

2001

School Nurses Asthma Knowledge and Management, Roles and Functions

Carolyn Levi
Grand Valley State University

Follow this and additional works at: <https://scholarworks.gvsu.edu/theses>



Part of the [Nursing Commons](#)

ScholarWorks Citation

Levi, Carolyn, "School Nurses Asthma Knowledge and Management, Roles and Functions" (2001).
Masters Theses. 597.

<https://scholarworks.gvsu.edu/theses/597>

This Thesis is brought to you for free and open access by the Graduate Research and Creative Practice at ScholarWorks@GVSU. It has been accepted for inclusion in Masters Theses by an authorized administrator of ScholarWorks@GVSU. For more information, please contact scholarworks@gvsu.edu.

SCHOOL NURSES ASTHMA KNOWLEDGE
AND MANAGEMENT, ROLES AND FUNCTIONS

By
Carolyn Levi

A THESIS

Submitted to

Grand Valley State University

In partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE IN NURSING

Kirkhof School of Nursing

2001

Thesis Committee Members

Linda Bond Ph.D., RN

Cynthia Coviak Ph.D. RN

Laura B. Moody MSN RN

Abstract

School Nurses Asthma Knowledge and Management, Roles and Functions

By

Carolyn Levi

The purpose of this study was to explore school nurses' asthma knowledge, and how they implemented their clinical practice within the school setting. The study also examined the role and functions of the school nurse to compare for continuity. This study examines the relationship of school nurses' educational level and length of experience upon asthma knowledge.

A self-report survey design was used to collect data. Instrument modification was initiated prior to use. The theoretical basis for this study was the Neuman Systems Model. Results were analyzed in order to investigate relationships and findings. The findings of this study showed no relationship between nurses' length of experience, educational level and asthma knowledge.

The study also suggests that school nurse roles and functions were consistently provided throughout the sample state, and in comparison with the United States and England the literature review. Implications for nursing practice and future research are discussed.

Dedication

Thank you God!!!

Being confident of this very thing, that He which hath begun a good work in you will perform it until the day of Jesus Christ. Philippians 1:6. (KJV)

To my husband Michael, **thank you** for your love, patience, encouragement and support. To my children Randy, Michael and Bethany **thank you** for your love, support and sacrifice during this chapter of our lives.

To the friends, family members and nurses who supported, encouraged and participated in this project **thank you**, I could not have done this without you!

To the Monday Night Women's Bible Study Group Thank you for your encouragement and prayers, I couldn't have done this without your intercession.

To those who proofed and edited Thank you so much!

This is the Lord's doing, and it is marvelous in our eyes. Psalms118: 23. (KJV)

Table of Contents

	Page
List of Figures.....	v
List of Tables.....	vi
List of Appendices.....	vii
CHAPTER	
1 Introduction	1
2 Theoretical Framework	5
Review of Literature	11
3 Methods	24
Design	25
Sample	25
Instrument	26
Procedure	27
Human Subjects Review	27
4 Results and Data Analysis	28
Question 1	28
Question 2	29
Question 3	30
Question 4	30
Additional Findings	31
5 Discussion and Implications	32
Purpose	32
Findings	33
Limitations	39
Implications for Nursing Practice	40
Recommendations for Future Research	43
Summary	43

List of Figures

Figure	Page
1. Neuman Systems Model applied to School Nurses Asthma Interventions	6

List of Tables

Table	Page
1. Asthma Knowledge Scores	29
2. School Nurse's Roles & Functions	31
3. Knowledge Scores Comparison (Levi & Calabrese et al)	33
4. School Nurse Activities Comparison (Levi & Calabrese et al.)	38

List of Appendices

Appendix	Page
A. Neuman Systems Model Use Permission	45
B. Calabrese & Huss Instrument Adaptation Request	46
C. Instrument Adaptation Permission	47
D. Local District Permission Request	48
E. Local District Research Permission	50
F. MASN Permission & Label Request	51
G. GVSU Human Subjects Review Approval	52
H. GVSU Human Subjects Review Approval	53
I. School Nurses Survey Cover Letter	54
J. Instrument Sample	

CHAPTER 1

INTRODUCTION

Asthma is defined as a chronic obstructive airway disease with multiple etiologies. Heredity and environment are key factors in the disease process (Mosby's Medical Dictionary 1998). Asthma is associated with tracheal and bronchial tree inflammation, which results in increased mucous production and secretion that generate recurring acute episodes (attacks) of breathing problems. The patient's airways, which are hypersensitive in this disease, respond to irritants by going into spasm when coughing, wheezing, shortness of breath, and chest tightness occur. When these spasms occur, mucus production increases, making the symptoms even worse. Hypersensitivity can also be triggered by allergens, upper respiratory infections, physical activity, and sometimes stress, and excitement yielding bronchial-spasms, and respiratory distress, and in severe case death (Mosby's Medical Dictionary, 1998).

Asthma affects approximately 4.8 million children in the United States alone (Bucher, Dryer, Hendrix, & Wong, 1998). Asthma is the most common cause of school absences (McEwen, Johnson, Neatherlin, Millard, & Lawrence, 1998) and accounts for approximately 25 percent of all school absences. Asthma continues to be one of the primary causes for hospitalization among children (McEwen et al., 1998). It is well known that children with asthma are absent twice as much as healthy

children. In addition, their absences are longer and more frequent in nature. The incidence of asthma increased 29 percent from 1980 to 1987, (National Heart, Lung and Blood Institute [NHLBI], 1992). In 1992 asthma was responsible for more than 500,000 emergency department visits in the United States alone. During that same time frame the mortality rate increased by three percent, with adolescents, minorities, and lower socioeconomic groups being at the highest risk for death due to asthma (Weil et al., 1999).

Asthma morbidity and mortality can be reduced when the focus is on the factors associated with the disease, and its treatment management. Within the school setting nurses strive to educate and intervene as patient advocate on behalf of the students they serve and their families. These persons may include students, parents, siblings, and staff. Health education and curriculum is essential for all persons within the school. Health education remains an integral portion of the standards of school nursing, and is essential in the promotion of health, and illness prevention. The roles of the school nurse are versatile, and varied, and include the following:

1. Individualized student care planning.
2. Provision of health services, assessment, and referral.
3. Medication, and treatment administration.
4. Preventative health maintenance interventions.
5. Disease and illness education for students and staff (Thurbur, Berry, & Cameron, 1991).

These are but a few of the responsibilities of the school nurse, but the overall goal is to promote and maintain health, prevent illness individually, and within the

environment, and improve student health outcomes. The school nurse is a key figure in the education of students, parents, and school staff regarding triggers, and preventative measures of asthma (Thurbur et al., 1991).

Problem Statement

Inadequate asthma control due to poor medication compliance, lack of knowledge regarding medications and attack triggers, as well as little standardization in treatment protocols all contribute to the growing morbidity and mortality in the disease of asthma. Childhood asthma and disease management is of great importance since it is the most common childhood chronic condition with an estimated prevalence rate between 5.8% and 7.2% (Center for Communicable Disease Control Asthma Morbidity and Mortality [Online]), Available FTP, 1998).

Asthma morbidity and mortality are increasing in the United States, as evidenced by the increased ambulatory care visit statistical data collected in 1993, and 1994. The report documents asthma as the 6th most frequent diagnosis in office based visits and in the outpatient departments, and 11th in emergency departments (Center for Communicable Diseases Control Asthma Morbidity and Mortality [Online], Available FTP, 1996).

Research suggests that asthma disproportionately affects children living within the inner city. According to the National Cooperative Inner-City Asthma Study (NCICAS) factors associated with inner-city asthma morbidity among a sample group of 1,528 children center around physical environment, psychosocial characteristics, cultural components, access to care and compliance (Weil et al., 1999). Coupled with this information is the clinical evidence that asthma morbidity

and mortality is on the rise in spite of, improving technology, health-care, and access to care.

Research suggests that asthma morbidity can be reduced with preventative, and educational measures, as well as early treatment. Since school is a common meeting place for all children, it is feasible that school nurses, where available are responsible to provide education, treatment and interventions for the child with asthma. With the increase in asthma morbidity and mortality, it is clear that education of preventative interventions would substantially decrease the deleterious effects of the disease. With the interventions of the school nurse the improved outcome of decreased asthma related absenteeism can become a reality.

Information available from national agencies such as, NHLBI, American Lung Association (ALA), National Institutes of Health (NIH), and others have provided support for research and education in the area of asthma. Subsequently curriculums have been developed by these agencies for national guidelines to treat and manage asthma by all providers throughout the United States. Therefore, the purpose of this study is to examine the knowledge base and role of the school nurse in pediatric asthma education within the school environment.

CHAPTER 2

LITERATURE AND THEORETICAL FRAMEWORK

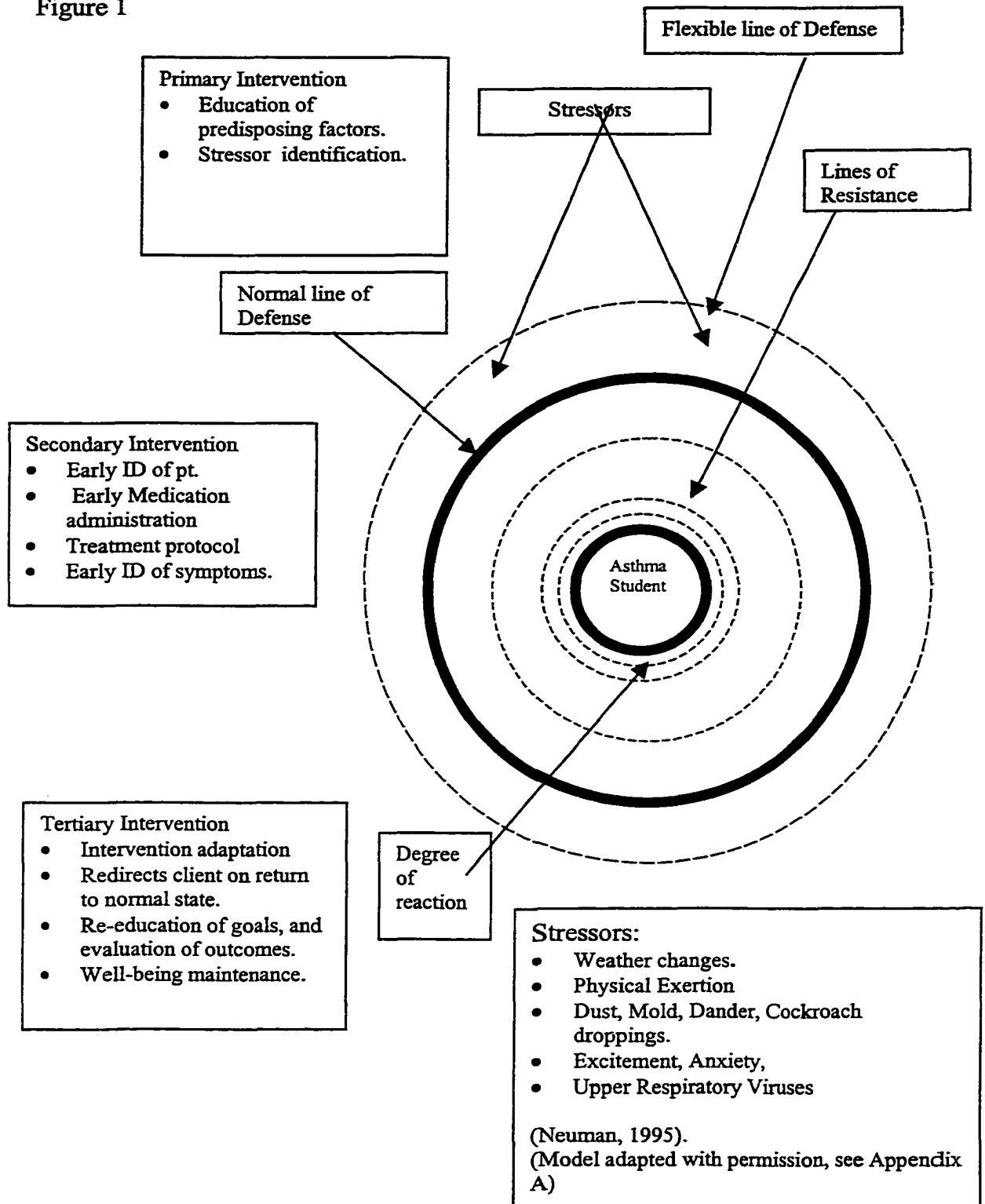
In assessing the school nurse's knowledge of asthma within the school environment one can begin to appreciate how standardization of treatment and the school nurse's knowledge of asthma play the pivotal role in decreasing the climbing percentages of asthma morbidity and mortality. It is necessary to assess the nurse's knowledge, role, and management in the event of asthma attack and disease maintenance.

For the intent of this paper the American Lung Association and the National Institutes of Health will be used as resources. The review of literature will include the school nurse's roles, functions, educational needs and knowledge of asthma.

The conceptual model of Betty Neuman (1995) can be applied to the educational principles and influences in the school nurse's management of the asthmatic student as depicted in figure 1, pp. 6. The four major concepts of this model are man (person), environment, health, and nursing. The premise is that these four concepts are in a constant state of change and interaction with each other.

Neuman's Model applied to school nurse's asthma knowledge & interventions.

Figure 1



Person.

The main focus of the Neuman Systems Model is on the client as a complete system. The client (student) is seen as an open system that interacts with internal, and external, interpersonal, and environmental forces and/or variables that occur between one or more clients. In all client systems there are five specific identifiable variables that assist the student to cope with stressors. Those variables are:

- Physiological, referring to the body structure and functions.
- Psychological, referring to mental processing and relationships.
- Sociocultural, referring to combined social and cultural functioning.
- Developmental, referring to life developmental processes.
- Spiritual, referring to spiritual belief influence (Neuman, 1995).

In this model the student with asthma maintains balance and harmony between internal and external environments by adjusting to stress and/or asthma triggers. These triggers can be anything from weather changes, dust, mold, pollen, upper respiratory viruses, and physical exertion, to anxiety or excitement. Using defense mechanisms, children learn to adjust to tension building stimuli (stressors) rather than to react adversely. The nurse's assessment of the triggers also can assist the student to identify coping mechanisms for dealing with invading stressors thus avoiding an asthmatic episode.

Stressors can have either positive or negative outcome effects. These include intrapersonal, interpersonal, and extrapersonal sources. Stressors are tension-producing stimuli or forces. These forces can originate from within the students own system (internal), from the environment (external), or between the student and

another person (interpersonal) (Neuman, 1995). The nurse assists the client, who moves on a continuum, either towards wellness, or the opposite end of illness in varying degrees. This assistance can be taught in primary intervention, such as early recognition and avoidance of common asthma triggers (e.g., cigarette smoke), and thus can prevent episodes of asthmatic attack. The desired end result is health on the wellness end of the continuum, which is achieved when the clients system needs are met. Contrarily, unmet system needs yield varying states of illness on the other (illness) end of the continuum.

Lines of defense protect the student from external stressors. Therefore when faced with asthma triggers such as weather changes, molds, pollens etc. the student has a flexible line of defense (FLD). This line of defense is shown on figure 1 pp. 6 as an outer broken circle surrounding the normal line of defense (solid circle).

The broken line acts as a protective buffer for the student's normal wellness state, against invading stressors. As the line expands away from the normal defense line (NLD) it provides greater protection. Conversely as the line draws closer to the defense line, it provides less protection. This line of defense, when breached determines whether or not a reaction (asthmatic attack) will occur, and to what extent the reaction will be, in the encounter with the stressor.

Protecting the innermost core is a concentric ring called the lines of resistance (LOR). When stressors invade the NLD, the LOR are involuntarily activated in an attempt to stabilize the client's system by restoring its NLD.

The theory encourages the nurse to intervene to assist the student in preventing, or reducing the reaction to the stressor. Internal lines of resistance also

exist when a reaction occurs, to maintain a state of equilibrium. When there is an interruption along the internal lines of resistance there is an expenditure of energy to cope with the interrupted normal (steady) state. If the student system utilizes more energy than has been built and stored, during an interrupted (disorganized) state the extreme outcome may be death. Wellness is then determined by the amount of energy required to return to and maintain system stability.

Nursing intervention is directed toward countering the stressor invasion of the LOR when stressors have penetrated the FLD, with a form of adapted system stability (Neuman, 1995). This may also include restoration, adjustment, and retention of some degree of stability between the client system and the stressors, based on energy conservation.

Environment

Stability of the system implies a state of balance or homeostasis that requires the expenditure or exchange of energy between the client and environment. This homeostasis allows the client to cope adequately with stressor attacks. Environment is defined as being all of the internal and external forces that surround or interact with the student. Neuman suggests that the environment is the source of stressors and provides resources for management of these stressors (Knight, 1990). Environmental stressors can be positive or negative, dependent upon the student outcome. If the student can effectively recognize, avoid and prevent environmental stressors then the outcome is positive. On the other hand if the student does not effectively recognize the stressor or deal with the stressor, the outcome will be negative

Health.

Neuman (1995) describes health and wellness as; the condition in which the flexible line of defense has prevented entry through the normal line of defense, which allows homeostasis to be maintained with the whole client.

The variance of wellness is illness, which can be described as a state of instability in which the student's normal line of defense has been breached.

Reconstitution is the student's ability to adapt to stressors and return to homeostasis.

Nursing

Neuman articulates nursing as a unique body of professionals concerned and assisting the client with variables that initiate a response to stress (Chinn & Kramer, 1991). The primary goal of nursing is to retain, attain, and maintain client system stability (Neuman, 1995). The nurse provides assessment, management, and evaluation of the student client system in order to formulate a plan for intervention. Intervention can occur at any given point at which a stressor is suspected or identified. Primary, secondary, and tertiary prevention interventions act as a basis for nursing intervention to attain, maintain or retain system integrity.

Primary prevention efforts could be to identify students with asthma and those who are symptomatic, but undiagnosed. The nurse also assists the student to identify, and reduce the number of asthma triggers (stressors) the student comes into contact with at home and school. This intervention allows the client's flexible line of defenses to be strengthened.

Secondary prevention allows the school nurse to assess and identify early symptomatology of asthma attack, or potential asthma triggers, such as weather

changes, and potential allergens, which can be compensated for if not avoided. In example the use of medication prior to physical exercise would greatly reduce symptoms in children with exercise induced asthma. Continuous education, prompt access to medication, and early identification of students with suspect symptoms are all priority nursing interventions to facilitate earlier treatment and management.

Tertiary preventative focus is on re-adaptation to stressors within the environment, such as metered dose inhaler use prior to physical exertion rather than after dyspneac episode occurs. It also focuses on maintenance in the "wellness" state. The nurse re-directs the client to a normal state. It is at this point that they are re-educated, and previous goals and outcomes are evaluated.

Review of the Literature

Few studies were found in the literature review on school nurses' asthma knowledge, therefore this review will begin with other studies on nurses' knowledge of disease and the implications for illness management and interventions.

Nurses' knowledge and impact on practice. Brown, Bowman, & Eason, (1999) researched nurses' attitudes and knowledge regarding pain management to determine if educational preparation, practice setting and clinical specialty influenced knowledge level and attitudes. Their survey of (n=260) nurses received a group mean of 64.58% of correct responses. There were no statistically significant differences found in scores based on the variables. Based on the research results it is suggested that there is a need for continued education and staff development on an ongoing basis. Educational preparation and length of experience were not found to influence pain management knowledge in this study.

Lenatsch (1999), surveyed nurses (n=42) in west Texas in a replicated study on “Knowledge, Attitudes, Treatment Practices and Health Behaviors of Nurses Regarding Blood Cholesterol”. This descriptive study utilized Orem’s self care framework as its theoretical foundation. The study suggested that while nurses are knowledgeable about diet and nutritional fat intake effects on cholesterol, there is room for improvement via continued education. The study also reports that nurse had positive attitudes about counseling regarding diet, lifestyle changes and cholesterol.

There were barriers noted to counseling which were identified as noncompliance to dietary and lifestyle changes. Inaccurate knowledge of national dietary recommendations regarding dietary fat content of specific foods and cholesterol levels were also noted. Limitations of this study were the small sample size, and use of a single state.

In a study by Williams, & McCarthy, (1995) entitled “School Nurses’ Experiences with Children with Chronic Conditions”, school nurses were surveyed (n=109) from one state representing 92 communities. Participants reportedly had average caseloads of 1488 students including an average of 127 students with chronic conditions. In this study asthma was the most commonly reported illness out of 28 conditions.

The survey results suggested that school nurses had extensive experience with a variety of chronic conditions. One need identified was for continued education and updates on chronic conditions and management regimens.

Limitations were the small sample size and the lack of reported validity and reliability of the instrument. There were no demographic characteristics of the sample reported, making it difficult to generalize the findings.

Pediatric Asthma and Standardized Curriculum Effectiveness. Bucher et al., (1998) performed a statewide assessment in Delaware of school age children with asthma. The survey was mailed to all schools in Delaware (N= 324). The response rate was 38.6 % (N=125). The survey of Delaware school nurses regarding students with asthma contained forty-two close-ended questions and five open-ended questions. The survey was a qualitative analysis in five sections consisting of the topics listed below.

- Demographic information of students with asthma, and school environment.
- Asthma medication used at school
- Medication and treatment administration protocols.
- The presence of asthma triggers in the school environment.
- Issues related to asthma education, community resources, and asthma management.

The survey design was descriptive with data collection done primarily by school nurses and a few administrators in all accredited K-12 Delaware schools. Results indicated that out of 1,623 students identified with asthma, 1,002 were on asthma medication. Sixty-five percent of students were non-compliant with their medication regimen according to the nurse respondents. Baseline peak flow rates, which are an

NHLBI standard, were obtained on 72% of students, while regular daily peak flow checks during school dropped to 57%.

This study included students with asthma attending public, private and parochial schools, making it more valid than some studies that have only used public school students. Only home schooled children were omitted from the study sample group. The instrument also included forty-two close-ended questions and five open ended questions in the five-section instrument. There has been no statistical information on content validity, reliability, or significance of the results reported.

Study limitations included only one state was assessed. The study did not present demographics of the nurse participants, which may have played an important role in the management factors of asthma. The low response rate of 38.6 % of surveys returned was also a limitation. Because of the respondent limitations data biases may well be high. The study does validate the need for continued research with this population to test generalizability, as well as the need for implementation of standardized asthma protocols throughout the nation. Further evaluation of nationwide asthma assessment of school-age students and the standardization of treatment protocols is needed. Other areas to address would be the specific programs that were initiated as a result of this survey.

Jones-Bauer, Lurie, Yeh, and Grant (1999) led a study titled "Screening for asthma in an inner-city elementary school in Minneapolis Minnesota". The study was performed in response to an increasingly higher incidence of school absenteeism, due to asthma morbidity and mortality. This was particularly relevant for minority and

low-income students who appeared to be a disproportionately affected population, and who were noted to have higher prevalence of asthma and greater disease severity.

The study tool was developed for the authors, and chosen after reviewing several instruments. The objectives for the choice of this tool, was the brevity of the five- question tool, as well as ease of understanding. The tool was also chosen to identify children with asthma symptoms, or who had utilized health services for asthma symptoms in the past year. Data collection was via school staff targeting all parents of enrolled students and was collected over a two-year period. The sample size in was year one 285, and in year two, 224. Unreturned questionnaires were followed up with a telephone call or home visit. A trained interviewer provided verification of information using a more detailed questionnaire to verify all children with positive screening responses, to determine convergence of data. This method was used to identify the subset of children diagnosed with asthma.

The data of children whose questionnaire responses indicated no asthma history were double-checked against a list of students who were authorized to take asthma medication at school compiled by the school nurse. Key findings were that some parents did not perceive their children as having asthma. Current symptoms, or symptoms within the previous twelve months, medication used, physician, or emergency room visits were all considered identifiers of asthma history for the study.

Although the study reliability was not reported this method was efficient as a simple screening for asthma and symptomatology in the school setting. The study identifies the need for school partnerships within the community to provide services for children, and to identify those with asthma earlier thereby reducing morbidity and

mortality over time. The need for children's services highlights the possibilities for collaboration among schools, health agencies, other community agencies and employers. As a result of forged partnerships the health center involved in this study, along with the local American Lung Association invited families of children with asthma to educational sessions about asthma management in an effort to improve overall health and school performance.

The authors make a valid point regarding the need for mandated standard health survey on all school enrollees. The forms would serve as an early alert for school nurses in the event that parents did not perceive their child as asthmatic after diagnosis had been established. The study was limited because there were no constraints in place to eliminate respondent bias and only one state was utilized for the study. Overall the information gleaned in this study proves to be of importance in simple methods of identification of disease and in the need for community partnerships in an effort to decrease morbidity and mortality that asthma causes.

The "Awesome Asthma School Days: Educating Children, Inspiring A Community" program was created and a study was implemented in Milwaukee, Wisconsin to improve asthma disease management among patients. The study, by Meurer, McKenzie, Moschler, Subichin, Malloy, and Varghese (1999), was completed through a community partnership in the Milwaukee Public School area and tested the hypothesis that children in this region were adversely affected by asthma, and had limited knowledge of asthma self care.

An assumption was that understanding and self- management of asthma would result in improved school attendance and reduced medical care costs. The study was

carried out by educational conferences of 1400 students during 1997 and again in 1998. The resulting population sample of the first 488 children was used to represent the group. The educational session utilized learning vehicles of songs, games, and other multi-media screens. The resulting assessment yielded information on functional impairment, prevalence of disease, triggers, lack of management devices, and effect of knowledge. Twenty-seven adults were also in attendance and completed surveys about the educational information they received. The reported survey results were consistent with information from national and other local sources that assessed that inner city children with asthma require special attention.

Limitations noted were, the survey responses by the children had no parental validation and qualitative analysis was not performed on open-ended questions. Parental survey would have provided useful confirmation of some of the gathered information. The information was used to provide some direction in the collaboration and planning of several agencies in community partnership, to address the identified problem of asthma morbidity and mortality. Interventions resulting from this study were member home-visit provision from a local HMO, provision of asthma management devices, smoking cessation clinics and other interventions. Although many areas have a similar population there seems to be little focus on this aspect of disease management at the present time.

Capen, Deadlow, Robillard, Fuller, & Fuller (1994) utilized an interdisciplinary pediatric pulmonary team of nurses, pharmacists, and social workers to present an educational forum to children at asthma camp. The curriculum which was NHLBI based, covering asthma management of children ages 7-11, used several

venues. The team educated the children through song, puppets, games, drawing and hands on manipulation. Observations and initial feedback from staff and parents indicated the children learned and retained information through the mediums used. While a more scientific evaluation is needed to evaluate validity and effectiveness, the study provides an excellent basis of learning methods that school nurses can utilize in asthma curriculum education

School Nurse Role and Functions. A study by Thurber et al., (1991), reviewed and described the previous literature regarding school nursing in the United States and describes the results of a study documenting state mandates for health education programs and the role of nurses within these programs. This national study asked all states to identify their mandates regarding the duties and responsibilities of the school nurse.

The nurse to student ratio was identified, along with health education requirements in the schools, and who was responsible for the education. The survey responses from all 50 states were analyzed and the implications, while not conclusive, revealed there also needs to be refined understanding of the school nurse's role. The survey revealed many inconsistencies in the perceived role of the nurse, which may well result from the nurse's inability to articulate that role to others. The results point out the need to define and validate the school nurse's role by provision of the standard scope of care. Other studies are needed to provide more subjective, and substantial data, nurse's time studies would be one way to survey the duties and functions of the nurse on a daily basis.

According to Lightfoot and Bines (1998), the school nurse's role is to contribute to the health and well-being of school age children through health promotion, health advocacy, family support, acting as a confidante through mandated and informal gate-keeping. The goal of their study was to generate information on nurse's role in meeting the health needs of children within a school setting. Data collection was via interview, respondents were health authority purchasers, (n=15), education and social services staff (n=6), school nurses (n=24), community nurses (n=18), medical staff (n=3), NHS trust managers (n=12), and teachers (n=27). A total of sixteen schools were involved in the study.

Findings revealed school as a natural and advantageous setting for education and intervention regarding health and wellness promotion, and disease prevention among school age children. Disadvantages remain; lack of resources such as funding, support, space, and access to the school nurse. The study also suggested a need for systematic population need assessment using nurse's data collection and the development of measurable evidence-based practice particularly with children's viewpoint included. The need for partnership, the development of appropriate standards for school nurses, and improved access to school nurses, were also highlighted as findings in this study. This theme of proactive nursing is noted to be a constant throughout the literature review. One point that should be examined is the lack of research regarding nurses' knowledge and disease processes and coordinating research tools.

In a recent study by Periard, Knecht, & Birchmeier (1999), the authors collaborated with university faculty to conduct a statewide school nurse survey to

identify current issues and role characteristics. A convenience sample of 340 Michigan school nurses belonging to the state nurse association was used for the study. Findings reported all participants were females between the ages of 28-68 (mean 48.2). The majority of participants identified themselves as Caucasian (93%), although African Americans (4%), and Other (3%) were also reported. The majority of participants reportedly were employed by school districts.

Strengths that emerged from the study were that nurses reported school districts support for professional development activities. Role responsibilities were noted as direct service to students, staff inservices, direct services to staff, health education and student health screening to name a few.

Limitations noted were the use of a single state for the survey making it difficult to generalize the findings to other states.

School nurses' asthma knowledge. Calabrese, Nandes, and Huss (1999) recently published their research on "Asthma Knowledge, Roles, Functions, and Educational Needs of School Nurses". This study focused on nurses in the Washington D.C. and Maryland school districts.

Data collection of this descriptive, qualitative survey was accomplished through questionnaires, which were mailed to the corresponding district public schools. All school nurses (N=790) were encouraged to participate, yielding a return rate of seventy percent. Results indicated that school nurses had excellent understanding of asthma issues. Function/roles were consistently identified by 90% of school nurses. Some functions and roles were:

- first aid

- immunization assessment/compliance /administration
- administering medication, and obtaining medication administration
- consent forms
- individualized student health counseling for various concerns
- parental contact for acute illness, or other health planning
- classroom health education lessons
- promoting physical activity, and wellness interventions
- developing, trouble-shooting, and carrying out emergency action plans.

Additionally asthma education needs were identified for staff and students. The need for training monies, programs, and other resources was identified as very important.

The authors identified four main issues as:

1. Reactive versus proactive roles needs to be addressed.
2. Delegation of health services to unlicensed personnel, to support delivery of health services to student.
3. Communication to parents and staff regarding education, health promotion, and asthmatic episodes.
4. Asthma Education activities for students, staff and parents and the need for continued education regarding asthma.

The researchers concluded that school nurses need administrative support of school and health officials to identify methods that promote a proactive nursing role.

Limitations of the study, was the small region utilized making the population not quite diverse enough. The study included only public schools, therefore it did not explore if results are different in other educational settings.

There is a need for updating existing asthma policies and management.

Standardized plans need to be in place on a universal scale. Asthma education should be ongoing via videotapes, books, lectures, and support programs. The hypothesis in this survey was clearly developed, however study limitations were not presented. The study is valuable in assessing what is known from the nurse and what needs to be addressed in terms of asthma education for nurses and students.

There are several published assessment tools which measure nurse's knowledge, perceptions and role of varied disease processes. Several institutions also track disease, and publish studies and educational materials regarding specific diseases. The literature provides evidence that even though nurses are very knowledgeable regarding asthma, there is still a need to increase the knowledge base and standards of asthma care (NHLBI, 1995). The literature also indicates that nurses need to take a proactive role within the school setting, rather than a reactive role. The reactive role serves to provide the very basic health maintenance within the school, while the proactive role serves to enhance the health of the entire school and takes on the extended patient advocate role.

Summary

This literature review, which includes the school nurse's asthma knowledge, roles and function reveals the need for further research on asthma outcomes after nursing intervention. The premise of decreased morbidity and mortality has been documented by, national organizations such as the CDC, the NHLBI, and the ALA. It is clear from the current literature that the increasing asthma morbidity and mortality numbers is an issue that cannot be ignored.

School nurses are in an optimal position to educate students, teachers, and families on interventions that strengthen the FLD and the NLD (e.g., consistent pre-medication prior to exercise, trigger avoidance, medication compliance, and physician referral). Intervention assessment studies may encourage increased standardization of asthma management, increased opportunity for asthma education, and resulting decreased morbidity and mortality.

Several drawbacks in the cited research were noted. The literature presented covered parental, student, teacher response, and physician case management regarding asthma, but limited information was found on school nurses and their feedback. This lack is detrimental to the health of the asthma student who spends approximately six hours daily, and nine out of twelve months annually in a school setting.

Research Questions

1. What is the asthma knowledge level among school nurses?
2. What is the level of nurses knowledge regarding NHLBI asthma care guidelines?
3. Is there a relationship between nurse's knowledge of asthma, educational preparation and length of nursing experience?
4. What are the commonly identified school nurse roles?

CHAPTER 3

METHODS

Design

A non-experimental descriptive design was used in this study of school nurses regarding asthma knowledge, role functions, and national asthma care guidelines.

Advantages to using a descriptive design for this study are the characterization of the reality of the problem, and to reveal relationships among the identified variables using a questionnaire that measures the nurse's response about asthma knowledge, treatment, symptoms, outcome, and maintenance. The nurse's functional role and management was also included in this questionnaire. A previous study by Calabrese et al. (1999) using the same variables was employed as the basis for this replication.

Although there are numerous studies on asthma and its effect in the health care literature, few studies on the nurse's knowledge and outpatient maintenance of asthma have been published.

Additional factors that may influence the perceptions of the school nurse role include educational level, ethnicity, age, gender, income, and demographic area.

These factors are assessed in the demographic section of the questionnaire, evaluated and their possible influence described.

Using the same questionnaire and cover letter, for all the respondents surveyed minimized potential threats to internal validity. Limitations to the study included the use of an instrument without established reliability and validity.

Advantages of the study design are the accuracy of portrayed characteristics of the subjects, and the frequency with which certain phenomena can occur (Polit & Hungler, 1997). The use of a descriptive study design enables future research to build upon study results of relationships of school nurse's asthma knowledge.

Sample

A convenience sample of school nurse (N= 140) participants was drawn from a local school district and from a state school nurse association. A mid-western state was the site utilized for this study. Criteria for participation in this study were current nursing licensure as either a registered or licensed practical nurse and employment in a school setting. All participants were required to be over age 18. The study sample consisted of 110 current members of a school nurse association and 30 local school nurses (N=140). From the sample group 91.5% (n=65) identified themselves as Caucasian, while the remaining categories of African American, and Other were 7% (n=5) and 1.4% (n=1) respectively. No one identified herself as Hispanic. The majority of the subjects were employed by school boards 84.5% (n=60) however, health department 7% (n=5) and private school employers 5.6% (n=4) were also identified by the group. All participants were female, ranging in age from 26 to 60, with a mean age of 46.15 (SD =7.18).

Educational preparation ranged from diploma and associates degrees to masters prepared nurses with one respondent reporting a Ph.D. in health

administration. The majority of the group were bachelor's degree level nurses 59.2% (n=42). The mean average length of licensure was 23 years while the mean average school nurse experience was 10.10 (SD of 7.95).

Permission for mailing was obtained from the district Research chair (see Appendix E). Permission to use the Michigan Association of School Nurses (MASN) membership was obtained from the membership secretary of group (see Appendix F). Completion and return of the questionnaires implied consent to participate in the study.

Instrument

The instrument used for this study was initially developed for researchers Calabrese et al. (1999), at Johns Hopkins University in Baltimore, Maryland to survey school nurses. The instrument has been adapted for use in this study with permission (see Appendix C). Data for this study were collected by the survey, and consisted of four components: nurse's asthma knowledge, role, functions, and knowledge of national guidelines regarding asthma. (For sample cover letter and questionnaire please refer to Appendix I & J). Scoring for the knowledge portion of this questionnaire was based on the thirteen asthma knowledge questions with one point awarded for each correct answer.

Validity of an instrument means that it actually measures what it claims to measure, and the most common forms are content, construct, and criterion related validity. No previous information on validity has been published. Face validity for this revised questionnaire, has been established by two school nurse experts.

Reliability means that the instrument measures the construct variable of interest consistently. Reliability types are stability, reproducibility, and accuracy. Reliability of this instrument has not been reported in the literature.

Procedure

Grand Valley State University Human Research Review Committee, regarding adherence to the standards of ethical inclusion of human subjects in research (see Appendix H) approved this research study. Following Human Research Review Committee approval the modified School Nurse Educational Needs Survey, cover letter (see Appendices I & J) and return stamped and addressed envelope were mailed to school nurses. Participants were requested to return the completed survey within ten days. To assure maximal participation reminder postcards were mailed to all respondents ten days after original mailing. Upon return of completed questionnaires each was assigned a code number. All responses were reported as aggregate data. Risks to the respondents were none. Anonymity was maintained through coding of returned questionnaires.

CHAPTER 4

DATA ANALYSIS

The purpose of this study was to examine the asthma knowledge of the school nurse and commonly identified roles and functions provided by the school nurse. Data were aggregated and analyzed using Statistical Package for the Social Sciences (SPSS) for Windows. The alpha was set at .05.

This study utilized a self-report survey and cross sectional design. Seventy-five subjects returned surveys; four surveys were discarded due to self-report of not being currently employed as a school nurse, leaving a sample of 71 (53.5%).

The research questions are related to the participant responses from the survey questionnaire. Participants completed the asthma knowledge test. Possible scores on that test were 0 to 13 points. Embedded within other sections of the questionnaire were related items to the school nurse role. Responses to the research questions will be answered in the following sections.

Research Question One

The first research question was “What is the percentage of school nurses who are accurate in asthma knowledge?”

These results reflected correct answers to the asthma knowledge questions. The total number of correct answers out of a possible 13 ranged from 1 to 13 (mean =11.64; SD =1.75). The knowledge scores analysis indicated 29.6% (n=21) of the

group answered all knowledge questions correctly. The number of correct responses per question is presented in Table 1.

Table 1. Asthma Knowledge Question Scores for School Nurses

QUESTION	Correct Answer	
	n	%
1. Asthma is a common disease among students.	69	97.2
2. Emotional response can trigger asthma attack.	63	88.7
3. Asthma is a psychological illness.	66	93
4. The way parents raise children can cause asthma.	44	62
5. Asthma attacks may cause breathing problems but are not harmful.	67	94.4
6. Asthma attacks may cause breathing problems but are not dangerous.	67	94.4
7. Asthma can be controlled.	69	97.2
8. Asthma can be cured.	67	94.4
9. Students with asthma can exercise.	70	98.6
10. Environmental factors can trigger attacks.	69	97.2
11. Students with asthma are absent more than other students.	66	93.0
12. Students with asthma have special needs.	68	95.8
13. NHLBI guidelines are: refer students when the PFM result is in the red zone.	42	59.2

Research Question Two

The second research question was, “What is the knowledge level of school nurses regarding NHLBI asthma care guidelines?”

The percentage of school nurses knowledgeable of NHLBI asthma care guidelines was 59.2 % (n=42) measured by a single item question on the survey

instrument. This question was answered correctly by 42 of the participants however, 10 participants did not answer this question resulting in a large number of missing data (see table 1 question 13). Although the question was answered correctly by the majority of nurses, it reflects a need for school nurses to have ongoing continuing education in the area of asthma particularly with the increases seen in the disease prevalence.

Research Question Three

The third research question was “Is there a relationship between school nurses’ knowledge of asthma, educational preparation and length of nursing experience?” This question was analyzed in two parts. The Spearman Rho test for non-parametric data, was used to examine the relationship between the knowledge scores and educational preparation variables. The resulting correlation coefficient value ($r = -.003$) suggests there is no relationship between knowledge and educational preparation in this study. Pearson’s r correlation test was performed on the variables of length of years’ experience and knowledge scores. The resulting value ($r = .134$) suggested no relationship between knowledge and length of nursing experience.

Research Question Four

The fourth research question was “What are the commonly identified school nurse roles/functions being provided currently?” These data were collected by participant report. The reported activities are depicted in Table 2. The top six activities reported by 90% of nurses were vaccine and medication compliance, first aid, parental contact for child illness, individual health counseling and health inservice provision.

Table 2. School Nurses' Roles/Functions

Activity	N=	Percent
1. Vaccine compliance	68	95.8%
2. Med. Consent form compliance	68	95.8%
3. First Aid	66	93%
4. Parent contact re: child illness	66	93%
5. Individual health counseling	64	90.1%
6. Inservice	64	90.1%
7. Medication administration	61	85.9%
8. Classroom teaching	58	81.7%
9. Care-planning	58	81.7%
10. Emergency plan dev.	58	81.7%
11. Health promo.	51	71.8%
12. Dev handicap classroom modifications	49	69%
13. Support groups	44	62%
14. Skilled procedures	43	60.6%
15. Transport ER/Home	34	47.9%
16. Dev emer evac plans for Impaired students	23	32%
17. Other	18	25.4%
18. Vaccine administration	16	22.5%

Other Findings of Interest

Additional findings in this study include, that there were 66.2% (n=47) participants reporting asthma inservices attendance in the year preceding this study. And of these, 32.4% (n= 23) reported having attended asthma inservices, in the six month period prior to this study. Other findings related to the role of the school nurse were that more than 75 % of school nurse participants reported having student populations over the recommended national guidelines of 1:750 American School Health Association (ASHA). Additional findings of interest were that in contrast to the NHLBI guidelines of recommended daily peak flow meter monitoring, only 46.5% (n=33) of nurses indicated that they administered peak flow meter testing daily within their school settings.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Purpose and Support of Research

School nurses are in a position to intervene and teach children with asthma regarding optimal disease management, asthma triggers, and medication compliance. The purpose of this study was to examine school nurses' knowledge of asthma management and treatment regimen; along with exacerbation prevention and knowledge of national standards for asthma care and to study if a relationship existed between educational background, length of nursing experience and asthma knowledge. The study also looked at the role of the school nurse and the commonly identified functions performed under the umbrella of school nursing.

During the initial search for a published tool to measure nurses' asthma knowledge, it was determined that there are few, if any, available that have established validity and reliability. Reported studies on specific skills and/or disease processes with focus on patient response have been common. One study, for example, included research on the nurse's knowledge of pain management (Brown et al., 1999). The current study was replicated using a modified version of the same survey instrument (Calabrese et al., 1999).

Study Findings Research Question One. The first research question was “What is the percentage of school nurses who are accurate in asthma knowledge?” In research question one, asthma knowledge was reviewed by participant responses to the questions listed in Table 1. This study’s knowledge scores are compared to the original study by Calabrese et al. (1999) in Table 3

Table 3. Compared Asthma Knowledge Question Scores for School Nurses

QUESTION	Correct Answers	
	Calabrese %'s	Levi %'s
1) Asthma is a common disease among students.	95	97.2
2) Emotional response can trigger asthma attack.	90	88.7
3) Asthma is a psychological illness.	89	93
4) Way parents raise children can cause asthma.	68	62
5) Asthma attacks may cause breathing problems but are not harmful.	96	94.4
6) Asthma attacks may cause breathing problems but are not dangerous.	95	94.4
7) Asthma can be controlled.	96	97.2
8) Asthma can be cured.	91	94.4
9) Students with asthma can exercise.	99	98.6
10) Environmental factors can trigger attacks.	93	97.2
11) Students with asthma are absent more than other students.	76	93.0
12) Students with asthma have special needs.	86	95.8
13) NHLBI guidelines are: refer students when the PFM result is in the red zone.	*NA	59.2

The sample size for the Calabrese study was 550 while the sample size for this study was 71. The scores for the knowledge tests were very similar. The current study percentages reflect the participants who answered questions correctly. In each study participants answers suggested that nurses' were knowledgeable about asthma, and managed their student load accordingly. Although nurses were knowledgeable about asthma the anticipated percentage for correct responses to the asthma questions was lower than expected. The findings in the current study are similar.

Research question one revealed that the 29% of nurses answered all 13 questions correctly on the knowledge portion of this study. Disparities between the group percentages are noted in several questions from the knowledge questions section. It is assumed that because this study revealed half of the sample reporting asthma inservices within the year prior to the data collection that some bias regarding psychological illness and asthma may have been eliminated. In question four of the same section there was a 6% difference among the groups, yet greater than 30% of each group answered incorrectly that the way parents raise children could cause asthma. While the question certainly could have been misinterpreted to ask if the way parents raise their children can influence asthma it could also reveal that nurses are unaware of the pathophysiological factors that cause asthma. This possibly is suggestive of attitudinal bias among nurses regarding the home environment being the cause of asthma. As nurses continue to attend regular inservice updates on asthma this misconception can be put to rest, with the knowledge that the home environment influences, but does not cause the disease.

Questions eleven addressed absenteeism rates of children with asthma compared to healthy students. The current study shows a larger percentage of correct answers. This may again be attributed to increased knowledge, continuing education and the increased emphasis on the need to decrease the increasing morbidity and mortality figures. Due to the current trend of increased asthma morbidity and mortality it is imperative that nurses are knowledgeable about the disease.

The survey results also indicated that of the participants 66.2% (n=47) who had attended an asthma inservice in the year window prior to the study, one half 32.4% (n=26) also had attended an asthma inservice in the preceding six months. Although almost half of the participants had participated in asthma inservice in the past year, there is a need for 100% compliance among all nurses in an effort to reduce asthma morbidity and mortality.

The knowledge scores were further analyzed using the Kuder Richardson 20 (K-R 20) reliability test to determine if the knowledge portion of survey was internally consistent. The resulting K-R 20 of .0478 strongly suggests that the instrument had little reliability in measuring asthma knowledge in this study. This suggests that the instrument needs to be refined or a new instrument developed for use in future studies.

Research Question Two. The second research question was, “What is the knowledge level of school nurses regarding NHLBI asthma care guidelines?” The level of school nurses knowledgeable of NHLBI asthma care guidelines (National Institutes of Health, 1997) was measured by a single item on the survey instrument. The second research question focused on school nurses’ knowledge regarding NHLBI

guidelines for referral when a student falls in the red (danger) zone, during peak flow meter testing.

Again the majority of nurses identified the correct answer to refer in the red zone 59.2% (n=42), however, 26.8% (n=19) answered yellow zone incorrectly and 14.1% (n=10) did not answer the question. No subjects chose the green zone. The results suggest that 40% of nurses were either unaware of the NHLBI guidelines, were not actively following the curriculum guidelines with their student population or were being more conservative and refer when readings are in the yellow zone as one participant wrote in detail on her survey. This question regarding NHLBI was added as part of the instrument modification. Findings in this study were that 46.5% (n=33) of nurses indicated that they routinely administered peak flow meter (PFM) testing within their school settings. This information indicates that there is a need to reinforce the rationale behind the use of the device, and that school nurses need to be patient advocates for students with asthma with their primary care providers and families. It is possible that PFM testing is done at home before or after school as well.

Bucher et al. (1998) found a significant drop in the use of daily peak flow meter testing when nurses were surveyed. The findings were the same for this study, and suggest the need for the adoption of NHLBI's recommendation in an effort to decrease asthma morbidity and mortality. Standardized adoption of the guidelines and preventative health education using the three levels of the Neuman Systems Model (Neuman 1995) would result in decreased student absenteeism due to asthma. The resulting improved health outcomes would in turn be cost effective for students,

families, schools and their communities. Continuity in nursing intervention and asthma management would also be developed and be reflective by improved patient outcomes. Though routine PFM testing is appropriate and needed to monitor airway obstruction levels it should be noted that if student ratios are high, nurses may not be able to provide this assessment function for students.

Research Question Three. The third research question was “Is there a relationship between school nurses’ knowledge of asthma, educational preparation and length of nursing experience?” Research question three looked at the data to determine if a relationship between educational background, length of nursing experience and asthma knowledge existed. No relationship was demonstrated among the variables. This finding is similar to other studies regarding nurses’ knowledge of cholesterol (Lenatsch, 1999), and pain (Brown et al.,1999).

Research Question Four. The fourth research question concerned the commonly identified roles and functions provided by school nurses. In comparison with the original study by Calabrese et al. (1999), the findings of roles and functions for this study were consistent with the previous research. First aid was high on the list of activities from the majority of participants. Medication and vaccine compliance were also high on the list of priorities, as well as health counseling and health education. Parental contact in the case of child illness was one of the commonly reported activities. Table 4 compares the top nine common role percentages obtained in both studies.

Table 4. Comparison Percentage Distribution of School Nurse Activities

School activities	Calabrese %’s	Levi %’s
Vaccine compliance	95.6	95.8
Med. Consent form compliance	96.2	95.8
First aid	97.1	93
Parent contact re: child illness	96.7	93
Individual health counseling	95.3	90.1
Inservice	82.9	90.1
Medication administration	94.4	85.9
Classroom teaching	81.6	81.7
Individual health plan	77.2	81.7

Thurber et al. (1999) researched the role of the school nurse in the United States regarding mandated health education and responsibilities. That study looked at each States’ responses regarding health education requirements and nurse to student ratios. The results suggested many inconsistencies in perceived nurse role.. In contrast, findings in this study suggest that despite a wide variation of nurse functions that many similarities do exist and many participants performed identical functions. The disparities in Table 4 begin with first aid. It should be noted that if injuries are not severe they are often delegated to non-nurse staff. This allows the nurse to be available for higher skilled nursing functions.

The nurse to student ratio consistently was greater than 1:750 recommended in regular education populations (Brener et al.1999). With greater numbers of students, nurses are stretched even further to provide health services for all students. The nurse to student ratio has been recommended on a national level as 1: 750 (ASHA 1991). The preliminary results of this study indicate that only 4 (5.6%) nurses reported that they had an elementary student population that met the

recommendation. The findings were consistent throughout all levels, school nurses indicated that their ratios ranged from 20 to 4500 students. Many nurses reported to have above the recommended number of students to provide optimal care however there were several surveys with missing data and several reporting outliers on student ratios. This serves to verify that nurses must be knowledgeable about asthma and able to articulate that knowledge to students, families and school staff. Armed with knowledge about the disease, its triggers, treatment and preventative measures, students are empowered to be active participants in their disease management. The percentages of individual health counseling and medication administration were lower in this replicated study when compared to the original. Possible reasons are again attributed to increased student ratios per school nurse, and the possible delegation of nursing functions to health aides and others.

Limitations of the Study

The low K-R 20 of .0478 strongly suggests that the instrument had no reliability in measuring asthma knowledge, this was the major limitation noted for the study. An instrument with high alpha levels would have strengthened the ability to note a relationship among some of the study variables. In particular, the knowledge section of the questionnaire revealed three questions (2, 4 and 13) which had lower than expected percentages of correct answers by participants. These questions may have been misinterpreted by the participant, or simply unknown. Question 13 (NHLBI standards) was the single item related to the standards. The majority of participants answered correctly 59.2% (n=42). The percent of incorrect responses raises some concern regarding the questionnaire format and nurses' knowledge of the

standards. A number of surveys did contain missing data that may have skewed the results.

Another limitation was the use of a single state for the sample group, and the use of a single state nurses association. This may have excluded many school nurses who are not members of the association. The use of a single state decreases the ability to generalize the findings to all school nurses

Other limitations were the small sample size and use of a convenience sample. This may have contributed to the inability to show a relationship among the variables of educational preparation, length of nursing experience and asthma knowledge. The sample group was made up of primarily a Caucasian majority, which may not be reflective enough to generalize the findings to all school nurses.

The self-report instrument method may also be a limitation, as the asthma questions could have been obtained after study if unknown by the participant. In addition the length of the instrument could have been a deterrent to potential participants and decreased the response rate.

Implications for Nursing

Despite the limitations noted for this study, the Neuman Systems Model (Neuman 1995), supports the educational interventions provided by the school nurse in an effort to decrease asthma morbidity and mortality in the school environment. On the primary level school nurses assess students with known asthma when they present for medications and or treatment before attacks occur. Education regarding asthma triggers symptoms and medication compliance is provided along with physician referral as needed. These interventions continue to strengthen the student's

FLD, and LOR. Other ways that the nurse can be proactive while implementing interventions would be for the school nurse to work as advocate within the school system. Inservice education is important for all levels of staff involved in the building including maintenance, administration, teachers and staff. Education would increase awareness of triggers and preventative interventions as well as care for acute events. The entire school system must be involved in an effort to decrease morbidity and subsequently decrease student absenteeism related to asthma.

This research found that nurses identified one of their routine functions as health education. This education was for the benefit of students, staff and parents. Participants also identified the development of individual health plans 82% (n=58) as a primary activity. The student's individual health plan once developed, is shared with school staff, family and primary care provider for input and continuity. Telephone calls or home visits in this stage to coordinate student needs with other providers involved in the student's care.

On a secondary level school nurses assess and identify early symptoms of an asthma attack and inform student, teachers, parents and primary providers. Through the secondary interventions of the school nurse morbidity and mortality reduction can become a reality.

Tertiary intervention by the school nurse will focus on re-adaptation to the optimal state of wellness after physical, psychological and environmental stressors have invaded the lines of defense and an asthma attack occurs. After an asthma attack has occurred, reevaluation, reeducation and reinforcement are the key components the school nurse utilizes in this stage.

School nurses are ideally situated to implement and evaluate asthma management in school-age children using national care guidelines. Guidelines recommended by NHLBI (NIH 1997) can be implemented in all schools nationally to reduce the impact of this chronic and often debilitating disease. Having access to students, parents, siblings, and school staff places school nurses in a position to intervene based on the Neuman Systems Model (Neuman 1995). The nurse provides education on how to manage asthma on a daily basis as well as when an acute situation occurs. This in turn allows school nurses to function in a more proactive role and clearly makes them better patient advocates.

Another concern for nursing was that the mean age for participants of 46.15 reflects the aging population of nurses worldwide and must be addressed by schools of nursing to insure that nurses are actively being recruited. This will provide a continuing supply of nurses to be available as our current nursing population ages. This finding becomes extremely important due to nursing shortages and increased nurse to student ratios. Larger than recommended student caseloads also serve as a threat to student safety. When nurses have above the recommended caseload and are servicing several schools simultaneously, students are placed in jeopardy.

School administrators must also be involved in providing resources needed for inservice and continued education opportunities for school nurses. With administrative support an atmosphere that encourages and supports continued education in this area is established. The resulting outcome would be nurses who are more proactively involved in asthma education and improving health outcomes, thereby reducing student absenteeism as well as morbidity and mortality.

Recommendations for Research

Further research is indicated for development and clarity of an accurate instrument that measures school nurses' asthma knowledge. Widespread presentations of the NHLBI guidelines with pretest, and post-test analysis should be examined to determine the significance of baseline asthma knowledge and acquired knowledge after curriculum presentation. These data could then be used to determine if outcomes improve when guidelines are known and implemented.

More research is needed on theory-based nursing interventions and their relationship to improved asthma outcomes. Intervention studies directed toward both individuals and the school systems would provide information about successful strategies that have been implemented to improve asthma outcomes.

Summary

The overall significance of this study's results reveal that school nurses are knowledgeable about asthma. Implementation of care guidelines and more studies are needed to determine how accurate that knowledge is and how it can decrease asthma morbidity and mortality. Although the study findings do not support that the educational preparation and length of nursing experience variables effect asthma knowledge, it should be noted that with experience and education comes knowledge and in many cases improved ability to think critically which is vital in asthma assessment and management.

The study also reveals that while the functions of the school nurse are numerous. Nurses consistently provide the same services as noted in the previous studies noted in the literature review (Brener et al., 1999). While the recommended

health services and more continue to be provided, it is clear from the trends of budget cuts and increased caseloads that nurses cannot continue to provide quality and equitable care when their caseload averages are 1000 students or more.

The study results suggest that there is a need for school nurses to receive asthma inservice updates as this could impact patient treatment and management. Through the adoption of national asthma care guidelines in school systems continuity will be established in asthma care thereby reducing pediatric asthma morbidity and mortality. This will result in increased health promotion activities and decreased student absenteeism. The school nurse can provide the leadership needed to carry these activities.

APPENDIX A

May 7, 2001

Betty Neuman, Ph.D.
Box 488
Beverly, Ohio 45715


Dear Dr. Neuman,

I am a master's student in nursing at Grand Valley State University in Allendale, Michigan, and I am currently working on my master's thesis. My thesis topic deals with school nurse's asthma knowledge, interventions, common role and functions. Specifically I am studying the relationship of school nurse's experience and education and their level of asthma knowledge. I am using the Neuman Systems Model as a basis for my study.

I would like permission to modify your schematic model drawing on page 17 of your book entitled "The Neuman Systems Model" (3rd edition, published in 1995) to include in my thesis. I have enclosed a copy of my modifications.

I would greatly appreciate receiving permission to adapt and use your model in my thesis

Sincerely,


Carolyn Levi, BSN, RN
1100 Calvin SE
Grand Rapids, Michigan 49506

Permission granted 5/29/2001.

APPENDIX B

January 10, 2000

Dear Ms. Calabrese,

Hello, my name is Carolyn Levi and I am currently a graduate-nursing student at Grand Valley State University in Grand Rapids, Michigan. I am writing to request permission to examine and use the tool used in the recently published *Journal of School Health* (Volume 69, Number 6). The study "Asthma Knowledge, Roles, Functions and Educational Needs of School Nurses." I am considering replicating the study using a convenience sample of local school nurses. As a school nurse in the community, I am sure that a replicated study would prove invaluable to myself and my peers in assessing where we are with asthma knowledge and where we need to be. The authors of the tool and research articles, used in the literature review would be referenced according to APA format within the formal paper.

Thank You,

Carolyn Levi RN.

APPENDIX C



January 19, 2000

Carolyn Levi, RN
1100 Calvin SE
Grand Rapids, MI 49506

Dear Ms Levi:

We are pleased to be able to provide you with a copy of our instrument, "School Nurses' Asthma Educational Needs Survey." We understand that you might need to add a few questions or adapt the survey to your specific needs and appreciate that you will cite the original instrument and it's authors. We would appreciate receiving a copy of the survey if you decide to revise it. Please keep us informed of your progress.

We wish you the best with your endeavors and look forward to the results of your research.

Sincerely yours,

[Redacted signature]

Barbara Calabrese, RN, BA
Senior Research Project Coordinator
Johns Hopkins Asthma and Allergy Center
5501 Hopkins Bayview Circle Room 4B32A
Baltimore, MD 21224

[Redacted signature]

Karen Huss, RN, DNSc, CANP, FAAN
Associate Professor
Johns Hopkins Schools of Nursing and Medicine
525 North Wolfe St. Room 416
Baltimore, MD 21205-21

5501 Hopkins Bayview Circle / Baltimore, MD 21224
(410) 550-3289 / (410) 550-0603 / Fax (410) 550-2612

APPENDIX D

GRAND RAPIDS PUBLIC SCHOOLS
EDUCATIONAL RESEARCH AND EVALUATION SERVICES

RESEARCH REQUEST

DATE 12/1/00

TITLE OF THE RESEARCH School Nurses asthma knowledge and management, roles & functions in sch. setting

RESEARCHER(S) NAME Carolyn Levi

RESEARCHER(S) AFFILIATION Grand Valley State University

STARTING DATE 1-15-01

ENDING DATE 1-30-01

PURPOSE OF THE STUDY:

For To meet graduate requirements of Master's thesis for Grand Valley State University. Study will collect data on school nurses roles and functions in the school setting and explore asthma knowledge standards & curriculum used.

BENEFIT(S) OF THE RESEARCH TO THE SCHOOL/COMMUNITY

- Validation of school nurse's asthma knowledge levels and management
- Provision of a foundation for research on school nurses & comparison with other n
- Assessment tool regarding educational needs of school nurses & asthma

TYPE(S) OF DATA TO BE COLLECTED (Attach instruments, if developed)

Data is descriptive

POPULATION school nurses - all - monthly meeting - mailback

ASSISTANCE NEEDED none

1. The researcher shall obtain the written approval of the Director of Educational Research and Development Center for the research design, all research instruments, and all pieces of correspondence to school personnel or parents regarding this research prior to their actual use in the study.
2. The researcher shall provide a report of findings for the data obtained from the Grand Rapids Public Schools in an acceptable format to the Director of Educational Research and Development Center.

3. No data, articles, or reports based on this study shall be released by the researcher to parties internal or external to the Grand Rapids Public Schools without the prior written approval of the Director of Educational Research and Development Center.
4. All activities of the researcher shall be in accordance with all federal, state, and local school district guidelines for handling student data and protection of the rights and privacy of parents and students.
5. The terms of this agreement may not be modified except by mutual written agreement between the Educational Research and Development Center and the investigator. Notwithstanding the foregoing, this agreement may be terminated by either party upon thirty days written notice to the other party at the addresses listed below.

Researcher

Carolyn Levi
(Name)

1100 Calvin S.E
(Address)

Grand Rapids, MI. 49506
(City, State, Zip Code)

[Redacted Signature]
(Signature of Researcher)

Grand Valley State University
(Institutional Affiliation)

12/1/00
(Date)

Educational Research &
Evaluation Services

1331 Franklin SE P.O. Box 117

Grand Rapids, MI 49501-0117

[Redacted Signature]
(Signature)

Director of Educational Research
& Evaluation Services

12/1/00
(Date)

APPENDIX E



Memorandum

To: Carolyn Levi
From: Walter DeBoer *WDB*
Re: Asthma Survey
Date: December 1, 2000

The Research and Evaluation Office hereby provides approval for your asthma research and specifically the survey you intend to administer to school nurses in the district. If anyone in your department has any questions they can call me at 616-771-2091. Thank you.

APPENDIX F

STATEMENT

TO: Carolyn Levi
1100 Calvin Avenue SE
Grand Rapids, Michigan 49506
Phone 241-2733

FROM: MICHIGAN ASSOCIATION OF SCHOOL NURSES

DATE: November 15, 2000

Enclosed are you MASN Membership Labels @ \$25.00 per set = \$25.00 total

Thank you for your payment of \$25.00, already received.

*Thank you, Carolyn!
Jill*

C: Mary Baker, MASN Treasurer

President
Frances Luker
12491 Iowe Drive
Brighton, MI 48114

Phone: 248-684-9349
Fax: 248-684-1628

Vice-President
Kathleen Williams
9385 Cogswell
Romulus, MI 481

APPENDIX G

To the Human research review committee,

The morbidity and mortality statistics of asthma are on the rise within the United States, in spite of improved access, and increasing technological advances in medical care. School nurses are in the prime position to serve as the primary caregiver for many of these children who are victims of this chronic disease. As such it is important that school nurses have access to continued education on asthma treatment, and management, as we are often the patient advocates in first line prevention and care. For school nurses, this information will be invaluable in providing data regarding the various important roles we serve. Further data will verify the national standardized curriculum guidelines we utilize in daily management of the asthma student. All gathered information will be reported as aggregated data.

The primary researcher will conduct this study, Carolyn Levi school nurse. The purpose of this study is to provide information to school nurses with information on common roles and functions of the school nurse. In addition the research also will be used as a springboard to verify the use of national asthma guidelines by school nurses and the need for such. A generalized level of asthma knowledge among school nurses will also be established. The survey tool will be self-reported by the convenience sample of 136 school nurses. Research will be conducted in the school nurse's free, time at his or her own discretion. The tool should take approximately 20 minutes to complete. Subjects from the state and local nurses association, and district schools will be recruited to participate. Subjects must be licensed and currently working in a school setting to qualify for the research. There is no risk to research participation, and returned completed surveys will imply consent to participate.

The research qualifies as exempted because the collection of data will be collected in a manner to provide anonymity. The data collection will be via the self-reported survey tool. Furthermore, the information involves nursing practices within educational settings. The research meets exemption from federal guidelines based on categories 1, and 5.

APPENDIX H



**GRAND VALLEY
STATE UNIVERSITY**

I CAMPUS DRIVE • ALLENDALE, MICHIGAN 49401-9403 • 616/895-6611

December 12, 2000

Carolyn Levi
1100 Calvin SE
Grand Rapids, MI 49506

RE: Proposal #01-96-H

Dear Carolyn:

Your proposed project entitled **School Nurse's Asthmas Knowledge and Management, Roles and Functions in School Setting** has been reviewed. It has been approved as a study, which is exempt from the regulations by section 46.101 of the Federal Register 46(16):8336, January 26, 1981.

Sincerely,



Paul A. Huizenga, Chair
Human Research Review Committee

APPENDIX I

February 12, 2001

Dear School Nurse Colleagues,

The morbidity and mortality statistics of asthma are on the rise within the United States, in spite of improved access, and increasing technological advances in medical care. School nurses are in the prime position to serve as the primary caregiver for many of these children who are victims of this chronic disease. As such it is important that school nurses have access to continued education on asthma treatment, and management, as we are often the patient advocates in first line prevention and care. For school nurses, this information will be invaluable in providing data regarding the various important roles we serve. Further data will verify the national standardized curriculum guidelines we utilize in daily management of the asthma student. I am currently conducting a study to identify school nurse's asthma knowledge, roles and functions within the school setting. This study is being conducted as part of my graduate work at Grand Valley State University, Kirkhof School of Nursing.

If you are a licensed nurse, (18 years of age and older), working in a school setting you are needed to participate in this research. Please take (approximately) 20 minutes to complete the enclosed questionnaire on school nurse's asthma knowledge, and roles. The directions are provided on the questionnaire. The survey should be completed and returned to me by February 23, 2001. There are no risks to completing the survey tool for this research. The tools have been designed to insure confidentiality and anonymity. Please do not write your name on any of the materials. A return addressed, stamped envelope has been provided for your convenience.

Participation is optional. There are no benefits or risks to participating in this study, however, this study should prove beneficial as an assessment tool for school nurses regarding levels of asthma education and resources. If you are interested in research results or if you have questions, feel free to contact me at (616) 234-4570, or Grand Valley State University's Human Subjects Committee Chairperson Paul Huizenga at (616) 895- 2472. Thank you in advance for your support, in helping me to complete this project.

Sincerely,

Carolyn Levi RN, BSN, MSNc

APPENDIX J

SCHOOL NURSE'S ASTHMA EDUCATIONAL NEEDS SURVEY

The purpose of this survey is to find out what school nurses would like to know about asthma. Your answers will help to define the role of the school nurse, and assist you in determining what management students with asthma in your schools require. There are no right or wrong answers. All of your answers will be kept confidential. Please answer yes, or no in the where applicable, You may also write/type sentence answers where applicable.

1. Date: (MM/DD/YY) ____/____/____
2. Age: ____
3. Sex: ____ 1 Female ____ 2 Male
4. Race: ____ 1 White ____ 2 Black ____ 3 Hispanic ____ 4 Other
5. City of school district ____
6. Employed by ____ 1 School Board ____ 2 Health Department ____ 3 Other
7. Educational preparation (check all that apply):
 - ____ 01 LPN diploma
 - ____ 02 RN diploma
 - ____ 03 Associate degree ____ 03a Nursing ____ 03b Other, Specify ____
 - ____ 04 Bachelor's degree ____ 04a Nursing ____ 04b Other, Specify ____
 - ____ 05 Master's degree ____ 05a Nursing ____ 05b Other, Specify ____
 - ____ 06 Doctorate ____ 06a Nursing ____ 06b Other, Specify ____
 - ____ 07 Nurse Practitioner
 - ____ 08 Other, Specify ____
 - ____ 09 Certification, Specify ____
8. What year were you first licensed? ____
9. Number of year's experience in school health? ____

Asthma Awareness

10. Do you think asthma is a common disease among students?
____ 1 yes ____ 2 no

Please go to next page

11. Do you think an emotional response can start an asthma attack?
____ 1 yes ____ 2 no
12. Do you think asthma is a psychological illness?
____ 1 yes ____ 2 no
13. Do you think the way parents raise children can cause asthma?
____ 1 yes ____ 2 no
14. Do you think that asthma attacks may cause breathing problems but are not harmful?
____ 1 yes ____ 2 no
15. Do you think asthma attacks may cause breathing problems but are not dangerous?
____ 1 yes ____ 2 no
16. Do you think that asthma can be controlled?
____ 1 yes ____ 2 no
17. Do you think asthma can be cured?
____ 1 yes ____ 2 no
18. Do you think students with asthma can exercise?
____ 1 yes ____ 2 no
19. Do you view environmental factors in a school setting as triggering asthma - response in students?
____ 1 yes ____ 2 no
20. Do you think students with asthma are absent from school more often than students without asthma?
____ 1 yes ____ 2 no
21. Do you think students with asthma have special needs?
____ 1 yes ____ 2 no
22. Do you have asthma?
____ 1 yes ____ 2 no
23. According to the NHLBI students using peak flow-meters should be referred to an MD when they are in the ____ zone?
____ 1 green ____ 2 yellow ____ 3 red
- Please go to next page**

School Nurse Role/ Functions

24. Number and types of schools that you cover? (Check all that apply).

- 1 Elementary 1a. # schools? 1b. Total # of students?
 2 Middle 2a. # schools? 2b. Total # of students?
 3 Secondary 3a. # schools? 3b. Total # of students?

25. How often are you at your schools? Please fill in each blank

- 1 Elementary 1a. Number of hours each day.
 1b. Number of hours each week.
 1c. Not assigned to an elementary school.
- 2 Middle 2a. Number of hours each day.
 2b. Number of hours each week.
 2c. Not assigned to a middle school.
- 3 Secondary 3a. Number of hours each day.
 3b. Number of hours each week.
 3c. Not assigned to a secondary school.

26. What types of activities do you perform in the school setting? (Mark all that apply).

- 01 First aid
 02 Skilled nursing procedures (catheterization, tube fdings, IV adm., etc)
 03 Immunization compliance
 04 Immunization administration
 05 Medication consent form compliance
 06 Medication Administration
 07 Classroom teaching
 08 Individual health counseling
 09 School-wide wellness promotion
 10 Health related education/support groups
 11 Individualized health plan (IHP) development /implementation
 12 Development of emergency plan
 13 Development of emergency/fire evacuation plan for impaired students
 14 Dev. of classroom modifications for students w/ health problems
 15 Contacting parent/guardian to pick up sick child
 16 Transport of sick children to home or to emergency department
 17 In-Service presentations for staff and family
 18 Other, Describe _____

Please go to next page

School Nurse Role

27. Does your school district have a medication administration policy?
_____ 1 yes _____ 2 no

28. Are students who are self administering medications being directly supervised?
_____ 1 yes _____ 2 no

Are students permitted to self-administer prescription asthma medications in your district?

29. Oral: _____ 1 Yes 2 _____ No
30. Inhaled: _____ 1 Yes 2 _____ No

Are students permitted to self-administer prescription, non-asthma or other medications in your district?

31. Oral: 1 _____ Yes 2 _____ No
32. Inhaled: 1 _____ Yes 2 _____ No
33. Epi-pen Injection 1 _____ Yes 2 _____ No
34. Insulin injection 1 _____ Yes 2 _____ No

35. Do you have a health assistant? _____ 1 yes _____ 2 no

36. How do you feel about delegating nursing functions to unlicensed personnel?
_____ 1 Strongly agree
_____ 2 Agree
_____ 3 Neutral
_____ 4 Disagree
_____ 5 Strongly disagree

37. Who provides the nebulizer machine for children who require a treatment during school?

_____ 1 Parent
_____ 2 School
_____ 3 Donation
_____ 4 Other, specify _____ 4a _____ 5 Don't know

38. What types of medication labels are acceptable in your district?

_____ 1 Pharmacy label
_____ 2 Parent label

Please go on to next page.

39. Where are student's medications stored?

- 1 Health room
- 2 Main office
- 3 Classroom
- 4 Child is permitted to carry own medications
- 5 Other, specify _____ 5a

40. Are medications secured?

- 1 Yes 2 No

41. Does your school or school district have a policy/procedure for caring for an acute asthma attack in the school setting?

- 1 Yes 2 No

42. Does your school district have a policy requiring emergency care plans for children with asthma?

- 1 Yes 2 No

43. In your school(s) who is the person most likely to take care of asthma – related medical emergency?

- 01 RN
- 02 LPN
- 03 CMA
- 04 Other health personnel _____ 4a Position/ Title
- 05 Principal
- 06 School secretary
- 07 Teacher
- 08 Other school personnel
- 09 Counselor
- 10 Parent liaison

44. In your school(s), how often approximately do you see students for asthma attacks?

- 1 Daily
- 2 two to three times a week
- 3 once a week
- 4 once every two weeks
- 5 Less than every two weeks
- 6 Less than once a month
- 7 once every other month
- 8 never

Please go on to next page

45. Where is the asthma episode documented?

- 1 Students health file
- 2 Health sheet in students school record
- 3 Letter sent to parent
- 4 Copy of parent letter placed in students school record
- 5 Other, describe _____ 5a
- 6 Health room log
- 7 No documentation kept

Education/Training

46. Are there programs for training school facility/staff to care for and treat students with asthma?

- 1 Yes 2 No

47. If there is training available, who provides it?

- 1 RN
- 2 LPN
- 3 CMA
- 4 Other health personnel _____ 4a Position/Title
- 5 Principal
- 6 School secretary
- 7 Teacher
- 8 Other school personnel _____ 8a Position/Title
- 9 Outside agency, Identify _____ 9a

48. If student asthma education is provided who does the training?

- 1 RN
- 2 LPN
- 3 CMA
- 4 Other health personnel _____ 4a Position/Title
- 5 Principal
- 6 School secretary
- 7 Teacher
- 8 Other school personnel _____ 8a Position/Title
- 9 Outside agency, Identify _____ 9a

49. Are there age appropriate asthma education materials for students in your school?

- 1 Yes 2 No

Please go to last page ☺

50. Do you use a peak flow meter in your school setting?

1 ____ Yes 2 ____ No

51. In the past six months have you attended any asthma education programs?

1 ____ Yes 2 ____ No

52. In the past year have you attended any asthma education programs?

1 ____ Yes 2 ____ No

53. Are you an active member of any school nurse association?

1 ____ Yes 2 ____ No

54. Please list any school nurse associations in which you are an active member of.

55. Please list any asthma guidelines that you use in your schools.

Thank you for participating in the school nurse's asthma knowledge and education needs survey. Please Forward survey to Carolyn Levi online at: Clevi92070@aol.com You may also mail to: 1100 Calvin SE. Grand Rapids, MI. 49506

REFERENCES

REFERENCES

American School Health Association, (1991). Implementation guide for the standards of school nursing practice. American School Health Association. Kent OH

Brener, N.D., Vernon, M.E., Bradley, B.J., Santelli, J.S., DuShaw, M.L., Lewis, P.J., & Brainerd, E.F. (1999). Assessment of school health nursing in the United States. Journal of Health Education. 30, (5) 50-57.

Brown, S.T., Bowman, J.M., and Eason, F.R. (1999). Assessment of nurses' attitudes and knowledge regarding pain management. The Journal of Continuing Education in Nursing. 30, (3) 132-139.

Bucher, L., Dryer, C., Hendrix, E., & Wong, N. (1998). Statewide assessment of school-age children with asthma in Delaware. Journal of School Health. 68, (7), 276-281.

Calabrese, B.J., Nanda, J.P., Huss, K., Winkelstein, M., Quartey, R.I., & Rand, C.S. (1999). Asthma knowledge, roles, functions, and educational needs of school nurses. Journal of School Health. 69, (6), 233-238.

Capen, C.L., Dedlow, E.R., Robillard, R.H., Fuller, B.M., & Fuller, C.P. (1994). The team approach to pediatric asthma education. Pediatric Nursing, 20, (3) 231-237.

Center for Communicable Diseases Control (1996) Asthma Morbidity and Mortality [Online]. Available: WWW.CDC.GOV/epo/mmwr.

Center for Communicable Diseases Control (1998) Asthma Morbidity and Mortality [Online]. Available: WWW.CDC.GOV/epo/mmwr.

Chinn, P.L., & Kramer, M.K., (1995). Theory and nursing: a systematic approach. Mosby. St Louis.

Evans, R., Gergen, P.J., Mitchell, H., Kattan, M., Kerckmar, C., Crain, E., Anderson, J., Eggleston, P., Malveaux, F.J., & Wedmer, J.. (1999). A randomized clinical trial to reduce asthma morbidity among inner-city children: results of the National Cooperative Inner-City Asthma Study. The Journal of Pediatrics 135, (3) 332-337.

Jones-Bauer, E., Lurie, N., Yeh, C., & Grant, E. (1999). Screening for asthma in an inner-city elementary school in Minneapolis, Minnesota. Journal of School Health 69, (1) 12-16.

Hanania, N.A., Wittman, R., Kesten, S., & Chapman, K.R. (1994). Medical personnel's knowledge of and ability to use inhaling devices. Chest 105, (1), 111-116.

Horner, S.D. (1998). Using the Open Airways Curriculum to improve self-care for third grade children with asthma. Journal of School Health, 68, (8), 329-333.

Knight, J.B., (1991). The Betty Neuman Systems Model applied to practice. A client with multiple sclerosis. Journal of Advanced Nursing 15, 447-455.

Lightfoot, J. & Bines, W. (1998). Keeping children healthy: role of the school nurse. Nursing Times. 94, (21), 65-68.

Lenatsch, G. (1999). Knowledge, attitudes, treatment practices, and health behaviors of nurses regarding blood cholesterol. The Journal of Continuing Education in Nursing. 30, (1), 13-19.

McEwen, M., Johnson, P., Neatherlin, J., Millard, M.W., & Lawrence, G. (1998). School-based management of chronic asthma inner-city African-American schoolchildren in Dallas Texas. Journal of School Health. 68, (5), 196-201.

Meurer, J.R., McKenzie, S., Mischler, E., Subichin, S., Malloy, M., & Varghese, G. (1999). The awesome asthma school days program: educating children, inspiring a community. Journal of School Health. 69, (2), 63-68.

Mosby's Medical Nursing & Allied Health Dictionary. 5th Ed. (1998). Mosby : St. Louis.

National Heart Lung and Blood Institute. (1991). Guidelines for the diagnosis and management of asthma. (as cited in Capen, Dedlow, Robilliard, Fuller, & Fuller, 1994) The team approach to pediatric asthma education. Pediatric Nursing, 20, (3) 231-237.

National Heart Lung and Blood Institute. (1998). How asthma friendly is your school? Journal of school Health. 68 (4). 167.

National Heart Lung and Blood Institute. (1997). Guidelines for the diagnosis and management of asthma : Expert Panel Report 2. NIH Publication; 98-4051 Clinical Practice Guidelines.

Neuman, B. (1995). The Neuman Systems Model. 3rd Ed. Appleton & Lange: Norwalk, Conn.

Periard, M.E., Knecht, L.D., & Birchmeier, N. (1999). A state association surveys school nurses to identify current issues and role characteristics. Journal of School Nursing. 15, (4), 12-18.

Polit, D.F. & Hungler, B.P. (1999). Nursing Research: Principles and Methods. (4th Ed.). Philadelphia: J.B. Lippincott Company.

Swanson, M.N., & Thompson, P.E. (1994). Managing asthma triggers in school. Pediatric Nursing. 20, (2), 181-184.

Thurbur, F., Berry, B., & Cameron, M.E. (1991). The role of school nursing in the United States. Journal of Pediatric Health Care. 5, (3) 135-140.

Weil, C.M., Wade, S.L., Bauman, L.J., Lynn, H., Mitchell, H., & Lavigne, J. (1999). The relationship between psychosocial factors and asthma morbidity in inner-city children with asthma. Pediatrics. 104, (6), 1274-1280.

Williams, J.K., & McCarthy, A.M. (1995). School nurses' experiences with children with chronic conditions. Journal of School Health. 65, (6), 234-236.