

EXPANDING ASTHMA AWARENESS IN ADOLESCENTS: A PILOT
INVESTIGATION

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Dedication

I have devoted my professional life to the *keiki* (children) of Hawai`i and their families. I am honored to dedicate this dissertation to them, and to my own family, sons Justin and Cory Bergh, husband Todd, his mother Anita, and my parents Jean and Jim Demeter.

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I would like to express my gratitude to all those who have contributed to my research and dissertation, especially the young participants who devoted time and effort to this study as well as the pilot study at Kamehameha Schools. This research is for you. The *kokua* (help), cooperation, and enthusiastic support of the faculty and the Medical Services Department were instrumental to completion of this project.

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ABSTRACT

Asthma is the most common chronic childhood disease (National Center for Health Statistics, 2004). In Hawaii, 28,600 children (9.7%) currently have asthma (State of Hawaii Department of Health, 2004). This study was designed to expand asthma awareness among freshmen students at a private high school in Hawaii through informative training sessions integrated into the mandatory Physical Education (PE) class and supportive coaching for students with asthma. Of 430 freshmen at the high school study site, 83 had asthma. A pre/posttest quasi-experimental design was utilized to assess enhanced knowledge after the intervention. Nearly 400 part-Hawaiian male and female students, aged 13-15, participated in the asthma training intervention. The study enrolled 270 students. Fifty-six students with asthma participated in the asthma coaching session. Participants with asthma were classified by national guidelines as mild intermittent to moderately severe.

All participants completed the Asthma General Knowledge Questionnaire before and after a training session presented in PowerPoint format. Scores were analyzed by paired *t*-tests. Only students with asthma participated in small group coaching sessions utilizing a PowerPoint presentation specifically tailored for adolescents. These participants completed the Pediatric Asthma Quality of Life Questionnaire before the session, then again three months after the session. Scores were analyzed using paired *t*-test and descriptive statistics.

Asthma training significantly increased general asthma knowledge scores ($p \leq 0.001$). Although asthma coaching improved the frequency of controller medication for

50% of the students (n=10), the increase was not statistically significant. Self-management improvements and quality of life scores differences were also not statistically significant. These results may be due to the small sample size and short study duration.

For an adolescent population where the rate of asthma is nearly 20%, providing asthma training to the entire group was demonstrated to be an effective means of increasing asthma awareness. Asthma education offered in a peer group setting demonstrates an innovative intervention modality that is culturally and developmentally sensitive to the adolescent population. Further study is needed over a longer time period to explore avenues to improved self-management skills and enhanced quality of life for adolescents with asthma.

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CHAPTER 1. INTRODUCTION

This chapter describes the purpose and objectives of the present study, and provides a brief statement of the problem and its significance. The research questions are also articulated and terms are defined.

Objective

The purpose of this study was to increase asthma awareness and knowledge among freshmen students at a private high school in Honolulu. All freshmen at the school are required to enroll in a Physical Education (PE) class. During the PE class time, freshmen students participated in a training session designed to foster support for teens with asthma. The study also provided supportive coaching for students with asthma to improve their self-management behaviors. Coaching sessions encouraged the use of controller medications, including inhaled steroids, for those with mild persistent, moderate, or moderate to severe asthma.

Research Questions

The following research questions were posed as the basis for the present study:

1. Can an asthma awareness education session significantly increase knowledge for participating students with and without asthma in freshman physical education class, as evidenced by improved scores on the knowledge acquisition questionnaire (Allen & Jones, 1998)?
2. Can an asthma coaching group session significantly improve self-management behaviors for those students with asthma as evidenced by improved scores on a quality of life asthma questionnaire (Juniper, Guyatt, Feeny, Ferrie, Griffith & Townsend, 1996)?

3. Can an asthma coaching group session significantly increase use of controller medicines?
4. Can an asthma coaching group session combined with the asthma awareness class promote a successful PE experience as evidenced by faculty and student reports regarding successful completion of the run or swim event, for those with asthma?

Problem

Asthma is the most common chronic disease of childhood and a leading cause of disability among children (Centers for Disease Control and Prevention, 2004). Self-reported asthma among high school students in the 2003 National Youth Risk Behavior Survey occurs at an 18.9% lifetime prevalence rate; 16.1% of these students currently have asthma (Centers for Disease Control and Prevention, 2005). In Hawaii, 9.7% or 28,600 children currently have asthma, with a lifetime prevalence rate of 14.1% or 41,600 children (State of Hawaii Department of Health, 2004). The asthma lifetime prevalence rate in the study high school study population approaches 20%; 83 of the 430 freshmen have a diagnosis of asthma.

On March 25, 2004, a 15-year-old male high school sophomore died of an asthma attack on the Island of Maui in Hawaii. "He always carried two or three inhalers in his backpack and his mom had placed albuterol ... in every room of their house" (Wilson, Honolulu Advertiser, 2004, p. 1). In 2000, 4,487 people died from asthma in the United States, at a rate of 1.6 per 100,000 people. Asthma deaths are rare among children; still, 223 children aged 0-17 died from asthma in 2002 (Centers for Disease Control and Prevention, 2002). Failure to seek emergency care and insufficient use of controller medications are cited as primary reasons for adverse outcomes in asthma patients

(National Asthma Education and Prevention Program, *Executive Summary*, 2002).

Airway remodeling with long-term poor control and chronic inflammation also poses a significant risk for persons with asthma (Jeffrey, 2001).

Significance

All students in this study were enrolled in a private high school in the State of Hawaii. All participants were of part-Hawaiian ethnicity, with parentage of at least 16% Hawaiian ancestry. The study population had an asthma lifetime prevalence rate of nearly 20%, as defined by private physician diagnosis noted on school physical exam forms. Out of 430 freshmen, all of whom were enrolled in the mandatory PE class, 83 students had a diagnosis of asthma. The required physical education class afforded an opportunity to provide training for all freshman in order to expand asthma awareness, encourage support for teens with asthma, and, in a subsequent session, provide supportive coaching to improve asthma self-management behaviors. Self-management behaviors include using controller medications for those with mild persistent, moderate, or moderate to severe asthma.

Definition of Terms

The following definitions were used for clarity throughout the study:

Diagnosis of asthma: The diagnosis of asthma was documented by the examining healthcare provider on the student's freshman year physical exam form. This diagnosis could reflect a past history or current active disease. Providers did not classify the severity of illness on the physical exam form. The diagnosis on the physical exam form was used as one of the inclusion criteria for the asthma coaching phase of the study.

Asthma severity classification: The National Asthma Education and Prevention Program's *Executive Summary* (2002) sets forth guidelines for diagnosis and management of asthma and defines asthma severity classifications. These categories include mild, mild intermittent, moderate, and moderate to severe. Components of assessment for category assignment include frequency of rescue medication use, frequency of awakening from nighttime symptoms, and peak flow and spirometry measurements.

For this study, asthma severity was loosely categorized according to self-reported symptom frequency and beta-agonist medication use, typically an albuterol inhaler. Symptom frequency and frequency of albuterol use were assessed by questions on the Pediatric Asthma Quality of Life Questionnaire (PAQOLQ) (Juniper et al., 1996). No symptoms and zero albuterol use over the last several years indicated that the student had a history of asthma rather than active asthma. Mild intermittent asthma was defined as symptoms of less than or equal to two days per week and characterized on the questionnaire as rarely or infrequently bothersome. Mild persistent asthma was classified as use of albuterol more than two times per week but less than five times a week, and sometimes bothersome on the quality of life survey. Use of Beta-agonists more than four times a week and symptoms characterized as frequently bothersome were classified as moderate persistent asthma. Severe persistent asthma was classified as symptoms that were always bothersome and very frequent, with continuous nighttime symptoms and use of beta-agonists more than seven times a week despite use of controller medications.

Self-management behaviors: Self-management behaviors include trigger avoidance when possible, symptom recognition, use of prescribed rescue medications with symptoms, use

of prescribed controller medications for moderate persistent asthma, use of calming breathing techniques, use of a peak flow meter, regular aerobic exercise to improve lung capacity, and call for help to access health care for unrelieved asthma episodes.

Rescue medicines: Rescue medications include albuterol and similar beta-agonist bronchodilator inhaled medications used when experiencing an asthma episode.

Controller medicines: Controller medications include prescribed medications taken daily to control inflammation and allergic reactions that precipitate an asthma event. These are most often inhaled steroids but can include other medications, such as a leukotrine modifier, longer-acting bronchodilators, or combination medicines.

Successful PE experience: Completion of the freshmen physical education class, a graduation requirement, involves four months of training for a timed 10 kilometer run and successful completion of the run.

CHAPTER 2. LITERATURE REVIEW

Chapter 2 presents a review of the literature and includes a brief discussion of asthma and its prevalence, diagnosis and treatment standards. Racial and ethnic disparities are also described and national guidelines for asthma management are provided. An analytic review of theoretical foundations pertinent to recent asthma research in children and adolescents is offered, as well as a summary of published asthma education program reviews.

Analysis of the Literature

There are primarily two phases of asthma: the initial response of broncho-constriction, and the later phase of inflammatory airway response. Medications are specific for each phase, and preventive medications that help to diminish the intensity and duration of the Late Asthmatic Response (LAR) are especially important for moderate to severe asthmatics (Sly, 2000). Early symptom recognition is essential, with rescue medication administration with a short-acting beta-agonist, such as albuterol, to control broncho-constriction. Compliance with anti-inflammatory medications is equally important to control the later inflammatory response, even when visible symptoms are not initially present. Early symptom recognition and compliance with medications are particularly important when parents or adolescents treat only visible symptoms with rescue medications, believing that medicines are not necessary when the child is not sick, or, conversely, treating wheezing with the preventive inhaler.

The long-term adverse pulmonary effects of unmanaged asthma in children are potentially severe and permanent, with acute inflammation progressing to chronic inflammation, which may then lead to remodeling of the airways (Jeffery, 2001;

Lemanske, 2001). Inflammation and remodeling are characteristic features of the conducting airways in asthma, which include injury and loss of the surface epithelium, thickening of the reticular basement membrane, and increase of underlying collagen, blood vessels, and airway smooth muscle (Jeffery, 2001). Therefore, it is vital to improve asthma control in children.

The Stepwise Approach for Managing Asthma in Adults and Children Older Than Five Years is the widely accepted standard of care in the United States (National Asthma Education and Prevention Program, *Executive Summary*, 2002). Treatment is outlined according to disease severity, with the severity classifications specifically outlined for each step and approach. Inhaled corticosteroids are the preferred first-line treatment for all but mild intermittent asthma (National Asthma Education and Prevention Program, *Executive Summary*, 2002).

Ethnicity has been associated with the prevalence of asthma. The Hawaii Health Survey 2002 reports that prevalence of asthma by ethnic groups in Hawaii is highest among Hawaiians/Part Hawaiians at 12.8%, compared to Caucasians in Hawaii at 7.5% (State of Hawaii Department of Health, 2002). Socioeconomic status, particularly poverty, also appears to be associated with asthma severity, resulting disability, and death. The reasons for these relationships have not yet been determined. Possible contributing factors include increased exposure to environmental triggers, such as pollutants, tobacco smoke, cockroach particles, household pet and rodent dander, as well as a lack of financial resources, lack of access to consistent medical care, and lack of social support to manage the disease on a long-term basis (Wade, 1997).

The National Asthma Education and Prevention Program's *Executive Summary* (2002) promotes the use of an individualized care plan, emphasizing medication management and patient education as its cornerstones. Care for young children with asthma, is ideally implemented using self-management or parent-management strategies. The goal of asthma management is to prevent complications, maintain optimal activity levels and promote pulmonary functioning through prevention, and early recognition and treatment of symptoms.

Several recent studies have suggested that one of the reasons for minimal improvement in asthma outcomes is the lack of provider implementation or provider adherence to the National Heart, Lung and Blood Institute (NHLBI) asthma guidelines (Cabana, Rand, & Becher, 2001; Finkelstein, Lozano, Schruoff, Inu, Soumerai, Ng & Weiss, 2000; Stempel, Pederson, & Blaiss, 2002). Even when providers do follow national treatment guidelines, improved asthma outcomes may be hindered by parent and/or adolescent management discrepancies. In any case, the *Healthy People 2010* (Centers for Disease Control and Prevention, 2000) recommendations emphasize education as the primary means of improving asthma outcomes.

In spite of this emphasis, a review of the literature of pediatric asthma research demonstrates that knowledge acquisition alone does not improve asthma outcomes for children, especially in culturally diverse or lower income populations (Brown, Avery, Mobley, Boccuti & Golbach, 1996; Hanson, 1998; Munro, Haire-Joshu, Fisher & Wedner, 1996.) However, non-compliance with self-care regimes among adolescents was found to be common (Buston & Wood, 2000). Most of the 49 teens interviewed in this qualitative study reported they did not use their prescribed medication as prescribed

for the following reasons: forgetfulness; belief that medicine was ineffective; denial about diagnosis; difficulty using the inhaler; fear of side effects; embarrassment; and, laziness (Buston & Wood, 2000).

Other recent studies have identified similar barriers to compliance, including forgetfulness when not actively wheezing, laziness, belief that medicine is not effective, belief that medicine should not be taken unless one feels sick or is wheezing, denial by the teen or the parent that one is asthmatic, inconvenience, and negative peer experiences (Baker, Friedman & Schmitt, 2002; Berg, Tichacek & Theodorakis, 2004; Buston & Wood, 2000; McCullen, Yoos & Kitzman, 2002; Peterson-Sweeney, McCullen, Yoos & Kitzman, 2003; Velsor-Friedrich & Srof, 2000). Additional studies report that many asthmatics are not taking preventive or controller medications because either they or their provider did not believe in medicating for prevention, primarily with inhaled steroids (Finkelstein et al., 2000; Peterson-Sweeney et al., 2003; Stempel et al., 2002).

Yoos, Kitzman, McCullen, Henderson and Sedora (2002) conducted a randomized clinical trial on symptom monitoring comparing peak flow meter (PFM), and daily use of subjective symptom monitoring to PFM symptom-associated monitoring in 168 children of diverse racial, geographic and socioeconomic backgrounds. The authors concluded that not every child needs a PFM daily, and that those who used the PFM when symptomatic had lower asthma severity scores, fewer symptom days, and less healthcare utilization than children in the other two treatment groups. Children of racial and ethnic minority backgrounds and poor children demonstrated the most improvement using PFMs when symptomatic.

Few previous studies have explored adolescents' beliefs and behaviors, as shown in a comprehensive review of asthma self-management programs for children (Velsor-Friedrich & Srof, 2000) and in an overview of the problem and current trends by Baker et al. (2002). In 2004, Velsor-Friedrich, Vlasses, Moberley, and Coover conducted a qualitative study, "Talking with Teens about Asthma." The study employed focus groups from four high schools and explored developmental tasks of adolescents with asthma. The study focused on the developmental tasks of adolescence, including establishing independence, body image and sense of self-worth, peer acceptance, and building meaningful relationships, establishing sexual identity, acquiring skills that are valued by the group, and developing formal operational thought. Focus group participants were asked to describe their positive and negative experiences with asthma, their current asthma management behaviors, what they felt was important in an asthma education program for teens, and their preferred ways to learn. The analysis revealed four themes: wanting to be normal, unpredictability of asthma, credibility of the teen with asthma, and self-management issues. The teens also expressed that they needed to know about: the causes and seriousness of asthma, use of peak flow meters, usefulness of breathing slowly, avoiding panic, how to get help during an asthma episode, emergency procedures, necessity of having extra inhalers, need to refill prescriptions, checking expiration dates, and communicating with peers and adults about their asthma-related needs. Teens identified preferred learning methods, such as peer group learning, the use of stories and discussion, visual materials, videos, software, and handbooks (Velsor-Friedrich et al., 2004). The Velsor-Freidrich study illustrates one of the most comprehensive approaches to defining effective asthma management for adolescents currently available.

Theoretical Foundation

The literature was also reviewed to determine whether perceptions, feelings, and beliefs influences compliance with prescribed asthma care. Findings suggest that meanings and values assigned to a situation influence adolescent and parental behavior related to asthma care (Brazil, McLean, Abbey & Musselmen, 1997; Bursch, Schwankovsky, Gilbert & Zeiger, 1999; Hanson, 1998; Mansour, Lamphear, & DeWitt, 2000; McCullen et al., 2002; Peterson-Sweeney et al., 2003; Svavarsdottir, McCubbin, & Kane, 2000; Wade et al., 1997).

Theoretical frameworks used in the studies reviewed varied widely. Frameworks used ranged from a medical model stressing patient education (Haby, Waters, Robertson, Gibson, Ducharme, 2001) without any defined theory base to the Health Belief Model (Munro et al, 1996), Social Cognitive Theory (Hanson, 1998), and social support (Winkelstein, Tarzian & Wood, 1997). Developmental theory was the basis for the studies by Brown et al. (1996) and Wilson et al. (1993, 1996).

Symbolic Interaction (SI) theory is the basis for the concept of “Definition of the Situation” used by Svavarsdottir et al. (2000) in their study of the well-being of parents of young children with asthma. In this study, the authors explored parental and key care givers definition of the situation. Perceptions, feelings, beliefs, and the degree of consistency among care givers were explored. These reports may provide an understanding of how care givers of children with asthma are orienting and organizing behaviors related to symptoms and management..

Definition of the situation provides an opportunity to consider developmental and cultural influences, while exploring values and beliefs. Assessing the adolescent’s

definition of the situation can assist in the identification of additional influences on self-management behaviors. The adolescent's definition of the situation evolves in relation to developmental issues that also influence behaviors, such as identity and independence issues, present-day orientation, risk-taking behaviors, and peer acceptance.

The adolescents' definition of their situation is also mitigated by cultural and social influences. At the high school involved in the present study, Hawaiian cultural values are articulated, studied and encouraged. These values include respect for self and others, placing *ohana* (family) over the individual, *lokahi* (working together in harmony), and *pono* (righteousness, doing what is considered morally right). These cultural values, described in *Culture & Quality* (Bureau of Primary Care, 2001), suggest a need to provide a supportive atmosphere for the asthmatic adolescent in a group setting.

A small qualitative study using semi-structured individual interviews was conducted with ten students with asthma from the same high school participating in this investigation to identify the beliefs and self-care practices of adolescents with asthma (Knight, 2005). The themes that emerged included knowledge acquisition and symptom recognition, both were positively associated with exposure to education from multiple providers, including family members, healthcare providers, and school-based educators. School-based or camp programs, even small poster sessions and short presentations facilitated knowledge acquisition. High self-efficacy was associated with positive experiences. The teens reported that they had fewer acute asthma events and decreased asthma severity when they were in better physical condition, on preventive medications, and/or avoided asthma triggers.

In this same study (Knight, 2005), several interviewees from the junior and senior high school classes reported that although asthma made the freshman PE running activity difficult, now that they were more physically fit, their asthma was less frequent or severe. They reported that higher levels of physical activity were associated with reduced asthma severity. Positive social support and acceptance were also noted to be helpful in facilitating greater self-efficacy, as the students felt “no shame” in using an inhaler in front of their friends. Social support for teens came from parents, family, friends, coaches, teachers, and healthcare providers. Recommendations from this pilot study included providing education regarding asthma awareness for all ninth grade PE faculty to increase knowledge and increased social support for students with asthma. Another recommendation highlighted the need for evaluation for asthmatics using albuterol inhalers more than three times a week, since according to national guidelines, they need controller medications added to their asthma care plan (NHBLI, 1997, 2002; National Asthma Education and Prevention Program, *Executive Summary*, 2002).

As for economic considerations, it is important to note that the present study population was not representative of all Native Hawaiian youth, many of whom experience high levels of poverty, incarceration, school failure, depression, anxiety and substance abuse and limited access to health care (State of Hawaii Department of Health, Office of Health Status Monitoring, 1999). Students of lower socioeconomic status in the study school population are provided with additional resources through the school, including financial, boarding, medical and counseling support.

Families’ use of traditional Hawaiian healers and healing practices were not identified in the teen pilot study in this same school, although a question was asked in the

semi-structured interview to elicit this information (Knight, 2005). Those who use traditional healing practice may opt not to seek services at a western-based on-campus facility. Cultural considerations were not a focus of this study and were secondary to the responses of the pilot study.

The theoretical foundation for this study is depicted in Figure 1. Knowledge acquisition, social support, and self-efficacy combine to form the definition of the situation, from which self-management behaviors emanate to yield outcomes.

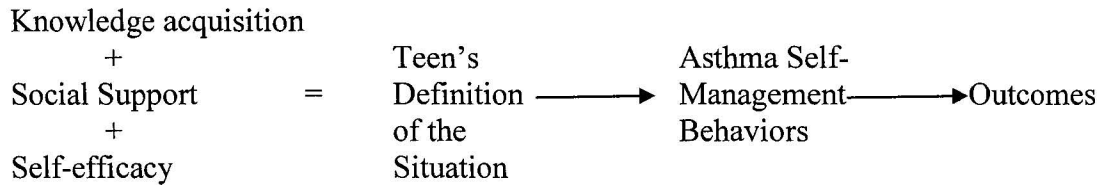


Figure 1. Theoretical Foundation

Review of Educational Programs

Several literature reviews appraised asthma education programs. The two-part series by Velsor-Friedrich and Srof (2000) was most comprehensive of the educational program reviews. Gaps were identified in research about programs for younger preschool-age children, adolescents, minority populations, and community-based studies. The authors conclude a more rigorous methodology is needed that focuses on the relationship between program implementation and asthma outcome measures. The authors summarized findings from six programs developed between 1990 and 1999 and 18 research articles evaluating programs. Programs for younger school-age children exist, but “not one study examined an exclusively adolescent population” (Velsor-

Friedrich and Srof, 2000, p.188). In a summary of findings, Velsor-Friedrich and Srof identified the following:

1. There is a critical need for preschool & adolescent programs.
2. Studies should assess changes in children over time in order to include a developmental approach.
3. There is a need for rigorous study design for reliability and validity.
4. Programs should reflect appropriate literacy levels and cultural sensitivity.

The authors stressed that outcome measures should include emergency department visits, urgent care visits, asthma self-management skills, self-efficacy and asthma knowledge improvement, Forced Expiratory Volume (FEV) measurements, school absences, and school performance. In addition, the authors noted a need for outcomes such as improved quality of life (QOL), cost-effectiveness, and increased knowledge and implementation of asthma management among school personnel and school nurses (Velsor-Friedrich and Srof, 2000).

As noted, few asthma education programs for adolescents exist. In a study by van Es, le Coq, Brouwer, Mesters, Nagelkerke, and Colland (1998), teens identified a need for specific answers to their questions about practical ways of preventing asthma symptoms and learning with visual aids. The Asthma and Allergy Foundation of America (1997) promotes the Power Breathing Program, which consists of three 90-minute experiential education sessions, with an optional 4th session for older adolescents. Berg et al. (2004) published the first and only known study to date using this program. The study targeted a population of 1,329 families, but only 13 participants (15 consented). The authors combined the Power Breathing Program with one additional

individual coaching session. The data analysis was descriptive because of the small sample size and the effect size was low. The Child Health Survey for Asthma in Adolescents by the American Academy of Pediatrics (AAP) (Asmussen, Olson, Grant, Fagan & Weiss, 1999) was the measurement tool utilized, but the tool has since been withdrawn by the AAP for further development (personal electronic mail correspondence with Asmussen at the AAP, June 2004). Teens in the study noted that their limited involvement in sports due to asthma often led to feelings of being stigmatized. The group approach for the coaching session employed in the study helped increase feelings of support (Berg et al., 2004).

The Starbright Foundation, with a grant from the Centers for Disease Control and Prevention, developed "Quest for the Code" (2003), an interactive CD-Rom based program for children up to 15 years. No reliability or validity studies related to this program have been published. The program is recommended for use with adolescents. Teens are used to evaluate the computer program, and their suggestions incorporated in order to make it more appropriate for school-age children, since the format was developed for a younger audience (Y. Sullivan Starbright Foundation, personal communication, August 3, 2004).

No programs or studies were identified focused on the development of peer support for adolescents with asthma, even though numerous studies have identified this need. Published validity and reliability statistics are not available for any of the asthma education programs developed for adolescents. The Asthma and Allergy Foundation of America has designed Meeting-in-a-Box for Schools (1998), a slide presentation with a

prepared script intended for parents and teachers of children with asthma. There are currently no reliability or validity statistics for the Meeting-in-a-Box program.

CHAPTER 3. METHODS

Methods and Procedures

This project employed a two-phase intervention. The first phase compared pre and post intervention asthma knowledge acquisition scores for students with and without asthma. Participants served as their own controls. The second phase compared quality of life and medication usage scores pre and post intervention for those students with a diagnosis of asthma.

Research Design

This study employed a quasi-experimental design. An intervention was administered but randomization was absent and the group served as its own control. Both phases of this study used pre and posttest measurements.

Intervention Model

Phase I involved Asthma Awareness Training. As there are no published reliable, valid asthma education programs designed for adolescents, a PowerPoint “talk story” was developed for this study (see Appendix C). “Talk story” is a local expression in Hawaii that refers to an informal conversational approach. Two nationally recognized programs formed the basis of the content of the Training Session, the National Asthma Education and Prevention Program (2004) guidelines and Meeting-in-a-Box for schools (Asthma and Allergy Foundation of America, 1998). Some of the learning styles suggested by teens, as identified by Velsor-Friedrich et al. (2004) were incorporated, including a video clip, digital photos of prior 10K run events, and quotes from teens with asthma who had completed the 10K run. More in-depth knowledge regarding

pathophysiology and control measures were added in PowerPoint format, as well as digital photos of prior physical education events at the school.

All freshman physical education (PE) students were presented with the asthma awareness education session (35 minutes) as part of the physical education curriculum. The training expanded upon the respiratory unit of instruction, part of the PE curriculum that consisted of basic anatomy and physiology of the lung, specific to physical activity and exercise. In January of 2005 the population consisting of 430 students was divided into thirds by virtue of their established class schedule, and the presentation (35 minutes) was repeated for the three groups on the same day. A pretest was conducted at the beginning of each session, after introducing the topic and explaining the study and consent forms. The posttest (10 minutes) was to be conducted immediately post-intervention, but time constraints unrelated to the study required that the posttest be completed as homework and submitted to faculty the following day.

Phase II of the intervention (45 minutes) consisted of an Asthma Coaching Session (see Appendix D). The population for this Phase consisted of all Freshman PE students with asthma (N=38). The literature review did not reveal any outcome statistics for asthma education programs designed specifically for adolescents. Therefore, a PowerPoint presentation was developed in “talk story” format. Content from the National Asthma Education and Prevention Program (2004) formed the basis of the content of the Coaching Session, while several of the learning styles suggested by teens (Velsor-Friedrich et al., 2004) were incorporated to include a video clip, digital photos of prior 10K run events, and quotes from asthmatic teens who had completed the 10K run.

The coaching session curriculum included specific information about trigger avoidance, symptom recognition, the value of aerobic exercise, the asthma action plan, medication administration technique, the importance of controller medications, and peak flow use. Group discussion focused on strategies for improving self-management that included how to refill a prescription, checking for expiration dates, and remembering to take controller medication daily. Values and beliefs of high school students with asthma were shared using quotes from participants in the qualitative study (Knight, 2005).

All students with a diagnosis of asthma (N=38) were encouraged by their faculty to attend an asthma coaching session offered two weeks after the initial asthma training class. The coaching session was conducted during a regular PE class time. These sessions were conducted in a separate classroom nearby.

In addition Phase II also included individual coaching for students who self-referred or were referred by the PE faculty to the school-based clinic for asthma concerns. All students at the school may self-refer or may be faculty-referred for medical evaluation for acute illness or injury. Students in this study were reminded that they could self-refer or be referred by their faculty for individual assistance for problems with PE related to asthma. These students included those who were using the rescue inhalers more than three or four times a week and were still experiencing difficulties in PE. The numbers of students who used the service post-training were tracked in aggregate form for those who had signed consent forms.

The medical visit included a typical physical examination conducted for ill or injured students at the school-based clinic by the investigator a Board Certified Pediatric Nurse Practitioner and researcher. The visit assessed heart rate, respiratory rate, pulse

oximetry and peak flow measurement. A detailed review of medications actually being used by the student was conducted, with individual discussion and patient education provided. Follow-up care was recommended with their primary care physician in communication with the parent or legal guardian.

Instruments

The Asthma General Knowledge Questionnaire for Adults (AGKQ) (see Appendix A) was developed as one of the outcome measures for a randomized controlled effectiveness trial of an asthma education program for adults with asthma (Allen & Jones, 1998). The authors published psychometric properties of the tool, citing content and face validity, with construct validity assessed using factor analysis. “Criterion-related validity, assessed using the contrasted groups method, demonstrated a significant difference ($p < 0.0001$) in total score and for 68% of item responses for the adults with and without direct experience of asthma” (Allen and Jones, 1998, p. 537). The authors report the Kuder Richardson-20 reliability coefficient for internal consistency at baseline, immediately post-intervention, then again 12 months after, as 0.56, 0.80, and 0.75, respectively. Although the first alpha of 0.56 is normally considered not acceptable, the second two are, and there is a dearth of measurement tools appropriate for adolescent participant research for which there are published psychometric evaluations. The tool was therefore considered acceptable for use in this study, with reliabilities calculated within the study results.

The literacy level of the AGKQ is reported at the fifth-grade reading level, while this author assessed the Flesch-Kincaid Grade Level as 6th grade 4 months. Thus, the readability of the tool was deemed appropriate as these students attend a private school

and must meet grade-level appropriate educational standards to qualify for continued enrollment.

The PAQOLQ (Juniper et al., 1996) was conducted as a pretest before the session, then again 14 weeks later at the end of the semester. The PAQOLQ is a disease-specific questionnaire that can be administered in both interview and self-administered formats. The tool is designed for children ages 7–17 years of age. There are 23 items that are rated using a 7-point Likert type scale with 3 domains or categories that include 10 items for symptoms, 5 items for activity limitations, and 8 items for emotional function. All scores are weighted equally, with a mean score calculated across all items within each domain (see Appendix B).

Psychometric properties of the tool are reported by Juniper et al. (1996). Construct validity was demonstrated by significant correlations between domains and clinical measures (forced expiratory volume, peak expiratory flow rate, and beta-agonist use) and domains and feeling thermometer scores. The tool “was able to detect quality of life changes in those patients who altered their health status as a result of treatment or natural fluctuations in their asthma ($p < 0.001$) and to differentiate these patients from those who remained stable, which indicates the instrument’s strength to discriminate between subjects of different impairment levels.” (Juniper et al., 1996, p. 35). Internal consistency reliability is not reported by the authors.

Three additional questions were added to the PAQOLQ for this study, including frequency of albuterol inhaler use, use of controller medicines, and whether the participant felt they had the support of friends when having an asthma episode. These questions were utilized in the pilot qualitative study (Knight, 2005). The support of

friends and any controller medication use were included on the same PAQOLQ tool using the same Likert-type response scale options. The albuterol frequency question was patterned after the same timeframe, using “in the past week” as a written number response.

Medication frequency questions were posed in order to identify students who had more than mild intermittent asthma. Asthma severity is classified by the National Asthma Education and Prevention Program (2002) as mild intermittent, mild persistent, moderate persistent, and severe persistent. Three criteria are evaluated for classification assignment: symptoms frequency per week, nighttime symptoms frequency per month, and lung function tests to include peak flow and forced expiratory volume. While it was beyond the scope of this study to evaluate lung function studies, weekly symptoms and medication use were included as proxy measures for estimating which students would be categorized as having more than mild intermittent asthma. Mild intermittent severity is defined as symptoms less than or equal to 2 times per week, nighttime symptoms less than twice per month, and peak flow variability less than 20% (National Asthma Education and Prevention Program, 2002). This classification requires the use of a beta-agonist only for these occasional symptoms and no daily controller medications. In this study, students who responded that albuterol frequency in the last week was zero to 2, and who scored their symptoms as never or rarely on the PAQOLQ tool were considered more likely to be in this category. Participants in this category would not be expected to increase controller medication use as it is not warranted.

Procedures

The investigation was implemented during the Spring 2005 semester. Letters explaining the investigation were sent to all parents. A consent form was included and parents willing to have their child's pre and post test data used for the investigation asked to sign the form and return it to the investigator. The intervention became part of the PE class and participation was not voluntary but implemented as a curriculum component. Permission to compare pre and post test scores constituted the research procedure and was consented to by parents and assented to by participating students.

Students were divided into three large groups and each group received the same training. The Phase 1 intervention a thirty-five minute PowerPoint Asthma Training Session was presented on January 10, 2005, with all students enrolled in second-semester freshmen physical education and present in class that day, N=392. Make-up sessions were conducted during the PE class time for those students who were absent due to illness or school-sponsored off-island activities, on January 20, 2005, N= 38. The pretest was conducted as part of the session (35 minutes), but due to time constraints, the posttest (an additional 10 minutes) had to be completed as homework and submitted to faculty the following day.

A reminder letter was then mailed to parents of students who had completed both pre and post questionnaires and/or PAQOLQ surveys, along with a postage paid return envelop to ask for their consent for their child's participation in Phase II of the investigation. Following Phase II of the study, a small incentive of a popular drink coupon was offered to students who submitted the QOL post survey.

Sample and Setting

All participants were freshmen students enrolled in the mandatory PE class in a private high school on the Island of Oahu, Hawaii. Participants were both male and female, aged 13 to 15 years, and of part-Hawaiian ethnicity. Part-Hawaiian ethnicity was defined in this study as those with parentage of at least part Native Hawaiian ancestry.

For Phase I, sampling and recruiting was defined by the freshman population participating in the freshmen physical education class and who had signed the consent forms with pre and post measures submitted voluntarily. For Phase II, the same definition was used with the diagnosis of asthma added.

Inclusion and Exclusion Criteria

For Phase I, all freshmen students enrolled in the mandatory PE class participated in the asthma training as part of the faculty-approved PE curriculum. Data analysis was conducted only for those with signed parental consent forms received by May 15, 2005. Some groups of students had been instructed by their faculty to submit only the parental consent, and that by completing the pretest and posttest, they were giving their “student” consent. Therefore, students who submitted both the pre and posttests and submitted a signed parental consent were also included in the study.

For Phase II, the coaching portion of the study, all students with asthma could attend the presentation as part of the PE curriculum, but data analysis was conducted only in relation to those with parental consents and by whom both pre and posttest surveys were voluntarily completed. In compliance with Institutional Review Board requirements and in keeping with ethical standards in research involving human participants, particularly in an educational and medical setting, all data were reported

anonymously and in aggregate form. Data related to participants who did not have a signed parental consent or who did not voluntarily submit both a pre and posttest or survey were excluded.

Informed Consent

Formal approval for this study was obtained from the high school's research board via telephone and e-mail notification on October 12, 2004 with written documentation that followed and was submitted to this Dissertation Committee Chair. Human subject considerations were addressed in accordance with the Code of Federal Regulations Title 45 (National Institutes of Health, 2001). Consent forms, developed in compliance with federal regulations governing research involving human subjects, were approved by the high school's research board and by the University of Hawai'i at Mānoa Institutional Review Board, which approved the study on October 21, 2004, following an expedited review.

Ethical Considerations

Data collection, including numbered posttests, will be kept by the researcher in a locked cabinet for at least seven years, to protect participant confidentiality in compliance with federal regulations. Data were reported as aggregate data and as number participants only. There are minimal risks for breach of confidentiality or stress of discussing feelings related to a chronic illness, as students were discouraged from disclosing or discussing these in the group coaching session and instead referred to the individual visits to the school-based clinic. Minimization of risk was ensured by maintaining confidentiality through use of a numeric code without any names or identifiers. The evaluation questions do not target negative emotions or conflicts.

Anticipated benefits outweighed minimal risks inherent to the study. Knowledge gained will strengthen student education asthma awareness for all participants, and may help participants with asthma improve self-management behaviors. Benefit for participants could include increased knowledge related to asthma and an opportunity for coaching and support for self-management behaviors related to asthma control. The session was part of the physical education class, and did not require time outside of the students' curriculum, unless students sought care at the school-based clinic.

Description of Variables

Demographic variables included gender and the presence or absence of the asthma diagnosis. Severity of asthma could be inferred from participant responses, but was not included as a variable in this study, except to determine if controller medications might be warranted according to the National Asthma Education and Prevention Program guidelines (2002). Participants shared common ethnic background. Participant age was fairly common; the age range of freshmen at the school is 13 to 15. Socioeconomic status was not included as a variable in this study. One aspect of socioeconomic status is access to health care. All participants had access to health care at school, and health insurance is required for enrollment in the school.

The outcome variable for Phase I was change in knowledge acquisition, as measured by the Asthma General Knowledge Questionnaire (Allen & Jones, 1998). Independent variables included gender and presence or absence of an asthma diagnosis. Power calculations for sample size estimation were sufficient for a paired *t*-test significance test for comparison of total knowledge score changes and for paired samples *t*-test for those with and without asthma diagnoses.

Outcome Variables

Outcome variables for this study are depicted in Table 1 with the corresponding measures and method of analysis

Table 1

Outcome Variables

Research question	Outcome variables	Measurement	Analysis
1. Can an asthma awareness education session significantly increase knowledge for students with and without asthma?	Scores on the knowledge acquisition questionnaire (Allen & Jones, 1998).	Continuous (Interval)	Paired <i>t</i> -test
2. Can an asthma coaching group session significantly improve self-management behaviors for those students with asthma?	Scores on a quality of life asthma questionnaire (Juniper, 1996).	Continuous (Interval)	Paired <i>t</i> -test

Outcome Variables (continued)

Research question	Outcome variables	Measurement	Analysis
3. Can an asthma coaching group session significantly increase use of controller medicines overall compared to baseline?	Self-report frequency scores.	Continuous (interval)	Paired <i>t</i> -test and Descriptive Statistics
4. Asthma coaching group session combined with the asthma awareness class promote a successful PE experience, for those students with asthma?	Successful completion of the run: pass or fail/repeat.	Binary yes/no	Rate percent and Descriptive Statistics

The outcome variables for the Asthma Coaching Session and individual health provider visits at the school-based clinic intervention were the change in Quality of Life survey scores, analyzed for significance utilizing the paired *t*-test. Successful completion of the 10K run at the end of the semester was measured as the completion rate and reported descriptively, as consent for comparison with rates from prior years were not requested for this study.

Data were entered into the Statistical Package for the Social Sciences, version 13.0 (SPSS Inc., Chicago, IL, 2004). Data were analyzed for general statistics, reliability alpha, frequencies, outliers and missing items. Demographics consisted only of gender, as age and primary identified ethnicity were fairly constant across the study group. The presence or absence of an asthma diagnosis, the independent variable, was coded as 1 for asthma and 2 for no asthma. Male gender was coded as 1 for male and 2 for female. A basic codebook was developed with items coded and labeled in a manner consistent with SPSS format and the tools themselves.

Both the AGKQ and PAQOLQ scores were analyzed for significance using paired *t*-tests for comparing pre and post knowledge and QOL scores. The paired *t*-tests were chosen as the differences in the scores met the requirement of being normally distributed. Statistics describing frequencies and percentages were used to analyze gender, demographics, presence or absence of asthma, and completion rate for the PE class. Descriptive chart review was completed for those students who self-referred or were faculty-referred for care at the school-based clinic, and for whom a signed study consent form was obtained.

Quality Control and Data Management

Each item of the AGKQ tool was read aloud to students during the pretest while the item was projected on the PowerPoint slide. Items were answered on a bubble sheet with which students were familiar. Sheets for the posttest were numbered "2" and were included in the packet with the written tool. Faculty collected the posttest the next day in class and reminded those students again the next day, with all forms submitted to this researcher on the second day post intervention. Initially, the answer sheets were to be

scored with a Scantron program to facilitate faster overall scores and basic statistics, but this proved unreliable, requiring hand-scoring of most sheets. Therefore, the data were entered into the SPSS 13.0 program. Outliers and frequencies revealed only one missing item, which was corrected with comparison to the original data. This phase of study employed a reasonable sample size to minimize random error and a low Type 1 error rate.

Each item of the PAQOLQ tool was read aloud to students for the pre-test with clarification on the controller medication question to allow for other medicines to include a common leukotriene modifier. Items were answered directly on the survey. Sheets for the post-test were numbered with the same identifier as the knowledge questionnaire. This researcher collected the post-test at the end of the session. Items for the PAQOLQ were entered into the SPSS 13.0 (2004) program. Outliers and frequencies revealed missing items for options under the Activities Domain.

CHAPTER 4. RESULTS

Chapter 4 summarizes the results of this study with figures depicting the results of the descriptive and inferential statistical analysis. Guided by the research questions, this chapter reviews the sample population, knowledge acquisition, pre and post test scores, and mean differences. Differences in PAQOLQ pre and post survey scores utilizing paired t-test analysis are also presented. The level of significance for all tests was set at 0.05 (two-tailed). Data were analyzed using the Statistical Package for the Social Sciences, version 13.0 (SPSS, Inc., Chicago, IL, 2004). The results also serve to facilitate discussion of study implications in Chapter 5.

Population Sample and Demographics

All participants in Phase I were ages 13 to 15 years of age, and of part-Hawaiian ethnicity, with 49% female and 51% male. There were 430 students eligible to participate in the study. Of these, 420 attended the Asthma Training Session. Of these, 270 completed both pre and post tests and signed consent forms, representing a response rate of 64%. While 270 completed the AGKQ, one additional student completed only the PAQOLQ, thus the study sample was comprised of 271 students. There were 83, approximately 19.8%, students with a diagnosis of asthma recorded on the school health record for this class. Of the sample (n=271), only 10% have asthma.

All participants in Phase II were between 13 to 15 years of age, and of part-Hawaiian ethnicity. Thirty-eight percent were female and were 62% male. Of the 83 students with asthma, 61 attended the Coaching Session, with 16 of these completing both pre and post QOL surveys and turning in signed consent forms.

The thirty-five minute “talk story” Coaching Session was conducted on January 27, 2005. Fifty-seven of 83 students with a reported diagnosis of asthma attended the asthma coaching session, where in-depth medication management was discussed. Of the 57, thirty-six students submitted parental consents. Of these, 16 students could be included in the data analysis with post-surveys at semester end. The PAQOLQ survey was completed at the end of the coaching session, and the post-survey was submitted at the end of the semester, during which students completed bi-weekly training runs for 15 weeks prior to the 10K event on April 29.

The school-based clinic visits numbered only four for those students enrolled in the study with consents. Two other students were referred by the PE faculty for frequent albuterol inhaler use and occasional difficulty with the training runs.

Research Question 1

Can an asthma awareness education session significantly increase knowledge for participating students with and without asthma in Freshman PE, as evidenced by improved post scores on the Asthma General Knowledge Questionnaire (AGKQ, Allen and Jones, 1998)?

The reliability of the 31-item Asthma General Knowledge Questionnaire for this study population is adequate with a calculated Cronbach’s alpha of .695 for the pretest and a Cronbach’s alpha of .760 for the posttest.

Paired *t*-tests were used to test the significance between the pre and post intervention scores. The pre and post scores were normally distributed, therefore basic assumptions for a paired *t*-test were met (see Figure 2).

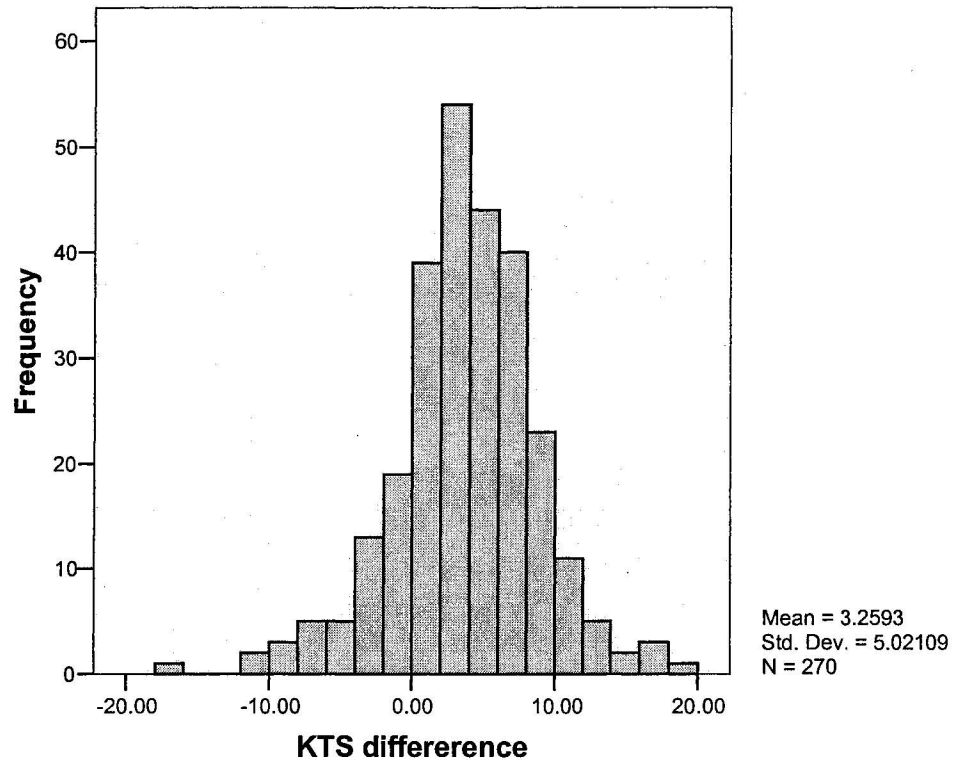


Figure 2. Normal Distribution of the Differences in Pre and Post Knowledge Scores

Differences between the pre and post test scores for the sample ($n = 270$) fall along a normal distribution curve, with a mean of 3 and a standard deviation of 5. No marked skew or kurtosis was identified. This allows for a paired t -test to be utilized for significance testing.

Knowledge acquisition scores increased significantly comparing pre and post-test scores ($P < 0.001$). There was statistically significant improvement in knowledge scores for the group as a whole. Table 2 depicts the statistics of the pre and post test scores, whereas Table 3 depicts the paired samples t -test of the differences in knowledge scores pre and post test.

Table 2

Phase I: Statistics of the Pre and Post Test Knowledge Scores

Scores	n	Mean	Median	Std. Deviation
Pre	270	20	20	4
Post	270	23	21	4

Table 2 depicts a pre-test mean of 20 for the sample ($n = 270$), with a median score of 20. The post-test mean was 23, with a median score of 21. The standard deviation for both pre and post tests was 4. The score increase represents a 10% increase in post-test scores.

Table 3

Phase I: Paired Samples t-test of the Differences in Knowledge Scores Pre and Post Test

Knowledge Scores (KS)	Mean	Std. Deviation	95% CI of the Difference		t	Sig. (two-tailed)	p value
			Lower	Upper			
KS pre and KS post	-3.3	5	-3.6	-2.7	-10.6	0.000 *	<.001

The paired samples *t*-test of the differences in knowledge scores demonstrates significance in scores improvement. The mean of -3.3 reflects the change in scores from pre to post test (20 minus 23) with a standard deviation of 5. The power calculation for this population size approached 1.0. a sample size of 48 would have been necessary for a power calculation of .95 for a 10% improvement in scores.

The differences in scores comparing those students with asthma to those without were analyzed using a two-sample t-test. Group sizes are unequal for those with asthma (n=27) and those without asthma (n=243). There were a total of 271 participants in the total sample. One student with asthma who completed the PAQOLQ did not complete the Knowledge Questionnaires, accounting for the sample (n=270 for the knowledge surveys). Table 4 depicts comparison statistics of the knowledge scores for those students with and without asthma, pre and post test.

Table 4

Phase I: Comparison Statistics of the Knowledge Scores for Students with and without Asthma, Pre and Post Test

Knowledge Scores	Asthma	n	Mean	Std. Deviation
Pre	yes	27	21	4
	No	243	20	4
Post	yes	27	24	4
	No	243	23	4

Within the sample of 270 participants, there were 27 students with asthma. These participants scored a group mean of 21 pre-test and 24 post-test. The group without asthma scored lower means of 20 and 23 pre and post test. A perfect score would have been 31 of 31 items correct. Students with asthma scored higher than students without asthma, but the mean score of both groups increased by three points, which is a 10% improvement from baseline.

Improvements in scores were statistically significant in a paired samples t-test of the differences in knowledge scores pre and post test for those students with asthma and for those without asthma (Table 5).

Table 5

Phase I: Paired Samples t-test of the Differences in Knowledge Scores Pre and Post Test for Students With and Without Asthma

Knowledge Scores (KS)	n	Mean	Std. Deviation	95% CI of the Difference		t	Sig. (two-tailed)
				Lower	Upper		
Non-asthma	243	-3.2	5	-4	-3	-10	.000* *
Asthma	27	-2.7	6	-5	-.2	- 2.2	.035*

* p value < .05

** p value < .001

Non-asthma participants difference in pre and post test scores reflects a group mean of -3.2 (pre minus the higher post-test scores), with a standard deviation of 5 and a small confidence interval of -4 to -3. Significance is demonstrated ($p < .001$) with a power calculation that approaches 1.0

The group mean for the smaller group of asthma participants' scores difference was -2.7, with a standard deviation of 6 and a larger C.I. interval of -5 to -.2. Significance is demonstrated ($p < .05$), but with a power calculation of only .44.

Research Question 2

Can an asthma coaching group session significantly improve self-management behaviors, for those students with asthma, as evidenced by improved scores on a quality of life asthma questionnaire (Juniper et al., 1996)?

Phase II of the study consisted of the coaching session intervention for those students with asthma. The *Healthy People 2010* (Centers for Disease Control and Prevention, 2000) objectives for asthma emphasize patient education as a means of improving outcomes through enhanced self-management skills. The investigator assumed that if asthma outcomes improved, then quality of life as reflected in symptom frequency and ease of physical activities would also improve.

The measurement tool used was the Pediatric Asthma Quality of Life Questionnaire (Juniper et al., 1996). The PAQOLQ measures symptom frequency, emotions, and activities in the three domain scores.

The reliability of the PAQOLQ was established for this age group of adolescents with asthma by Juniper et al., (1996). Reliability statistics for the PAQOLQ for this study were assessed using Cronbach's alpha for each of the three domains: Symptoms, Emotions, and Activities. Cronbach's alphas were adequate for the Symptoms Domain at .868 and .895 pre and post survey, and for the Emotions Domain at .923 and .918. The Cronbach's alpha could not be calculated for the Activities Domain. The scoring for this domain was compromised because of missing items, as some students in this survey chose not to score two of the four options in the pretest, thus negating the ability of calculating an alpha reliability. Nearly all the students chose to answer only two of the four choices during the posttest.

Self-management behaviors did not improve with statistical significance as demonstrated by PAQOLQ Total Scores at Time 1 and Time 2 in this study. Fifty-seven of 83 students with reported diagnosis of asthma attended the asthma coaching session, where in-depth medication management was discussed. Of the 57, thirty-six had obtained parental consent forms. Of these thirty-six, 16 students could be included in the data analysis with post surveys at semester end.

Table 6 depicts the statistics of the quality of life domains at pre and post times, including the total QOL scores. The responses are scored on a 7-point Likert scale; lower scores indicating more frequent symptoms and lower quality of life and higher scores reflecting less frequent symptoms and greater quality of life.

Table 6

Phase II: Results for the PAQOLQ Domains at Pre and Post Times PAQOLQ Tool

Domain	n	Mean	Range	Std. Deviation	Sig. of the Difference
Symptoms					
Pre	16	5.4	3.4 – 6.3	.92	.228
Post	16	5.6	4.4 – 6.3	.67	
Activities					
Pre	16	5.7	2.0 – 7.0	1.6	.409
Post	16	5.9	3.7 – 7.0	1.2	
Emotions					
Pre	16	6.2	2.5 – 7.0	1.2	.314
Post	16	6.3	3.1 – 7.0	1.0	

Results for the PAQOLQ Domains at Pre and Post Times PAQOLQ Tool (continued)

Domain	n	Mean	Range	Std. Deviation	Sig. of the Difference
QOL Total					
Pre	16	5.9	2.9 – 7.0	1.2	.284
Post	16	6.2	4.0 – 7.0	0.8	

The symptoms domain pre-test group mean score of 5.4 reflects symptom frequency of “a little of the time”, while the post-test group mean of 5.6 leans more to “hardly bothered by symptoms”. The group mean for the activities domain indicates feeling bothered “a bit” to “hardly bothered”, although there is a broader range of scores from “very bothered” (score 2) to “never bothered” (score 7). The emotions domain and the QOL total scores reflect similar mean scores of “hardly bothered”, but a wide range of scores reflecting very to never bothered.

Research Question 3

Can an asthma coaching group session significantly increase use of controller medicines?

An additional measure of self-management behavior is the use of controller medications for anything other than mild intermittent asthma, with a corresponding decrease in beta-agonist (albuterol) use. Those students with mild intermittent asthma would not be expected to need controller medications. Of the 16 enrolled participants with asthma, 6 students, or 38%, could be categorized as probably having mild intermittent asthma. This is based on the frequency of albuterol or other beta-agonist or rescue medication, and symptoms less than or equal to twice per week. There were 10

students, or 62 %, who might be categorized as more than mild intermittent, and therefore might benefit from a controller medication such as an inhaled steroid. Table 7 depicts self-reported controller medication use for the ten students who did not fall into the mild intermittent category pre and post survey.

Table 7

Phase II: Statistics for Controller Medication Use Pre- and Post-Survey

Controller use	Every day to quite often	Sometimes to once in a while	Hardly to none of the time	n
Pre	2	3	5	10
Post	4	2	4	10

The frequency of controller medicine use scores reflect some increase in use post-intervention, in the every day to quite often category.

This phase of study, however, could not access a reasonable sample size to minimize random error. A paired samples *t*-test utilized to compare the differences in the means of controller medication pre and post intervention did not demonstrate significance ($P = .05$). In a descriptive analysis of the data, however, the scores for controller use did increase empirically over the course of one semester for 5 of the 10 students (50%) who were not in the mild intermittent category pre and post intervention.

Research Question 4

Can an asthma coaching group session combined with the asthma awareness class promote a successful PE experience as evidenced by successful completion of the run event, for those with asthma?

Of the sixteen enrolled students completing the asthma coaching session, one student (6%) did not successfully complete the course due to asthma. Of the 83 students diagnosed with asthma, this same student could not complete the course due to asthma, despite increasing the use of controller medicines. The student will repeat the course next year, performing a timed 3-kilometer swim instead. There were students who could not participate in the run for other medical reasons, and they were considered exempt for the time of this study. They will repeat the course next year as well. For those students who were not exempt, the completion rate was 94%.

In addition to the group coaching session, Phase II of this study included an intervention of individual school-based clinic visits for asthma concerns. The school-based clinic visits numbered only four for those students enrolled in the study with consents. Two were evaluated and treated for non-asthma illnesses as part of their regular care at the clinic. Asthma care was evaluated and discussed at that time. No changes were necessary and regular follow-up visits were completed. These two students successfully completed the PE run. The other two students were referred by the PE faculty for multiple uses of the albuterol inhaler and difficulty on occasion with the training runs. One of these was the student who could not complete the course due to asthma.

Summary

Asthma Training for students both with and without asthma significantly improved general asthma knowledge scores. In the Asthma Coaching group of students with asthma, the scores for controller medication use appeared empirically greater but no significant differences were demonstrated. A significant increase in controller medication use could not be demonstrated and statistical power was low in Phase II of the study. Quality of life scores did not improve over the course of one semester.

CHAPTER 5. DISCUSSION, LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

Chapter 5 discusses the findings of this study in relation to the current literature and state of the science of asthma care for adolescents. Limitations for each of the research questions are outlined, along with conclusions, implications for practice and recommendations for future research. A summary and implications for practice and research are offered at the conclusion of this chapter.

Research Question 1

The first research question relates to asthma knowledge acquisition. “Can an asthma awareness education session significantly increase knowledge for participating students with and without asthma in Freshman PE, as evidenced by improved scores on the knowledge acquisition questionnaire (Allen and Jones, 1998)?”

Discussion

Findings indicate that there was significant improvement in knowledge scores for the group as a whole, after conducting a 35 minute group presentation. The tool tested general asthma knowledge considered important for understanding and self-management by the National Asthma Education and Prevention Program, *Executive Summary* (2002). Knowledge tested by the tool include etiology, symptom recognition, triggers management, rescue and controller medications, as well as psychological issues. The *Healthy People 2010* initiative identifies patient education as the first and primary step in improving asthma outcomes (Centers for Disease Control and Prevention, 2000). The extensive literature review could not identify any other study with adolescents that targeted all adolescents for education within a population; rather, studies were focused

upon only those teens with asthma. Self-image, peer group support and identification with the peer group are hallmark developmental characteristics of adolescence. Velsor-Freidrich and Srof (2004) identified four themes that emerged from teen asthma focus groups: wanting to be normal, unpredictability of the disease, credibility of the teen with asthma, and self-management issues. This intervention study addressed these concerns, particularly in the method and content of the PowerPoint presentation.

This author believes it is more effective to direct asthma awareness training to all students, particularly in settings with high asthma prevalence. Educating all students may lead to improved social support and peer acceptance for students with asthma. Conducting such training in a regular school-based physical education class allows for promotion and support for vigorous exercise as a long-term means of improving overall health, including asthma management, and avoids singling out students with a chronic condition such as asthma. The author feels that this approach allows the adolescent with asthma to expand their definition of the situation to include identity and independence issues and uses a present-day orientation in the context of the physical education experience while promoting peer acceptance.

Limitations

Adolescents identified preferred methods of learning about asthma in groups so that they can learn from peers, and through the use of stories, audiovisuals, software, and handbooks (Velsor-Freidrich and Srof, 2004). While the Asthma Training Session used in the study sought to incorporate these methods, the session had to be conducted in larger groups than originally planned. This precluded some of the peer-sharing, discussion, and reaction to the audiovisuals.

Another limitation is the possible validity of the post-test responses done as homework rather than immediately post-intervention or in a more controlled setting. A primary limitation of the study is the small number of enrolled participants with asthma. The power for the analysis for those with asthma is limited with an $n=27$. The total group of participants ($n=270$) did have sufficient power for analysis of knowledge acquisition for the group as a whole.

Conclusion

It was effective and efficient to conduct asthma awareness training for the whole class, rather than targeting only students with asthma, as is the case in most healthcare and educational settings. With the incidence rate of asthma near 20% on campus and 10% among enrolled study participants, most students will know someone with asthma, probably in addition to family and other friends. The data demonstrated that the training can increase knowledge and promote awareness about asthma care. It is hoped that students with or without asthma can then share their knowledge with others, especially their peers.

Recommendations

Recommendations for the school would include continuation of asthma awareness training for all freshman students as part of their respiratory class in the physical education curriculum, as these classes already meet in smaller groups. Future research recommendations would include conducting a study with groups of varied ethnic and socioeconomic backgrounds, to allow for greater generalizability of the findings.

By providing asthma training to the whole group of adolescents in the physical education class setting, knowledge acquisition was demonstrated with statistical

significance. Further research might hypothesize that social support through peer awareness may also improve through a descriptive analysis of the Emotion Domain scores and the question about feeling supported in asthma care.

Research Question 2

The second research question explores the use of a focused group presentation and discussion with students with asthma to improve self-management behaviors, following participation in the prior Asthma Training Session. “Can an asthma coaching group session significantly improve self-management behaviors, for those students with asthma, as evidenced by improved scores on a quality of life asthma questionnaire (Juniper et al., 1996)?

Discussion

The PAQOLQ assesses quality of life and includes measures that are also identified by the National Asthma Education and Prevention Program’s *Executive Summary* (2002) as indicative of self-management behaviors. In testing the tool for construct validity, Juniper et al. (1996) demonstrated significant correlations between the domains in the tool and clinical measures (forced expiratory volume, peak expiratory flow rate, and beta-agonist use) and domains and feeling thermometer scores (Juniper et al., 1996). Therefore, beta-agonist use and the use of controller medications were two additional questions added to this tool for this dissertation study as measures of self-management. The Domain of Emotions specifically addresses feelings of frustration, concern, anger, feeling different or left out. The third question added to the PAQOLQ asked whether the student felt they had the support of friends when having an asthma episode. These three questions were used in the qualitative pilot study (Knight, 2005). It

was assumed that if self-management improved, quality of life as scored in the tool would improve as a result.

Descriptive analysis depicted that the QOL scores overall did improve slightly, although not significantly. One possible explanation is the increase in vigorous physical activity (running three times a week) that was required over the course of the semester, which started after the pretest. The posttest survey was taken after three months of running. If reviewed in the context of the pilot study (Knight, 2005), the interviewed students in that study stated that they believed their quality of life related to asthma improved after two years of vigorous physical activity (running and swimming at least three times a week). In retrospect, one semester may be too short a timeframe to allow for improvement in lung capacity and improved asthma control.

Limitations

While frequency of albuterol (beta-agonist) and controller medication use are two measures that reflect key self-management skills for asthma, and these measures were used to demonstrate construct validity for the PAQOLQ, it is still an assumption that the improved self-management behaviors would be reflected in the quality of life scores of the PAQOLQ. The experience of the student who did not complete the course highlights the limits of this assumption; the student did improve controller medication use, but experienced little improvement in quality of life as measured by the tool.

The primary limitation is the low number of participants in this portion of the study. While all students benefited from the educational session and many of those with asthma participated in the coaching session, only those with signed consent forms were entered into the study. An additional limitation is the short length (one semester) of the

study rather than across the two-year physical education classes that prepare the student for the biathlon final of a 10K run and 3K swim at the end of the second year.

Conclusion

Self-management behaviors were measured using the PAQOLQ tool with medication usage questions pre and post intervention. These scores did not improve with statistical significance.

Recommendation

Further research is needed with larger population samples in multiple settings over longer time periods to explore possible improved quality of life and self-management behaviors with these interventions. The findings of the qualitative pilot study would suggest that at least two years are needed to document improvements. Further research might also examine the relationship between knowledge acquisition and controller medication use, both pre and post intervention.

The knowledge content stressed self-efficacy in developing and improving self-management behaviors in the coaching session, in an effort to expand or refine the definition of the situation for students with asthma. Further research is needed over a longer time period in similar settings to determine whether self-management behaviors can be improved significantly and result in improved asthma outcomes, as was reported by participants in the small qualitative pilot study.

Research Question 3

The third research question assessed whether group coaching could increase use of controller medicines. “Can an asthma coaching group session significantly increase use of controller medicines overall compared to baseline?”

Discussion

There were too few participants for sufficient power to answer this question. There were 10 students, or 62 %, who might be categorized as more than mild intermittent, and therefore might benefit from a controller medication such as an inhaled steroid. In a descriptive analysis of the data, however, controller use did improve over the course of one semester for 5 of the 10 students (50%) who were not in the mild intermittent category pre and post intervention.

Limitations

A major limitation is the low power resulting from the low number of students with asthma enrolled in the study. The length of the study was also a limiting factor, as this can be a short time period to allow for student referral to the primary care provider or specialist for asthma evaluation and a change in medical care plan for students who do not board at the school.

Conclusion and Recommendation

Scores for controller medication use did not increase with statistical significance. Descriptive analysis might indicate that significance might be obtained with a larger population of adolescents with asthma over a longer timeframe.

Research Question 4

The fourth research question evaluates the benefit of including asthma training and coaching in the context of a high school physical education class over the course of one semester. “Can an asthma coaching group session combined with the asthma awareness class promote a successful PE experience as evidenced by faculty and student

reports regarding successful completion of the run or swim event, for those with asthma?”

Discussion

This question could only be addressed with a rate of completion within the study population. While a completion rate of 94% would seem exemplary, it should be noted that there are potentially many other variables involved in the success of the PE experience, such as the considerable support and after-school training that PE faculty provide for students, including make-up practice runs. Other conditions that might have hindered a successful PE experience, such as injuries or other medical conditions, were excluded from the study by design.

The school-based clinic visits numbered only four for those students enrolled in the study with consents. However, anecdotally, there were visits by students not enrolled in the study who sought care for asthma and other conditions. Asthma medications and plan of care were nevertheless discussed during these visits. Point-of-contact education and care is advocated to increase immunization rates and injury prevention education (Centers for Disease Control and Prevention, 2003). Therefore, using this approach with students who seek care at the clinic may also be an effective form of asthma management.

Limitations

A comparison to prior-year completion rates would strengthen the study. There was no consent to look at populations other than those who consented for this study. It cannot be assumed that the asthma training is the only variable that leads to a successful PE experience for students with asthma.

Conclusion and Recommendation

It would strengthen the study to compare completion rates over time. Student and faculty course evaluations that assessed perceived value of the asthma training and support sessions would also strengthen the study.

Summary and Implications for Practice and Research

The findings provide evidence to support asthma education in a high school setting. Asthma is a heterogeneous disorder with a wide range of expression in different individuals. There is no current treatment of cure for asthma though much can be done to reduce the number and severity of asthma exacerbations. This research explored an innovative intervention modality that is culturally and developmentally sensitive to the adolescent population. Generalization would be improved with replication in pilot studies in multiple schools with varied ethnic and socioeconomic populations.

Nurses in school settings are challenged to provide asthma education and to assist with asthma management by providing interventions that have been proven to be efficient and cost-effective. While there are several successful school-based asthma education programs for school-age children, very few programs for adolescents exist. Further research is needed to assess the validity of this broad approach to providing asthma training for all teens in the school physical education class. Trial studies that examine intervening variables are needed in multiple school settings with larger sample sizes to improve self-management, peer support, and overall quality of life for students with asthma.

APPENDIX A.

ASTHMA GENERAL KNOWLEDGE QUESTIONNAIRE

(Allen & Jones, 1998)

Here are some questions about asthma in general. Use pen or pencil.

In the left-hand margin, write "T" for True, "F" for False, and "NS" for not sure.

1. Left untreated, asthma will eventually go away.
2. Asthma is a nervous or psychological illness.
3. Asthma is a breathing problem that may be triggered by strong emotions.
During an asthma attack...
 4. ... the muscles around the airways tighten and the tube becomes narrow.
 5. ... more mucous is produced in the airways
 6. ... the lining of the airways becomes swollen.
 7. ... the changes in the airways make it difficult to get the air into the lungs.
 8. ... the airways collapse.
 9. ...the changes in the airways make it difficult to get the air out of the lungs.
10. Medication helps the airways to return to normal.
11. You can become addicted to asthma medications if you use them all the time.
12. Asthma medications do not work well if you use them all the time.
13. Although it cannot be cured, asthma can usually be controlled by taking the correct medication(s).
14. Side-effects are less likely with inhaled medication than with tablets because inhaled medication is not absorbed into the body.
15. Syrups and tablets work about as quickly as inhaled medications.

16. If you get a cold or flu, you should increase your asthma medicines.
17. A doctor or health care provider is **best** able to measure how bad asthma is by listening to the chest with a stethoscope.
18. Measuring the amount of air in the lungs with a peak flow meter or spirometer is a more accurate way of measuring how bad asthma is.
19. Most asthma deaths could have been prevented.
20. If a person has died from an asthma attack, it usually means that the attack must have begun so quickly that there was no time for treatment.
21. You may have fewer asthma attacks if you can identify and avoid things that trigger them.
22. When asthma is well controlled by medication it is not triggered as easily.
When you know that you are going to be exposed to something that triggers your asthma, ...
23. ... you should take medication just before exposure
24. ... you should wait until you develop symptoms before taking medication.
25. Regular exercise such as swimming can totally cure asthma.
26. Exercise can help keep you fit and well and better able to cope with asthma.
27. Exercise until you become breathless can damage the heart and or lungs.
28. You should not exercise if exercise brings on even the occasional asthma attack.
29. Some medications taken 10 minutes before exercising can stop you getting an asthma attack when you exercise.
30. Some medications can be used during exercise if you get asthma.
31. Only a doctor can call an ambulance for you.

APPENDIX B.

PEDIATRIC ASTHMA QUALITY OF LIFE QUESTIONNAIRE

Pediatric Asthma Quality of Life Questionnaire

ID # _____

NOTE: The actual questionnaire listed the seven-point Likert scale options after *each* question. Forms are NOT scanable. The seven-point scales were either:

- | | |
|---------------------------|---------------------------|
| 1. extremely bothered | 1. all of the time |
| 2. very bothered | 2. most of the time |
| 3. quite bothered | 3. a good bit of the time |
| 4. somewhat bothered | 4. some of the time |
| 5. bothered a bit | 5. a little of the time |
| 6. hardly bothered at all | 6. hardly bothered at all |
| 7. not bothered | 7. none of the time |

List three activities in which your asthma bothered you in the last week. Some common activities include things like: running, swimming, climbing stairs, walking up hills, dancing, playing ball, like football, volleyball, basketball, doing dusting chores, track and field, laughing, yelling, or singing. The first one is your PE run or swim – circle the one you are doing.

1. run / swim
2. _____
3. _____

Please tell me how much you were bothered by your asthma while doing these activities during the last week.

1. How much have you been bothered by your asthma for activity #1 above?
2. How much have you been bothered by your asthma for activity #2 above?
3. How much have you been bothered by your asthma for activity #3 above?

4. How much did COUGHING bother you?
5. How often did your asthma make you feel FRUSTRATED?
6. How often did you feel TIRED?
7. How often did you feel WORRIED, CONCERNED, OR TROUBLED because of your asthma?
8. How much did ASTHMA ATTACKS bother you?
9. How often did your asthma make you feel ANGRY?
10. How much did WHEEZING bother you during the last week?
11. How often did you feel IRRITABLE?
12. How much did TIGHTNESS IN YOUR CHEST bother you?
13. How often did you feel DIFFERENT OR LEFT OUT because of your asthma?
14. How much did SHORTNESS OF BREATH bother you?
15. How often did you feel FRUSTRATED BECAUSE YOU COULDN'T KEEP UP WITH OTHERS?
16. How often did your asthma WAKE YOU UP AT NIGHT?
17. How often did you feel UNCOMFORTABLE because of your asthma??
18. How often did you feel OUT OF BREATH?
19. How often did you feel YOU COULDN'T KEEP UP WITH OTHERS because of your asthma?
20. How often did you have TROUBLE SLEEPING at night because of your asthma?
21. How often did you feel FRIGHTENED BY AN ASTHMA ATTACK during the past week?

22. Think about all the activities that you did during the past week. How much were you bothered by your asthma doing these activities?
23. How often did you have difficulty taking a DEEP BREATH during the past week?
24. How often during the last week did you feel supported in managing your asthma?
25. How often in the last week did you use a controller medicine, like Advair, Flovent, or other inhaled steroid?
26. How often in the last week did you use your albuterol inhaler?

APPENDIX C.

ASTHMA AWARENESS TRAINING

Outline Notes from Power-Point Presentation

1. Purpose

Increase our understanding of asthma

In our community and on campus

among family & friends

2. Dispel the myths and share accurate information about asthma triggers, care and treatment.

3. Improve support for students with asthma.

4. Most common chronic disease of childhood.

Prevalence rates:

- Mainland – about 6 %
- Hawaii – about 12 %
- Campus – nearly 20 %

5. Asthma in Hawaii

- Asthma can be mild, triggered by only cold viruses, or only exercise
- Or, asthma can be fatal...

6. About 20 asthmatics in Hawaii die yearly.

On March 19, 2004, a 15 year old male from Maui died from an asthma attack at home.

WAILUKU, Maui - Baldwin High School sophomore Cory Tumpap had always been

able to quell his asthma attacks with inhalers, but in the early morning hours of March 19

there would be no relief. Tumpap, 15, collapsed at home, unable to breathe, and suffered irreparable brain damage. He died a week later at Kaiser Moanalua Medical Center. "It happened so quickly. He couldn't even talk to us," said his mother, Janice Tumpap.

By Christie Wilson, Honolulu Advertiser 4/2/04

7. Asthma Myths

It doesn't have to be this way:

asthma can be treated such that people don't die from asthma attacks.

Asthma myths

It doesn't have to be this way:

waking up every night wheezing, or more often, coughing, can be prevented.

It doesn't have to be this way:

not being able to keep up with others your age in sports or PE class, due to asthma.

8. Olympic athletes have asthma.

9. With proper treatment, teens with asthma can:

- Participate in vigorous exercise, including competitive sports...
- Avoid long-term lung damage from uncontrolled asthma.
- Have good attendance at school & work
- Stay out of the emergency room

10. What This Means

Responsibility to ourselves, friends, and family to learn about how to support people with asthma in:

- Avoiding triggers
- Taking medicine when they need it

- Exercising to develop and maintain healthy lungs
- Dispelling the myths....

11. The truth about asthma...

Asthma & Allergy Foundation

CDC/NIH National Guidelines

12. Common Triggers

Two most common in Hawaii: Mold (humidity), Cock roaches

- Other common triggers: Cold virus, Exercise, Smoke, chemicals
- Strong emotions can trigger asthma, but it is NOT a psychological illness.
- Colds and flu can trigger asthma. People with asthma usually take or increase their asthma medication when they get colds or flu. Asthmatics qualify for the flu shot.

13. Exercise induced asthma

- Aerobic exercise will strengthen lungs
- It will build lung capacity and help keep asthma under better control
- Use quick-relief medicine (inhaler) before exercise
- Use quick-relief inhaler before trigger exposure

14. Inhaled medications...

- Inhaled medicines work faster – faster than pills or syrups
- Have less side-effects, as they do not travel through the bloodstream, and go to work directly in the airways of the lung.

15. Myths about asthma

- Left untreated, asthma will NOT go away
- You don't really outgrow asthma
- You CANNOT become addicted to asthma medicines
- Taking them regularly will NOT make them less effective

16. Uncontrolled asthma

- Asthma deaths are preventable.
- If a person dies from an asthma attack, it usually means their asthma was NOT under adequate control.

17. Students SHOULD carry inhalers

- Some deaths on the mainland
- 2004 Hawaii State legislature passed a law saying students with asthma must be allowed to carry their inhalers.

18. Peak flow meters

- Measure amount of exhaled air
- Can help with symptom recognition
- Can indicate severity of the attack
- Better than just listening with a stethoscope
- Spirometry and pulse oximetry other ways to measure severity

19. Asthma emergencies

- Belly breathing: expands lung capacity and has a calming effect
- Anyone can call 911.

- Can use Epipen in true emergency

20. Asthma can be controlled.

- Common among family & friends
- Responsibility to be aware of asthma truths, to dispel myths
- To support and encourage

21. Adolescents & asthma

- It's a family affair ...
- It's part of being a good friend ...

22. Asthma coaching session

- For those students with diagnosed asthma.
- Specifics about medications, options.
- Date/place: TBA

APPENDIX D.

ASTHMA COACHING SESSION

Keys to Controlling Your Asthma

Outline Notes from Power-Point Presentation

A. Keys to Controlling your asthma

1. Know your triggers
2. Exercise for stronger lungs
3. Know your Action Plan
 - Rescue / relief medication
 - Controller medications

B. What K.S. teens have said... Interviews with ten students on campus

Methodology

- ◆Qualitative study in which interviews were conducted and audio-taped, then transcribed.
- ◆ Transcriptions were analyzed to identify themes .

Demographics

- Most had mild-to-moderate asthma.
- Most were from rural areas of neighbor islands.
- 50% male / female

Talk story

- ◆*Feasibility of trigger avoidance:* recognize limited feasibility to control your environment. "I get sick every time I go home. The weather changes, the dampness, the

smoke and vog...” Patient interview, April 12, 2004. “at home, the vog, I kinda feel tired, I don’t feel as good, and then most times (at home) I have a lot of mucous”.

Interview #3

◆ “when the weather’s cold, when it’s dusty; when there’s lots of fires – a lot of smoke (cane fires on Maui). Those are triggers for me” Interview #5, 16 y.o female.

Talk Story

◆ “I think what benefited me the most is working out...working out benefits my body, keeps me physically fit...I don’t breathe hard... it puts my asthma away (in control and) I don’t kinda come dependent on it – the nebulizer.” Interview #3 thirteen year old male.

Talk Story

◆ “I have allergies, so I take the allergy stuff” Interview # 8 fourteen year old male.

◆ “if you’re having a hard time breathing, jus’ use your inhaler and if it doesn’t work, then tell someone.” Interview # 6 sixteen year old male

Talk story

Self-efficacy (do you believe that what you can do for your asthma will make any difference??)

Yes!! exercise & trigger avoidance made a positive difference.

Yes!! It was worth it to continue because it made a positive difference for themselves.

If feelings of limitations and fear, didn’t “believe”, and asthma was not in good control.

◆ “I don’t feel secure without it – the puffer – I have it in my hand, running, just in case.

If you need it, you have it with you – you don’t need to rely on anyone else, just yourself.

I feel safe with that.” Interview #3 thirteen year old male

Talk Story

◆ “if I don’t exercise for a while, then get back into it...the (asthma) usually starts, but if I exercise constantly, then I’m fine... Staying in shape, not getting sick (helps prevent asthma)” Interview #7 eighteen year old male.

Findings

Fewer asthma episodes when:

◆ In better physical condition (biathlon training helped, and they kept it up as juniors and seniors).

◆ Trigger avoidance

◆ Controller medications used appropriately

Better physical condition

◆ PE running was difficult, using MDI frequently (red flag if > 4 times/week)

◆ until they were in good shape... stay in shape and now fewer if any asthma episodes

◆ Still keep MDI handy

◆ Now many are off controller meds, by staying in shape

Trigger avoidance

◆ Most common triggers

–Mold

–Cock roaches

–Exercise

–Cold viruses

–Smoke and chemicals

Trigger avoidance

◆Using a mask to clean

◆Trading chores to avoid dusty ones

◆If allergies, asking about medications, such as Allegra, Claritin, Zyrtec, or others, such as Singulair.

◆Hand washing and not touching your face, to avoid viruses.

◆Flu shot

Controller medications

◆Vs Rescue or relief medications: Albuterol MDI

◆If using albuterol more than 3 – 4 times a week, need to ask about controller medications.

◆Allergy medications, if appropriate

◆Inhaled steroids

Controller medications

◆Inhaled Steroids:

–Not the side-effects of pills or liquids

–Growth retardation actually more for children NOT on inhaled steroids who suffer from uncontrolled asthma

–Affects the long-acting swelling of the internal wall of the airways

–Shown to prevent the long-term damage to airways that may occur with uncontrolled asthma in young children

Peak Flow Meters

- Recommended to help with daily assessment
- Helps to learn your own “personal best” and how that feels, and how to interpret your symptoms during asthma events (McCullen et al, 2002).

Social Support

- ◆ Talk story with your friends, so they understand
- ◆ Let people know about your asthma and how they can help if you need it.

Just do it!

- ◆ These ten interviewed students were not fatalistic about their asthma, and all but two did not feel limited by it.
- ◆ They were accepting of the challenges presented by being prepared with their albuterol inhalers, the need for trigger-avoidance measures, and especially important was the recognized need to stay in shape.
- ◆ They were not ashamed, and not especially anxious, even though away from home.

Good intentions, but.....

Reported reasons for non-compliance (Buston & Wood, 2000)

#1 main reason: I forgot!

(just don't think about it when we feel well)

#2. felt medicine was ineffective

Others:

Difficulty with inhaler, inconvenience, embarrassment, fear of side effects, and laziness.

Helpful hints...

From a study @ UCLA with teens:

- ◆ How to fill your prescription refills, pay for it, and check expiration dates & how many doses are left.
- ◆ Carry extra MDI in car, gym bag.
- ◆ Keep hydrated.
- ◆ What to do in a real emergency (14 y.o. Maui boy died).

Don't panic – belly-breathe & get help.

Keys to Controlling your asthma

1. Know your triggers
2. Exercise for stronger lungs
3. Know your Action Plan
 - Rescue / relief medication
 - Controller medications

APPENDIX E

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF HAWAII

Committee on Human Studies

MEMORANDUM

October 21, 2004

TO: Diane Knight, RN, MS, CPNP
Principal Investigator
School of Nursing

FROM: William H. Dendle
Executive Secretary

SUBJECT: CHS #13286- "Adolescents and Asthma"

Your project identified above was reviewed by the Chair of the Committee on Human Studies through Expedited Review procedures. The project qualifies for expedited review by CER 46.110 and 21 CFR 56.110, Category (7) of the DHHS HSR or expedited review categories.

This project was approved on October 19, 2004 for one year. If in the active development of your project you intend to change the involvement of humans from that indicated in the materials presented for review, prior approval must be received from the CHS before proceeding. If unanticipated problems arise involving the risks to subjects or others, report must be made promptly to the CHS, either to its Chairperson or to this office. This is required in order that (1) updating of protective measures for humans involved may be accomplished, and (2) prompt report to DHHS and FDA may be made by the University if required.

In accordance with the University policy, you are expected to maintain, as an essential part of your project records, all records pertaining to the involvement of humans in this project, including any summaries of information conveyed, data, complaints, correspondence, and any executed forms. These records must be retained for at least three years from the expiration/termination date of this study.

The CHS approval period for this project will expire on October 19, 2005. If your project continues beyond this date, you must submit a continuation application to the CHS at least four weeks prior to the expiration of this study.

We wish you success in this endeavor and are ready to assist you and your project personnel at any time.

Enclosed is your certification for this project.

Enclosures

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