistically significant differences noted between the treatment and control groups. The treatment group reported fewer symptoms, better asthma management with a higher mean number of the PFM usage, and fewer interruptions in daily activities immediately post-intervention at 6 weeks, and again at 12 weeks. Although school absences were not statistically significant, the treatment group missed fewer school days (42) compared to the control group (66).

The findings from this study were consistent with previous intervention studies, which found that children had fewer asthma symptoms and exacerbations (Fiks et al., 2015; Grover, et al., 2016; Horner et al., 2016, Kintner eat al., 2015; Lv et al., 2019; Payroovee et al., 2014; Rasberry et al., 2014; Suwannakeree et al., 2016); their knowledge of asthma management increased (Fiks et al., 2015; Grover, et al., 2016). They also reported fewer missed school days (Fiks et al., 2015; Suwannakeeree et al., 2016), more

usage of a PFM (Suwannakeeree et al., 2016), better quality of life, and increased self-efficacy related to asthma management (Grover et al., 2016).

Conclusion

Conclusions of this study are as follows:

1. Asthma self-management programs for the pediatric population are valuable and should be available in community settings to support children and families living with asthma.
2. Educating children living with asthma for self-management can increase their understanding of their own self-care responsibilities for optimal wellbeing.
3. School-age children are capable of acquiring the knowledge within their cognitive abilities to manage their condition and maintain their health. Educating children about asthma self-management takes significant time, practice, and dedication.
4. Elementary school-age children should be involved in their self-care for health maintenance with the guidance of school nurses and family members.
5. Self-care management requires knowledge of the condition, associated symptoms, and the acquisition of skills to perform the needed actions for maintenance and when symptoms arise. Self-care activities may be more important for children living with asthma and other chronic conditions to be informed about and encouraged to participate in.

6. Well-designed nursing interventions can be implemented to minimize the disproportion between self-care needs and self-care abilities to promote adequate self-management.
7. Educating children living with asthma about self-management can increase their understanding of their own self-care responsibilities for wellbeing.

Recommendations for Further Study

1. More research is needed to examine asthma self-management as a strategy in different geographic settings and assessed over longer periods of time.
2. Expanding this study to include high school students is indicated. Asthma self-management studies using the Orem's self-care theory would help to increase self-care and self-confidence among both elementary and high school-age children.
3. Experimental studies that pair children and parents/guardians as subjects focusing on knowledge and skills for asthma management at the individual and family level are warranted.

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APPENDIX A

Asthma Control Questionnaire

ASTHMA CONTROL QUESTIONNAIRE (ACQ)

© 1997
QOL TECHNOLOGIES LTD.



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DECEMBER 2002

ASTHMA CONTROL QUESTIONNAIRE©

PATIENT ID: _____

DATE: _____

Page 1 of 2

Please answer questions 1 - 6.

Circle the number of the response that best describes how you have been during the past week.

- | | |
|---|---|
| 1. On average, during the past week, how often were you woken by your asthma during the night? | 0 Never
1 Hardly ever
2 A few times
3 Several times
4 Many times
5 A great many times
6 Unable to sleep because of asthma |
| 2. On average, during the past week, how bad were your asthma symptoms when you woke up in the morning? | 0 No symptoms
1 Very mild symptoms
2 Mild symptoms
3 Moderate symptoms
4 Quite severe symptoms
5 Severe symptoms
6 Very severe symptoms |
| 3. In general, during the past week, how limited were you in your activities because of your asthma? | 0 Not limited at all
1 Very slightly limited
2 Slightly limited
3 Moderately limited
4 Very limited
5 Extremely limited
6 Totally limited |
| 4. In general, during the past week, how much shortness of breath did you experience because of your asthma? | 0 None
1 A very little
2 A little
3 A moderate amount
4 Quite a lot
5 A great deal
6 A very great deal |

5. In general, during the past week, how much of the time did you **wheeze**?
- 0 Not at all
 - 1 Hardly any of the time
 - 2 A little of the time
 - 3 A moderate amount of the time
 - 4 A lot of the time
 - 5 Most of the time
 - 6 All the time
6. On average, during the past week, how many **puffs/inhalations of short-acting bronchodilator** (eg. Ventolin/Bricanyl) have you used each day?
(If you are not sure how to answer this question, please ask for help)
- 0 None
 - 1 1 - 2 puffs/inhalations most days
 - 2 3 - 4 puffs/inhalations most days
 - 3 5 - 8 puffs/inhalations most days
 - 4 9 - 12 puffs/inhalations most days
 - 5 13 - 16 puffs/inhalations most days
 - 6 More than 16 puffs/inhalations most days

To be completed by a member of the clinic staff

7. FEV1pre-b ronchodilator: 0 >95% predicted
- FEV1pr edicted: 1 95 - 90%
- FEV1%predicted: 2 89- 80%
- (Record actual values on the dotted lines and score the FEV1 %predicted in the next column) 3 79- 70%
- 4 69-60%
- 5 59- 50%
- 6 < 50% predicted

APPENDIX B

Paediatric Asthma Quality of Life Questionnaire with Standardized Activities

PAEDIATRIC ASTHMA QUALITY OF LIFE QUESTIONNAIRE WITH STANDARDISED ACTIVITIES (PAQLQ(S))

SELF-ADMINISTERED

© 1999
QOL TECHNOLOGIES Ltd



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JANUARY 2001

PAEDIATRIC ASTHMA QUALITY OF LIFE
QUESTIONNAIRE(S)

PATIENT ID: _____

SELF-ADMINISTERED

DATE: _____

Page 1 of 4

Please complete **all** questions by circling the number that best describes how you have been during the **past week as a result of your asthma**.

HOW **BOTHERED** HAVE YOU BEEN DURING THE LAST WEEK DOING:

	Extremely Bothered	Very Bothered	Quite Bothered	Somewhat Bothered	Bothered A Bit	Hardly Bothered At All	Not Bothered
1. PHYSICAL ACTIVITIES (such as running, swimming, sports, walking uphill/upstairs and bicycling)?	1	2	3	4	5	6	7
2. BEING WITH ANIMALS (such as playing with pets and looking after animals)?	1	2	3	4	5	6	7
3. ACTIVITIES WITH FRIENDS AND FAMILY (such as playing at recess and doing things with your friends and family)?	1	2	3	4	5	6	7
4. COUGHING	1	2	3	4	5	6	7

IN GENERAL, **HOW OFTEN** DURING THE LAST WEEK DID YOU:

	All of the Time	Most of the Time	Quite Often	Some of the Time	Once in a While	Hardly Any of the Time	None of the Time
5. Feel FRUSTRATED because of your asthma?	1	2	3	4	5	6	7
6. Feel TIRED because of your asthma?	1	2	3	4	5	6	7
7. Feel WORRIED, CONCERNED OR TROUBLED because of your asthma?	1	2	3	4	5	6	7

PAEDIATRIC ASTHMA QUALITY OF LIFE
QUESTIONNAIRE(S)

PATIENT ID: _____

SELF-ADMINISTERED

DATE: _____

Page 2 of 4

HOW BOTHERED HAVE YOU BEEN DURING THE LAST WEEK BY?

	Extremely Bothered	Very Bothered	Quite Bothered	Somewhat Bothered	Bothered A Bit	Hardly Bothered At All	Not Bothered
8. ASTHMA ATTACKS	1	2	3	4	5	6	7

IN GENERAL, HOW OFTEN DURING THE LAST WEEK DID YOU:

	All of the Time	Most of the Time	Quite Often	Some of the Time	Once in a While	Hardly Any of the Time	None of the Time
9. Feel ANGRY because of your asthma?	1	2	3	4	5	6	7

HOW BOTHERED HAVE YOU BEEN DURING THE LAST WEEK BY?

	Extremely Bothered	Very Bothered	Quite Bothered	Somewhat Bothered	Bothered A Bit	Hardly Bothered At All	Not Bothered
10. WHEEZING	1	2	3	4	5	6	7

IN GENERAL, HOW OFTEN DURING THE LAST WEEK DID YOU:

	All of the Time	Most of the Time	Quite Often	Some of the Time	Once in a While	Hardly Any of the Time	None of the Time
11. Feel IRRITABLE (cranky/ grouchy) because of your asthma?	1	2	3	4	5	6	7

HOW BOTHERED HAVE YOU BEEN DURING THE LAST WEEK BY?

	Extremely Bothered	Very Bothered	Quite Bothered	Somewhat Bothered	Bothered A Bit	Hardly Bothered At All	Not Bothered
12. TIGHTNESS IN YOUR CHEST	1	2	3	4	5	6	7

PAEDIATRIC ASTHMA QUALITY OF LIFE
QUESTIONNAIRE(S)

PATIENT ID: _____

SELF-ADMINISTERED

DATE: _____

Page 3 of 4

IN GENERAL, HOW OFTEN DURING THE LAST WEEK DID YOU:

	All of the Time	Most of the Time	Quite Often	Some of the Time	Once in a While	Hardly Any of the Time	None of the Time
13. Feel DIFFERENT OR LEFT OUT because of your asthma?	1	2	3	4	5	6	7

HOW BOTHERED HAVE YOU BEEN DURING THE LAST WEEK BY?

	Extremely Bothered	Very Bothered	Quite Bothered	Somewhat Bothered	Bothered A Bit	Hardly Bothered At All	Not Bothered
14. SHORTNESS OF BREATH	1	2	3	4	5	6	7

IN GENERAL, HOW OFTEN DURING THE LAST WEEK DID YOU:

	All of the Time	Most of the Time	Quite Often	Some of the Time	Once in a While	Hardly Any of the Time	None of the Time
15. Feel FRUSTRATED BECAUSE YOU COULDN'T KEEP UP WITH OTHERS?	1	2	3	4	5	6	7
16. WAKE UP DURING THE NIGHT because of your asthma?	1	2	3	4	5	6	7
17. Feel UNCOMFORTABLE because of your asthma?	1	2	3	4	5	6	7
18. Feel OUT OF BREATH because of your asthma?	1	2	3	4	5	6	7
19. Feel YOU COULDN'T KEEP UP WITH OTHERS because of your asthma?	1	2	3	4	5	6	7
20. Have trouble SLEEPING AT NIGHT because of your asthma?	1	2	3	4	5	6	7
21. Feel FRIGHTENED BY AN ASTHMA ATTACK?	1	2	3	4	5	6	7

PAEDIATRIC ASTHMA QUALITY OF LIFE
QUESTIONNAIRE(S)

PATIENT ID: _____

SELF-ADMINISTERED

DATE: _____

Page 4 of 4

THINK ABOUT ALL THE ACTIVITIES THAT YOU DID IN THE PAST WEEK:

	Extremely Bothered	Very Bothered	Quite Bothered	Somewhat Bothered	Bothered A Bit	Hardly Bothered At All	Not Bothered
22. How much were you bothered by your asthma doing these activities?	1	2	3	4	5	6	7

IN GENERAL, HOW OFTEN DURING THE LAST WEEK DID YOU:

	All of the Time	Most of the Time	Quite Often	Some of the Time	Once in a While	Hardly Any of the Time	None of the Time
23. Have difficulty taking a DEEP BREATH?	1	2	3	4	5	6	7

DOMAIN CODE:

Symptoms: 4, 6, 8, 10, 12, 14, 16, 18, 20, 23

Activity Limitation: 1, 2, 3, 19, 22

Emotional Function: 5, 7, 9, 11, 13, 15, 17, 21

APPENDIX C

Demographic Information

1. Age: What is your age? _____

2. What is your gender?

☐ Female

☐ Male

☐ Other

3. Ethnicity origin (or Race): Please specify your ethnicity (3) (Check as many as apply).

☐ White

☐ Hispanic or Latino

☐ Black or African American

☐ Native American or American Indian

☐ Asian / Pacific Islander

☐ Other_____

4. What is your grade level?

☐ First Grade

☐ Second Grade

☐ Third Grade

☐ Fourth grade

☐ Fifth Grade

☐ Sixth Grade

5. How many people live in your house?_____

6. Current housing situation

- ☐ Living in a house/apartment owned or rented
- ☐ Living in a shelter
- ☐ Living with more than one family in a house or apartment
- ☐ Living in a motel or hotel
- ☐ Moving from place to place
- ☐ Living in a car, park or outside
- ☐ Housing lacks running water and/or electricity

7. Eligibility for school lunch

- ☐ Self-pay
- ☐ Reduced fee lunch
- ☐ Free lunch

8. Do you have any health problem(s) other than asthma?

- ☐ Yes
- ☐ No

If yes, what is your health problem? _____

Appendix D

Institutional Review Board (IRB) Approval



Institutional Review Board
Office of Research
6700 Fannin, Houston, TX 77030
713-794-2480
irb-houston@twu.edu
<https://www.twu.edu/institutional-review-board-irb/>

DATE: August 27, 2018

TO: Ms. Elif Isik
Nursing - Houston

FROM: Institutional Review Board (IRB) - Houston

Re: *Approval for School Nurse-led Asthma Intervention for Elementary School-aged children living with Asthma (Protocol #: 20196)*

The above referenced study has been reviewed and approved by the Houston IRB (operating under FWA00000178) on 8/27/2018 using an expedited review procedure. This approval is valid for one year and expires on 8/27/2019. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Ainslie Nibert, Nursing - Houston
Dr. Nina Fredland, Nursing - Houston
Graduate School

APPENDIX E

Institutional Review Board (IRB) Revision Letter



Institutional Review Board
Office of Research
6700 Fannin, Houston, TX 77030
713-794-2480
irb-houston@twu.edu
<https://www.twu.edu/institutional-review-board-irb/>

DATE: December 18, 2018

TO: Ms. Elif Isik
Nursing - Houston

FROM: Institutional Review Board - Houston

Re: Notification of Approval for Modification for School Nurse-led Asthma Intervention for Elementary School-aged children living with Asthma (Protocol #: 20196)

The following modification(s) have been approved by the IRB:

There will be 98 participants instead of 34 based on statistician consultation.
The recruitment flyer should be put in the selected school website to reach as a recruitment strategy in addition of the approved recruitment strategies.
I also need to modify the consent form to track the subjects' missed school days.

cc. Dr. Nina Fredland, Nursing - Houston

APPENDIX F

Houston Independent School District Approval Letter



HOUSTON INDEPENDENT SCHOOL DISTRICT

Hattie Mae White Educational Support Center
4400 West 18th Street • Houston, Texas 77092-8501

Grenita F. Lathan, Ph.D.
Interim Superintendent of Schools

www.HoustonISD.org
www.twitter.com/HoustonISD

Carla J. Stevens
Assistant Superintendent
Research and Accountability Department
Tel: 713-556-6700 • Fax: 713-556-6730

December 10, 2018

Elif Isik, RN, MA
8823 Emerald Heights Ln.
Houston, TX 77083

Dear Ms. Isik:

The Houston Independent School District (HISD) is pleased to approve your **revision** to the proposed research study, "School Nurse-Led Asthma Intervention Program for Elementary Students Living with Asthma." The purpose of the study, as outlined in your proposal, is to improve school attendance and academic performance and increase classroom seat time by empowering students to manage their asthma effectively. The study is being conducted in partial fulfillment of the doctoral degree requirements at the Nelda C. Stark College of Nursing at Texas Woman's University and the projected completion date is December 31, 2019.

Approval to conduct the study in HISD is contingent on your meeting the following conditions:

- From the designated primary research site, Briarmeadow Charter School, and several alternative research sites (i.e., **Mark White Elementary, Emerson Elementary, Rodriguez Elementary, Briargrove Elementary, Pilgrim Academy, Piney Point Elementary, Benavidez Elementary, School at St. George, Neff Elementary, and Tanglewood Middle schools**), the researcher will invite students with asthma to participate in this study.
- To protect student privacy in accordance with federal law, the researcher will recruit students independently from the use of health records maintained by the school. Outreach to potential study participants may be achieved through such passive means as using full-page advertisements placed throughout the chosen research sites and letters sent home to the study body, or through active means as talking with parents during parent-teacher conferences. The researcher shall not rely on her knowledge of those known to have asthma to recruit participants for this study.
- The researcher will recruit a sample of no greater than 98 students living with asthma.
- The researcher will restrict data collection to basic demographic information and pre- and post-intervention information gleaned from the Asthma Control Questionnaire and the Standardized Pediatric Asthma Quality of Life Questionnaire.
- Active, signed parental/guardian consent is required to allow students to participate in this study.
- Written assent is required of all participants in this study, including parents, students, and staff. No district staff may be compelled to complete a survey or be interviewed without his or her active consent.
- The researcher alone is responsible for all data collection related to this study.
- The researcher understands that the proposed research study may not interfere with the District's instructional/testing program. The researcher must follow the guidelines of

HISD and Texas Woman's University regarding the protection of human subjects and confidentiality of data (i.e., Institutional Review Board [IRB] approval or exemption must be obtained prior to the commencement of the proposed study).

- HISD's Department of Research and Accountability will monitor the study to ensure compliance with ethical conduct guidelines established by the Department of Health and Human Services, Office for Human Research Protection (OHRP) as well as the disclosure of student records outlined in Family Educational Rights and Privacy Act (FERPA).
- Data will only be reported in statistical summaries or reports that preclude the identification of the district or any student participating in the study.
- All data collected for the proposed research study, including signed consent forms and questionnaires, will be locked in a secure file cabinet in the principal investigator's home office for a maximum of three (3) years. Only the principal investigator will have access to participants' information. At the conclusion of the specified three-year period, all records will be disposed of in accordance with the principal investigator's data management plan.
- In order to eliminate potential risks to study participants, the reporting of proposed changes in research activities must be promptly submitted to the HISD Department of Research and Accountability for approval prior to implementing changes. Non-compliance to this guideline could affect the approval of future research studies in HISD.
- The final report must be submitted to the HISD Department of Research and Accountability within 30 days of completion.

Any other changes or modifications to the current proposal must be submitted to the Department of Research and Accountability for approval. Should you need additional information or have any questions concerning the process, please call (713) 556-6700.

Sincerely,



Carla Stevens, Assistant Superintendent
Research and Accountability Department

CS:ddt

cc: Noelia Longoria
Gwen Johnson
Zabeth Parra-Malek
Thayer Hutcheson
Peter Heinze
Alexander Rodriguez
Amanda Wingard
Diana Castillo
Bobbie Swaby
Luz DeAnda

Dave Wheat
Gretchen Kasper-Hoffman
Lisa Hernandez

APPENDIX G

Recruitment Flyer

Join the Childhood Asthma Research Study



RESEARCH STUDY Childhood Asthma Intervention Program

• WHO MAY QUALIFY TO PARTICIPATE THIS STUDY

- Children with asthma
- Children's ages must be seven to twelve years old

• BENEFITS

The study participants will be given

- A peak flow meter to keep, a log sheet for recording peak flow rates, and spacer.
- \$20 Wal-Mart gift card

Participants and their parents/guardians will have a chance to learn much information about his/her condition.

Texas Woman's University
College of Nursing Ph.D. student
as well as school nurse Elif Isik,
developed an asthma education
program for school-age children.
She wants to help children living
with asthma by teaching them
how to better manage their
asthma. She hopes to learn what
strategies work best.

If you have further questions
about the program, please
stop by the nurse's office or
call me at (281) 372-9016 or
email me at
eisik@houstonisd.org
eisik@twu.edu

9501 Dunvale Rd, Houston, Texas 77063

Tel 713.556.7422
Cell 281.572.9016

Fax 713.458.5506

EISIK@HOUSTONISD.ORG

EISIK@TWU.EDU



Únase al estudio de investigación sobre el asma infantil

ESTUDIO DE INVESTIGACIÓN

Programa de Intervención de Asma
Infantil

• ¿QUIEN PUEDE CALIFICAR PARA PARTICIPAR EN ESTE ESTUDIO?

- Niños con asma
- Las edades de los niños deben ser de siete a doce años

• BENEFICIOS

Los participantes del estudio recibirán

- Un medidor de flujo máximo y, una hoja de registro para registrar las velocidades de flujo máximo y un espaciador.
- \$20 tarjeta de regalo para Wal-Mart

Los participantes y sus padres / tutores tendrán la oportunidad de aprender mucha información sobre su condición.

Estudiante de doctorado en la Facultad de Enfermería de la Texas Woman's University alumna y enfermera de la escuela Elif Isik, desarrollo' un programa de educación sobre el asma para niños de edad escolar. Ella quiere ayudar a los niños que viven con asma enseñándoles cómo manejar mejor su asma. Ella espera aprender qué estrategias funcionan mejor.

Si tiene más preguntas sobre el programa, pase por la enfermería o llámeme al (281) 372-9016 o mande un correo a eisik@houstonisd.org eisik@twu.edu

8801 Durrain Rd. Houston, Texas 77063

Tel 713.556.7422
Cell 281.372.9016

Fax 713.456.5506

EISIK@HOUSTONISD.ORG

EISIK@TWU.EDU

APPENDIX H

Informed Consent

TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Title: School Nurse-led Asthma Intervention Program for Elementary School-aged Children Living with Asthma

Investigator: Elif Isik, MA, RN

eisik@twu.edu 281/ 372-9016
eisik@houstonisd.org 713/458-5500
nfredland@twu.edu 713/ 794-2908

Supervisor: Nina M. Fredland, PhD, RN, FNP

Explanation and Purpose of the Research

You are being asked to allow your child to participate in a research study for Mrs. Isik's dissertation at Texas Woman's University. Please read the information below and ask any questions you might have before deciding whether to allow your child to take part. The purpose of this research is to see if a school nurse-led asthma program will help your child to better manage his/her asthma.

Description of Procedures

A computer-generated randomization process will assign your child to be in the study group or control group. If your child is in the study group, she/he will attend six educational classes. Each class will happen once a week. Each 30 to 40-minute session will focus on a different topic such as a) what is asthma? b) how to use a peak flow meter, c) how to identify asthma symptoms, d) how to properly use an inhaler, e) how to identify asthma triggers, and f) how to manage asthma. The asthma intervention classes will be implemented during lunchtime, ancillary time, or after school and scheduled with assistance from school administrators, you, and teachers. The children will not miss any school work. The control group will receive usual asthma care. All participants will complete the study questionnaires before the first class, and again at 6-weeks, and at 12-weeks. The control group will have the same intervention program after the final 12-week testing session, if you and your child wish. To participate in this study, your child must have asthma and be between 7-12 years old.

Potential Risks

There are minimum risks for your child to participate in the program. If your child feels uncomfortable talking about their asthma experiences, they will not be forced to speak. A researcher will teach and demonstrate the techniques to use a peak expiratory flow meter and inhaler with a spacer. If your child becomes tired, hungry or upset, they may take break as needed.

Approved by the
Texas Woman's University
Institutional Review Board
Approved: August 27, 2018

Please initial _____

Page 1 of 3

Confidentiality and privacy will be protected to the extent that is allowed by law. The classes will be held at your child's school. Students' names and private information will not be revealed in the study. Students, parents, or employees will not be personally identified in any reports that may result from this study. After completion of the study, the data will be destroyed. The results of the study may be reported in scientific journals, but your child's name or any other identifying information will not be included. There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings and internet transactions. However, this is unlikely and no personal or health data will be transmitted in this manner.

The researcher will take all necessary action to fully explain the material and procedures to your child to eliminate the risk of embarrassment.

Your child can bring his/her bottle water, snack, or lunch. Snacks and milk will be available if it is not lunch time for participants. The researcher will make sure your child does not have any food restrictions.

The researcher will control the environment and eliminate hazardous items to prevent tripping while moving about in the class environment.

This study does not ask about child abuse; however, if the researcher should observe physical signs of child abuse or hear a direct account of child abuse from your child, state law requires reporting suspected abuse to relevant agencies such as Child Protective Services or the Texas Department of Family and Protective Services.

The researchers will try to prevent any problem that could happen because of this research. You and your child should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Participation and Benefits

Your child's involvement in this study is completely voluntary, and your child may withdraw from the study at any time. Refusing to participate or withdrawing from participation in the study will not affect you and or your child's school relations in any way.

Your child will be given a peak flow meter to keep, a log sheet for recording peak flow rates, and an inhaler spacer. Your child will have a chance to learn much information about his/her condition, and you will also have the opportunity to ask questions during the program period. Your child will be given two \$10 Wal-Mart gift cards: one at 6-weeks, and one at 12-weeks after completing the questionnaires.

Approved by the
Texas Woman's University
Institutional Review Board
Approved: August 27, 2018

Please initial _____

Page 2 of 3

If you would like to know the results of this study, we will be glad to mail or email them to you.*

Questions Regarding the Study

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study, you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your child's rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research at 713-794-2480 or via e-mail at IRB@twu.edu.

Your signature below indicates that you have read the information provided above and have decided to allow your child to participate in this study. If you later decide that you wish to withdraw your permission, simply tell one of the researchers listed at the top of this form.

Name of Your Child: _____

Signature of Parent or (Legal) Guardian

Date

Signature of Person Obtaining Consent

Date

Signature of Principal Investigator

Date

*Email address or Mail address for receiving results

Approved by the
Texas Women's University
Institutional Review Board
Approved: August 27, 2018

Page 3 of 3

TEXAS WOMAN'S UNIVERSITY
CONSENTIMIENTO PARA PARTICIPAR EN EL ESTUDIO

Titulo: Programa de Intervencion de Asma para Niños (as) que Viven con Asma en edad Escolar
Primaria Dirigido por la Enfermera de la Escuela

Investigadora: Elif Isik MA, RN

elisik@twu.edu 281-372-9016

elisik@houstonisd.org 713-458-5500

Presidenta: Nina M. Fredland PhD, RN, FNP

nfredland@twu.edu 713-794-2109

Explicacion y Proposito del Estudio

Se le ha pedido que permita que su hijo (a) participe en un estudio para la tesis de Mrs. Isik en la Texas Woman's University. Este formulario le provee la informacion acerca del estudio. Por favor lea la informacion de abajo y haga preguntas antes de decidir si permitira que su hijo (a) participe. El proposito de este programa es explorar la efectividad de un programa de asma dirigido por la enfermera de la escuela en los sintomas del asma infantil despues de aprender acerca de como manejar su asma mejor y usar un medidor de flujo máximo. Tambien deberia mejorar la asistencia escolar, y la habilidad de participar en actividades diarias. Se ha solicitado su permiso para participar en este estudio porque el/ella tiene asma.

Descripcion de el Procedimiento

El proceso randomizado generado por una computadora asignara a sus niños en el grupo o grupo de control del estudio. Si esta de acuerdo en que su hijo (a) participe en este programa, a su hijo (a) se le pedira que asista a un programa educativo de asma por un total de seis veces. El programa sera una vez a la semana 30 a 40 minutos de clase cada una enfocandose en diferentes areas como a) que es asma, b) como leer y usar un medidor de flujo maximo, c) reconocer y manejar sintomas del asma, d) usar un inhalador correctamente para inhalar toda la medicina y ejercicios de respiracion, e) identificar que provoca los ataques de asma y f) establecer metas mutuas para un mejor manejo del asma. Las clases de intervencion del asma se implementaran durante la hora de la comida, tiempo auxiliary, o despues de escuela programado con la ayuda de los administradores de la escuela, usted, y la maestra. Los niños (as) no se perderan trabajo escolar. El grupo de control recibira cuidado usual de asma. Todos los participantes completaran el cuestionario del estudio antes de la primera clase, y una vez mas a las 6 semanas y 12 semanas. El grupo de control tendra el mismo programa de intervencion despues del final de session de las 12 semanas, si a usted y su hijo (a) de gusten. Para ser un participante en este estudio, su niño (a) tiene que padecer de asma y tener entre siete y doce años de edad.

Riesgos Potenciales

No creo que haya algun riesgo para su hijo (a) si participa en el estudio. La investigadora implementara clases de intervencion de manejo para el asma. Durante las clases de intervencion, los estudiantes se pueden sentir incomodos al hablar de sus experiencias acerca del asma; no se presionara a los estudiantes en caso de que no quieran hablar. La investigadora enseñara y demostrara las tecnicas para usar un medidor de flujo espiratorio máximo y un inhalador con espaciador (tubo). Se les permitira tomar un descanso cuantas veces lo necesiten si los estudiantes

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Texas Woman's University
Institutional Review Board
Approved: August 27, 2018

Ponga su Inicial _____

Pagina 1 de 3

se muestra cansados o molestos.

La confidencialidad se protegerá según lo permite la ley. Las clases de intervención se llevarán a cabo en la escuela de su hijo (a). La confidencialidad y privacidad del estudiante serán protegidas. El nombre e información privada del estudiante no serán reveladas durante el estudio. Estudiantes, padres, o empleados no serán identificados personalmente en ningún reporte o publicación que resultara de este estudio. Al finalizar el estudio, la información será borrada de la computadora, y los papeles serán destruidos no más tarde de 08/28/2021. Cualquier información personal reunida durante el estudio se mantendrá confidencial en la medida de la ley. Los resultados del estudio serán reportados en revistas científicas, pero su nombre y cualquier otra información de identificación no serán incluidas. Existe un riesgo potencial de perder confidencialidad en todos los correos electrónicos, descargando, juntas electrónicas y transacciones vía internet. Sin embargo, esto es muy poco probable e información personal o médica no serán transmitidas de este modo.

El estudio tomará todas las acciones necesarias para explicar por completo el material y procedimientos a su hijo (a) para eliminar el riesgo de que se avergüenzan.

Su hijo (a) pueden traer agua, bocadillos, o comida. Bocadillos y leche estarán disponibles de no ser la hora de la comida de los participantes. La investigadora se asegurará de que su hijo (a) no tengan restricción de comida.

La investigadora controlará el entorno para eliminar artículos peligrosos para prevenir tropiezos mientras se mueven en el cuarto.

Este estudio no está preguntando acerca del abuso infantil; sin embargo, si la investigadora observara signos físicos de abuso infantil o escucha directamente del estudiante acerca de abuso infantil, la confidencialidad se romperá: la ley del estado requiere que se reporte el abuso a las agencias relevantes como Departamento de Protección al Menor o Departamento de Servicios de Protección y Familia.

Los investigadores tratarán de prevenir cualquier problema que pueda ocurrir debido a este estudio. Usted y su hijo (a) deben decirle a la investigadora inmediatamente si hay algún problema para que le ayuden. Sin embargo, TWU no provee servicios médicos o asistencia financiera por lesiones que pudieran ocurrir porque esta siendo parte de este estudio.

Beneficios y Participación

La participación de su hijo (a) en este estudio es completamente voluntario, y su hijo (a) puede retirarse del estudio en cualquier momento. Usted puede rehusarse a participar sin penalidad o pérdida de beneficios a los que de lo contrario tiene derecho. Rehusarse a participar o retirarse del estudio no afectará su relación o la de su hijo (a) en la escuela.

A su hijo (a) se le dará un medidor de flujo máximo para quedárselo, una hoja de registro para apuntar las veces que hay flujo máximo, y un inhalador con espaciador (tubo). Su hijo (a) tendrá la oportunidad de aprender mucha información acerca de la condición de él/ella, y usted también tendrá la oportunidad de hacer preguntas durante el periodo de este programa. A su hijo (a) se le darán dos

Approved by the Texas Woman's University Institutional Review Board Approved: August 27, 2018
--

Ponga su Inicial _____

Página 2 de 3

tarjetas de certificado de Wal-Mart de \$10.00 dólares: una a las 6 semanas, y la ultima a las 12 semanas despues de haber terminado el cuestionario. Si usted quiere saber el resultado de este estudio, se lo mandaremos por correo.

Preguntas Referentes al Estudio

Se le dara una copia firmada y fechada de este documento para usted. Si tiene preguntas acerca del studio preguntele a las investigadoras; sus numeros de telefono estan en la parte de arriba de la hoja. Si tiene preguntas acerca de sus derechos como participante de este estudio o del modo que se ha conducido, puede contactar a la oficina investigacion de la Texas Woman's University al 713-794-2480 o via correo electronico irb@twu.edu.

Usted esta tomando la decision acerca de permitir que su hijo (a) participe en este estudio. Su firma abajo indica que usted ha leido la informacion proporcionada arriba y ha decidido permitir que su hijo (a) participe en el estudio. Si despues decide retirar el permiso para que a su hijo (a) participe en el estudio, simplemente dejeme saber. Usted puede retirar la participacion de su hijo (a) en cualquier momento.

Nombre de su hijo (a): _____

Firma del Padre o Tutor Legal

Fecha

Firma de la Persona Obteniendo el Permiso

Fecha

Firma del Investigador Principal

Fecha

*Correo electronico o correo postal para recibir los resultados

Approved by the
Texas Woman's University
Institutional Review Board
Approved: August 27, 2018

APPENDIX I

Assent Form

Assent Form

TEXAS WOMAN'S UNIVERSITY
ASSENT TO PARTICIPATE IN RESEARCH

Elif Isik is a nurse at the Houston Independent School District-Briar Meadow Charter School. She will conduct a study that called "School Nurse-led Asthma Intervention Program for Students living with Asthma."

I agree to be in a study about healthy and unhealthy relationships. This study was explained to my parents/guardian who said that I could be in it. Even my parents say yes, I can still say no and decide not to be in the study. If I do not want to be in this study, I do not have to be in it. I know that participating in this study is up to me and no one will be upset if I do not want to be in it. No one will know how I answer the questions. My name will not be anywhere on the form. The people in charge of the study will be the only ones to collect the questions. If I decide to be in or not the study, my choice will not affect my grades or whether people like me.

There will be two groups in this study. One group will receive usual asthma care, and the other group will participate weekly for 45 minutes for 6 weeks the intervention classes at school. I don't know which group I will be in. I will be asked about my asthma management, daily activities, and school attendance. Before, during, and after intervention classes or survey collection times, I can ask questions for the study to the researcher.

Writing my name on this page means that the page was read by me and that I agree to be in this study. I know what will be expected of me if I decide to be in the study. If I choose to stop after this research begin, all I have to do is tell the researcher.

Child's Signature

Date

Person Obtaining Assent

Date

APPENDIX J

Signature Page



Final Defense

Date of final defense: 10/21/2019

Student: Elif Isik
Student ID#: 1140945

We, the undersigned are submitting herewith a ☐ Thesis ☒ Dissertation, entitled:
School Nurse-led Asthma Intervention for Elementary School-aged Children Living with Asthma,
written by the aforementioned student. We affirm that we have examined this document
for form and content and recommend that it be accepted in partial fulfillment of the
requirements for the degree of: Doctor of Philosophy in Nursing Science
with a minor in: N/A

Nina M. Fredland
Nina M. Fredland, PhD
Major Professor/Committee Chair

Anne Young
Anne Young, EdD
Committee Member
Rebecca G. Schultz
Rebecca G. Schultz, PhD
Committee Member

Committee Member

Committee Member
George Nisbet
Department Chair (or appropriate title for Departmental Administrator)

Extra signature lines have been provided.

The Graduate School
P.O. Box 425649 | Denton, TX 76204 | 940 898 3415 | gradschool@twu.edu

Appendix K

Manuscript Submission Proof

Dear Mrs. Isik:

Your manuscript entitled "A School Nurse-Led Asthma Intervention for School-Age Children: A Randomized Clinical Trial to Improve Self- Management" has been successfully submitted online and is presently being given full consideration for publication in The Journal of School Nursing.

Your manuscript ID is JSN-19-11-220.

You have listed the following individuals as authors of this manuscript:

Isik, Elif; Fredland, Nina; Young, Anne; Schultz, Rebecca

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/josn> and edit your user information as appropriate.

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Thank you for submitting your manuscript to The Journal of School Nursing.

Sincerely,

Julia Muennich Cowell

The Journal of School Nursing
