PRIMARY SCHOOL TEACHERS' KNOWLEDGE OF ASTHMA IN UMDONI SUBDISTRICT, KWAZULU NATAL

Submitted to:

NELSON R. MANDELA SCHOOL OF MEDICINE

UNIVERSITY OF KWAZULU-NATAL

DURBAN, SOUTH AFRICA

Submitted in partial fulfilment of the academic requirements for the degree of Master of Public Health in the School of Family and Public Health Medicine

BY:

Desiree Govender

SUPERVISOR

Mr. Andy Gray

Principal investigator:
Desiree Govender
GJ Crookes Hospital –Ugu North
UKZN student no.: 200003419

Collaborating investigator:
Dr Stephen Knight
Department of Public Health Medicine
School of Family and Public Health Medicine
Nelson R Mandela School of Medicine
University of KwaZulu-Natal

Supervisor:
Mr. Andy Gray
Department of Therapeutics and Medicines Management
School of Family and Public Health Medicine
Nelson R Mandela School of Medicine
University of KwaZulu-Natal

ABSTRACT

Introduction

On the 5th of December 2009, at the 40th Union World Conference on Lung Health in Cancun, Mexico, the American Thoracic Society and the Forum of International Respiratory Societies declared 2010 as the "Year of the Lung". Asthma features amongst the "big five" of the respiratory diseases worldwide. It is estimated that South Africa has the 25th highest asthma prevalence in the world and the 5th highest case fatality rate in the world. Asthma has been reported as one of the most serious common chronic condition affecting young children. The South African media and government reports states that one in eight children in South Africa has asthma. Children spend a considerable amount of time at school. Teachers are often recognised as *in loco parentis* at school. Therefore, it is imperative that primary schoolteachers have some knowledge of asthma and its management to ensure that asthmatic school children can be assisted.

Aim

The aim of this study was to elucidate asthma knowledge and management in primary schools in Umdoni subdistrict.

Methods

A cross sectional study design was used. Two hundred and twenty six schoolteachers' from 19 primary schools participated in this paperless survey. An asthma knowledge questionnaire was developed by the researcher in consultation with a paediatric asthma specialist and was fielded using the Mobile Researcher mobile application channel, provided by Clyral. The survey was conducted using cellular telephones that were used to capture teachers' responses during face-to-face interviews with fieldworkers. The completed surveys were uploaded using general packet radio service (GPRS) to the web-based "Research Centre". Data were exported to a Microsoft Excel spreadsheet, cleaned and then imported into SPSS 15.10 for analysis.

Results

This study found that although the majority of primary schoolteachers (61.5%) had above 50% correct answers in the asthma knowledge test, the vast majority (95.1%) felt asthma education was necessary for schoolteachers. The results suggest that although teachers have reasonable knowledge on certain areas regarding asthma, however there is huge gap in their knowledge on the care of a child with an acute exacerbation of asthma. The lack of medical or nursing personnel at these schools means that the initial management of the child during an asthma attack will be in the hands of school personnel. In light of this, it is important to note that 38.5% of participants scored less than 50% on an asthma knowledge test, which denoted poor or limited knowledge of asthma and its management. This study also showed that teachers' knowledge of asthma and sports was deficient and teachers do have misconceptions about asthmatic children's abilities. None of the schools had written material to guide the management and care of asthmatic children. Such materials would be necessary, especially in circumstances when prompt action is required in a severe acute asthma attack.

Conclusion

The results conclude that primary schoolteachers' knowledge in Umdoni subdistrict is deficient especially in the knowledge of the care of a child with an acute exacerbation of asthma. Teachers in Umdoni subdistrict are in contact with and exposed to asthmatic schoolchildren on a regular basis. Teachers have to cope with asthmatic children who have diverse needs. The importance of enhancing school based asthma health promotion strategies is highlighted by the following recommendations: asthma education training for school personnel, participation and support from Departments of Health and Education and the development and implementation of sound asthma policies in schools.

Plagiarism

DECLARATION

I, Desiree Govender…….....declare that

(i) The research reported in this dissertation, except where otherwise indicated, is my original work.

(ii) This dissertation has not been submitted for any degree or examination at any other university.

(iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

(iv) This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

a) their words have been rewritten but the general information attributed to them has been referenced;
b) where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

(v) Where I have reproduced a publication of which I am an author, co-author or editor, I have indicated in detail which part of the publication was actually written by myself alone and have fully referenced such publications.

(vi) This dissertation does not contain text, graphics or tables copied and pasted from the internet, unless specifically acknowledged, and the source being detailed in the dissertation and in the References sections.

Signed: _____Date_____

Department of Public Health Medicine,
Nelson R Mandela School of Medicine
University of KwaZulu-Natal
Durban
South Africa

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude and appreciation to the following people:

Mr. Andy Gray, my supervisor, at the School of Medicines and Therapeutics, University of KwaZulu Natal; for his invaluable support, guidance, encouragement and tolerance throughout the study. Without Mr. Gray's financial contribution towards the cost of the technology for this study, this study would not have been possible. I will always be grateful for his kindness.

Dr Stephen Knight my collaborating investigator, at the Department of Public Health Medicine, University of KwaZulu Natal; for his encouragement and motivation.

Mrs. Tonya Esterhuizen, biostatistician at the School of Health Sciences, University of KwaZulu Natal; for her guidance with statistical analyses.

Mr. Muhammed E Hoque, biostatistician at the University of Limpopo; for his assistance and advice in data analyses and interpretation of data.

Professor Prakash Jeena, paediatric specialist at the University of KwaZulu Natal for his assistance in developing the asthma knowledge questionnaire

Officials at the Department of Education of KwaZulu-Natal and the head teachers of the participating primary schools in the Umdoni subdistrict for granting me permission to conduct this survey.

The primary schoolteachers who participated in this study. I am grateful to each one of you for showing such enthusiasm in this study. Thank you all.

My sisters Kersarie and Terisha for their encouragement, patience and tolerance.

Sister Lorna Reddy and Cyprian Shangase, my fieldworkers who have invaluably contributed their time, effort, dedication and co-operation throughout the fieldwork. I thank you both for being part of an exciting journey in my life.

Shanaz Ghuman, Ugen Gramany, Shantel Moodley, Antoinette Naidoo, Lihle Dlungwane and Sindiswa Malunga, my friends, who showed me constant support, love, patience and tolerance.

Mr Rufus David, my transport assistant, for providing transport and guidance into the areas of Umdoni subdistrict. Thank you for your tolerance and patience.

Above all, I thank God for giving me the courage and strength to persevere. This journey began with you and I thank you for this opportunity in life.

DEDICATION

I dedicate this dissertation to the following persons who have thought me unquantifiable lessons of life that no degree can match:

To my late mother, your faith in me helped me through the painful and hard times of this journey. Although you knew you wouldn't be here to share this moment with me in witnessing the pieces of my research dissertation coming together, nevertheless you gave me hope and faith to believe in myself for a lifetime.

To my father, thank you for believing in the empowerment of women through education.

To the precious children of our rainbow nation, your health is and should of the utmost importance as you'll are the leaders of tomorrow.

In celebration of the "Year of the Lung" 2010 – may every opportunity be used to improve the lives of all those affected by respiratory diseases such as asthma.

ACRONYMS AND ABBREVIATIONS

GINA	:	Global Initiative for Asthma
IMB	:	Information Motivation Behavioural
IRDS	:	Integrated Rural Development Strategy
ISAAC	:	International Study of Asthma and Allergies in Childhood
MDG	:	Millennium Development Goal
NAQK	:	Newcastle Asthma Questionnaire
NDOH	:	National Department of Health
NIH	:	National Institute of Health
RUDASA	:	Rural Doctors Association of South Africa
SABC	:	South African Broadcasting Commission
SPSS	:	Statistical Package for the Social Sciences
WHO	:	World Health Organization

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

1.1 Introduction

Houston (2003, pp.2-5) has stated that "Children cannot learn if they are hungry. They cannot learn if their teeth hurt. Children cannot learn if they cannot breathe". Clearly, there is a direct relationship then between an effective learning environment and freedom from the clinical symptoms of asthma. Houston continues: "Moreover, asthma can be deadly". Access to appropriate care for the asthmatic child can therefore be not merely a matter of school performance, but also one of life or death. This study set out to determine primary schoolteachers' knowledge of asthma and asthma management in a selected sub-district (Umdoni) of KwaZulu–Natal, South Africa. It is hoped that the outcomes of this study will help to guide targeted interventions at improving primary schoolteachers' knowledge of asthma and asthma management, as well as stimulating further studies in this area.

On the 5th of December 2009, at the 40th Union World Conference on Lung Health in Cancun, Mexico, the American Thoracic Society and the Forum of International Respiratory Societies declared 2010 as the "Year of the Lung" (Feldman, 2010). Asthma features amongst the "big five" of the respiratory diseases.

Asthma has been reported as one of the most serious common chronic condition affecting young children (French & Caroll, 1997; Harris, 2002; Henry *et al*., 2006; Ones *et al.*, 2006; Rodenhorst, 2003; Sapien *et al.,* 2004 and Tse and Yu, 2002). Bell *et al.* (2000) estimated that approximately four children are likely to be asthmatic in a class of thirty school children. Asthma is also responsible for high rates of school absenteeism (Hamm, 2004; Harris, 2002; Jeena *et al.*, 2004 and Rodenhorst, 2003).

Children spend a considerable amount of time at school (Brook, 1990, Bahari and Rahman, 2003). Since asthma is a common chronic disease amongst young children, it is imperative that primary schoolteachers have some knowledge of asthma and its management to ensure that asthmatic schoolchildren can be assisted (Brook, 1990; Seto *et al.,* 1992; Neuharth-Pritchett and Getch, 2001; Tse and Yu, 2002 and

Rodenhorst, 2003). The American Academy of Allergy, Asthma and Immunology (1999) identified the parents, teachers, coaches, school nurse, school principal and clinician as members of the asthma management team responsible for the well-being of the asthmatic school child.

Internationally, studies conducted on schoolteachers' knowledge of asthma and asthma management have found that they are often not aware of the role of asthma preventative medication that can be taken prior to sports and thus may limit the asthmatic child's participation in sports (Bevis and Taylor, 1990; French and Carroll, 1997, Tse and Yu, 2002 and Ones *et al.,* 2006). Schoolteachers' often have poor knowledge of the trigger factors associated with acute asthma attacks (Bell *et al.,* 2000 and Ones *et al.,* 2006). Such trigger factors may well be prevalent within the school environment. In the absence of the school nurse and in the event of an emergency such as an asthma attack in a school child, the schoolteacher will have to make decisions to assist the asthmatic school child (Brook, 1990; Bevis and Taylor, 1990; and Bell *et al.,* 2000).

In South Africa, studies on asthma in children have traditionally focused on issues of prevalence, trends in asthma admissions, morbidity and mortality. MacIntyre, de Villiers and Owange-Iraka (2001) reported that childhood asthma admissions had increased between 1986 and 1996 by 2.5 times at Ga-Rankuwa Hospital, which serves the population of parts of northern Gauteng as well as the North West Province. These authors concluded that asthma education programmes at community and national level should be a priority. The Centre for Health and Environmental Health at the University of KwaZulu-Natal conducted a study of teachers' knowledge of asthma and its management in six primary schools in the disadvantaged South and West metropolitan areas of the eThekwini Metropolitan Municipality (Khan, 2006) This unpublished study is the only one of its kind to have been conducted to date in a South African school setting. As with studies conducted in other countries, Khan (2006) reported that teachers' knowledge of asthma and its management was deficient.

Asthma education interventions have been shown to improve school personnel's knowledge of asthma and hence enable proactive behaviour towards the disease (Anderton and Broady, 1999, Harris, 2000, Sapien *et al.*, 2004, Keyser *et al.,* 2006). Accordingly, this study has chosen as its theoretical base the Information Motivation

Behavioural Skills Theory (IMB), developed by Fisher and Fisher (1992). This model states that having more knowledge (information), motivation (good attitudes towards the behaviour), social motivation and behavioural skills results in favourable behaviour. More details on the theoretical model used are provided in the Methods section (Chapter 3). A comprehensive literature review is provided in Chapter 2.

1.2 Background to the Study

In September 2000, at the United Nations Millennium Summit, 189 nations agreed on a set of eight Millennium Development Goals (MDGs) which are to be achieved by 2015 (UNDP, 2005). South Africa is a signatory to this instrument and has committed to the attainment of the MDGs. MDG 4 is to reduce child mortality. Various actions have been suggested, including ensuring full coverage of immunization programmes, scaling up vitamin A supplementation, pursuing exclusive breastfeeding for children under 6 months of age and breastfeeding plus appropriate complementary feeding for children aged 6 months to two years, providing adequate nourishment for children of poor families (despite food price rises), promoting hand-washing and treatment of home drinking water, targeting the underlying socioeconomic causes of child mortality (such as mothers' access to reproductive health, education and employment), preventing and providing effective treatment of pneumonia, diarrhoea, malaria and other infectious diseases, promoting comprehensive and universal coverage of primary health-care systems (with the engagement of community health workers) accompanied by sustained delivery of health services and women's education programmes, and injecting additional aid flows, (of the order of $10.2 billion per year) to ensure sufficient financing for the strengthening of health systems to meet the demand for maternal and childcare and other reproductive health services. The target set for this Goal is to reduce by two thirds, between 1990 and 2015, the under-five mortality rate. The under-five mortality rate is a standard measure and one that is sensitive to the interventions proposed. However, MDG 4 should not be seen as only dealing with mortality in children under school-going age. It needs to be interpreted more broadly as signaling a need not only to reduce child mortality from infectious diseases but also to improve the prevention and management of non-communicable diseases, such as asthma. According to Neuhart-Pritchett and Getch (2006), there is much apprehension about the inadequate levels of knowledge of asthma amongst teachers, and more especially,

about their inability to recognize a severe acute asthma attack which needs prompt medical attention.

1.2.1 Global Burden of Asthma

Asthma is a significant public health problem (Hazir *et al*., 2002). The World Health Organization (WHO) has reported that approximately 300 million people in the world are asthmatic (WHO, 2006). WHO reported global asthma mortality as 180000 deaths worldwide each year in 2004 (WHO, 2004). In 2005, WHO estimated that 255000 deaths worldwide could be attributed to asthma (WHO, 2006). Globally asthma poses a huge economic burden. Worldwide asthma economic costs are far greater than the economic costs related to tuberculosis (TB) and HIV/AIDS combined (WHO, 2004).

Braman (2006) has stated that asthma morbidity, mortality and economic burden are drastically increasing, especially in children. The same author reported that a sharp increase in hospital admissions for asthma was associated with an increase in the severity of asthma, inadequate control of asthma and poor socio-economic conditions. Importantly, Braman also pointed out that most governments in the world do not regard asthma as a priority in the health care sector. Braman (2006) has proposed that, on the African continent, a condition such as asthma may be sidelined as a result of competing priorities like poor nutrition and infectious diseases. In general, in developing countries, there is inadequate public health awareness of asthma (Singh, 2005).

A study conducted by Grieling *et al*. (2005, p.286) to identify asthma deaths in US schools between 1990 and 2003 found that “31 percent of asthmatic schoolchildren died while waiting for medical assistance and a delayed response or hesitancy of school staff to provide medical assistance may have contributed to some of the deaths”. In total, 38 deaths were reported in the school environment and 12 asthmatic children died while waiting for medical assistance accounting for 31% of the deaths. The American Lung Association (2005) reported that between 1999 and 2002, 159 children younger than 15 years old died of asthma each year.

1.2.2 National Burden of Asthma

According to the executive summary of Global Initiative for Asthma (GINA) Dissemination Committee Report, South Africa has the 25th highest asthma prevalence in the world and has the 5th highest case fatality rate in the world (Masoli *et a*l., 2004). The same report stated that South Africa has the highest prevalence of asthma on the African continent.

Local data would support the view that asthma incidence is increasing in South Africa. Jeena *et al.* (2004) reported that hospital admissions for asthma had increased from 25- to 200-fold in Durban and Soweto hospitals in the preceding 25 years. The 1998 International Study of Asthma and Allergies in Childhood (ISAAC) revealed that asthma prevalence amongst the South African 13-14 year old age group was 20.3% higher than the African and global prevalence rates, which were 15.4% and 13.7% respectively (Green *et al.,* 2007). This perception is also seen in popular media and government reports - the SABC News (2006) and Ministry of Health, Western Cape (2006) reported that one in eight children in South Africa has asthma.

The International Study of Asthma and Allergies in Childhood Phase lll provided interesting results that is of great relevance to South Africa. The lack of priority for an important disease such as asthma particularly in Sub-Saharan Africa were limited resources are used on competing diseases like tuberculosis, AIDS and malaria has been highlighted in the report by Ait-Khaled *et al.* (2007) on the prevalence of symptoms of asthma, rhinitis and eczema in 13-to-14-year-old children in Africa, International Study of Asthma and Allergies in Childhood (ISAAC), Phase lll. ISAAC Phase lll found that the following centres in Africa which includes Cape Town, Reunion Island, Nairobi, Brazaville, Urban Ivory Coast and Conakry displayed symptoms of asthma prevalences of 20.3%, 21.5%, 18.0%, 19.9%, 19.3% and 18.6% respectively. The high asthma prevalence of 20.3% in Cape Town is analogous to prevalence of asthma symptoms in Western Europe Ait-Khaled *et al* (2007). Cape Town also presented with highest prevalence of wheeze and rhinoconjunctivitis. The ISAAC Phase lll study also noted that the prevalence of asthma was higher in urban than rural areas and this could be attributed to urbanisation.

Zar *et al.* (2007) conducted a study to determine time trends in the symptoms of asthma, allergic rhinitis, and atopic eczema among South Africa adolescents as there was paucity of information of these trends in Africa. The researchers performed comparisons of cross sectional data from the International Study of Asthma and Allergies in Childhood questionnaire based surveys. These surveys included ISAAC phase I and ISAAC phase lll which were conducted seven years apart that focused on self reported asthma symptoms. The study samples were 5178 adolescents in 1995 and 5037 adolescents in 2002. The findings included that there was a profound increase in the prevalence of the following symptoms during a 12 month period: wheezing (16% vs 20.3%), exercised induced wheeze (21.5% vs 32.5%), nocturnal cough (23.6% vs 36.6%), sleep disturbance due to wheeze (9.6% vs 16%). There was also a considerable incease in the symptoms of atopic diseases like allergic rhinitis, rhinoconjunctivitis and eczema. The results of these comparisons between 1995 and 2002 have shown that asthma, allergic rhinitis and eczema have increased (Zar *et al*., 2007).

Steinman *et al.* (2003) conducted a study in South Africa to determine the prevalence of atopic sensitization and bronchial hyper-responsiveness (BHR) in traditional rural Xhosa children, recently urbanised Xhosa children and established city white children. The researchers studied 1457 children aged 10-14 years from rural Transkei, a suburban area and urban Cape Town using questionnaires. The findings of the study revealed that 17% of rural and 34.4% of urban Xhosa children displayed increased BHR which was established by bronchial challenge with histamine. This result showed that there was a significant increase in BHR in comparison to 0.03% BHR for rural and 3.17% for urban children in a previous study that used the exercise challenge. According to Steinman *et al.* (2003) sensitization to house dust mites in rural Xhosa children was a new finding.

An increase in asthma prevalence in rural children has also been reported in South Africa (Green *et al.,* 2007). Asthmatic adults and parents of asthmatic children in rural South Africa are fearful of the disease. Asthma control appeared to be poor amongst these asthmatic adults and children (Green *et al.,* 2001). The authors recommended patient education to alleviate anxiety and the unawareness surrounding the disease in rural South Africa. This study also revealed that 33% of the asthmatic children surveyed had experienced hospitalisation at some point due to asthma.

In a South African study conducted by Green, Davis and Price (2008) on patients' perceptions, impact and management of asthma, it was revealed that there was under–treatment, inappropriate treatment and a lack of patient education for South African asthmatic patients. School and work absenteeism was high amongst the asthmatic patients with only 35.1% of asthmatics reporting non-absenteeism at work or school in the previous year. This study also showed that non adherence to asthma treatment significantly affects the quality of life for most South African asthmatics. Similar findings were noted in an earlier study by Green *et al.,* (2001) on asthma management and perceptions in rural South Africa.

An important study was conducted by Nriagu *et al.* (1999) in urban South–Central Durban, a highly polluted petrochemical and industrial complex. These researchers determined the prevalence of asthma and respiratory symptoms using a cross sectional survey of 213 households in the communities of Merewent and Austerville. The researchers found that doctor-diagnosed asthma prevalence in the childhood population of Merebank was 10%. In a more recent study 50% of schoolchildren at a primary school in Merebank, also located in urban South–Central Durban, were found to have asthma (Doko, 2008).

According to Ait-Khaled *et al.* (2007), the findings of ISAAC Phase lll highlights that asthma without doubt is a growing public health problem in the African continent and the new found epidemiologic evidence should pave the way for greater political commitment of decision makers, policy analysts, researchers, research funders to assist in asthma prevention and effective management.

1.2.3 Burden of Asthma in the study site

Asthma is prevalent in the Ugu District.[1] Prior to conducting this study, the number of primary health care encounters for asthma treatment (termed asthma visits) in the Ugu North area and its Umdoni subdistrict were obtained from the Ugu District Informatics Office for the calendar years 2006-2008.

[1] Personal communication with the school health programme manager of Ugu District, Ms Mavis Moonsamy (April 14, 2008)

Figures for the Umdoni subdistrict were compiled from data collected at the Pennington clinic, Philani clinic, Scottburgh clinic, Umzinto clinic, Umzinto mobile 2, Umzinto North clinic and the gateway clinic located within the GJ Crookes District Hospital. Data for Ugu North reflected figures collected in the Umdoni, Umzumbe and Vulamehlo subdistricts. The figures provided were for presentations at primary health care facilities where the presentation was for asthma treatment for those aged 18 years and over and those aged less than 18 years. Currently, no data on the incidence of new asthma cases are collected, and the degree of unreported asthma is also unknown. The prevalence of asthma is therefore estimated to approximate the number of patients recorded by primary health care facilities in the district as seeking treatment for asthma. The District Health Office has no accurate catchment populations for the various clinics within Ugu North, thus any attempts at calculating the prevalence of asthma per 1000 population would be misleading.

Between January 2006 and December 2008, the number of adults (over 18 years) presenting for asthma treatment in the Ugu North district per month ranged from 2240 to 4074. During the same time period, the number of adults presenting for asthma treatment In the Umdoni subdistrict ranged from 346 to 743. Data on asthma visits for patients under 18 years of age (including children) are shown in Table 1.

Table 1: Asthma visits by patients aged under 18 years in Ugu North and Umdoni subdistrict in 2006-2008 (source: Ugu District Informatics Office)

	Asthma visits by patients aged under 18 years					
	2006		2007		2008	
Month	**Ugu North**	**Umdoni**	**Ugu North**	**Umdoni**	**Ugu North**	**Umdoni**
January	432	101	381	31	328	50
February	386	110	337	28	430	72
March	309	62	399	28	299	69
April	345	44	402	34	312	35
May	397	77	294	30	447	35
June	387	52	251	35	335	41
July	535	51	334	43	352	74
August	407	45	347	31	377	90
September	373	26	327	34	310	41
October	269	42	323	38	662	284
November	317	27	339	34	364	51
December	375	42	265	33	345	40
Total	4532	679	3999	399	4561	882

Table 1 shows a significant number of asthma visits by patients under 18 years in Ugu North as well as the Umdoni subdistrict. Although the validity and accuracy of the data could be questioned, it would appear that patients do present for treatment of asthma across the district, but that the number of children presenting for asthma treatment is lower than the number of adults.

The statistics from Ugu District Information Office shows that the visits for “asthma” in Ugu and Umdoni subdistrict is more in adults than children whereas asthma is a common childhood illness and the prevalence of “true asthma” is higher in the paediatric population. According to Levin (2007), the influence of language or linguistics can be debated in the diagnosis of asthma. Communication difficulties may “either falsely raise or decrease the prevalence of questionnaire based assessments of wheezing and asthma depending on the composition of the group interviewed and

language questionnaire. This is of relevance if the diagnosis of asthma at clinics is based on interviews and clarifying of the reported symptoms by the health professional. Asthma or respiratory terminology is perceived differently in the various languages and culture. This will be discussed in the literature review.

Although the data for October 2008 may be misstated, the number of children seeking asthma treatment seems to have increased over time. The rural Umdoni subdistrict would thus seem an appropriate setting for a study of this nature.

1.2.4 Asthma and rural schools

Most of the studies on teachers' knowledge of asthma and its management have been conducted in urban and suburban school settings. Only one international study, conducted by Rodenhorst (2003), focused solely on rural elementary schoolteachers' knowledge of asthma and their intent to manage children with asthma symptoms in Western Nebraska and Eastern Wyoming. Rodenhorst reported that limited accessibility to health care services for the asthmatic school child in the rural areas may be a problem and schoolteachers may have to assist in the management of the asthmatic child.

In South Africa, as mentioned previously, Khan (2006) undertook a pilot study in five peri-urban primary schools in eThekwini South and West subdistricts. Khan noted that coal, wood and gas, which were predominantly used in these learners' households as fuel products, are known to emit carbon monoxide, nitrogen dioxide and hydrocarbons, all of which can have a deleterious effect on the respiratory system. Khan also reported that "use of coal is associated with lung cancer and childhood asthma". Rural communities still utilise coal for cooking and heating in South Africa. Cockroaches, dust, pets, mould, and tobacco smoke were identified as common allergens in the disadvantaged areas where these learners lived.

Rural schools may experience more difficulties than urban schools to ensuring effective asthma management for their asthmatic schoolchildren (Hillemeier, Gusie and Yu Bai, 2006).

1.2.5 Asthma education and primary schoolteachers

Asthma education and training is not included in most teachers' training curriculum and most teachers would appreciate training on asthma management (Connor, 1997). Carruthers *et al* (1995) stated that the asthmatic child's asthma management can be influenced by the attitude of the school. Thus it is important to assess how much schoolteachers know about asthma and its management. This can contribute to keeping children healthy and improving the standard of their health at school. Neuhart-Pritchett and Getch (2001) found in their asthma survey that schoolteachers expressed a keen interest in receiving more information about asthma. Prelip *et al.* (2006) stated that teachers have great potential to promote health within the school environment.

1.2.6 South African National School Health Policy

South Africa has an official National School Health Policy (NDOH, 2003). School Health Services are regarded as part of Primary Health Care in South Africa. The South African National School Health Policy was developed in line with the provisions and principles of the Convention on the Rights of the Child. The rights of the child include being in a safe environment that ensures "human dignity and harmonious development of the child" (UNICEF, 2008, p2). However, the National School Health Policy focuses more on malnutrition and infectious diseases and pays little attention to chronic non-communicable conditions such as asthma.

1.3 Problem Statement

Umdoni is a mix of urban and rural settlements. Schools in the rural settlements have limited accessibility to health care services for the asthmatic school child and schoolteachers may have to assist in the management of the asthmatic child.

None of the schools in Umdoni subdistrict have a full time school health nurse who is stationed at the school.

The school environment may be hazardous to the asthmatic schoolchild with abundant trigger factors in the environment, such as dust mites, fumes and chalk dust (Clark *et al.,* 1999). It is therefore important to know if schoolteachers can identify these asthma trigger factors, as most international studies have reported that teachers' knowledge of asthma trigger factors is deficient.

There has been very little research in South Africa to assist in determining asthma knowledge amongst primary schoolteachers. This study can therefore assist in improving our understanding about what schoolteachers know about asthma and its management.

1.4. Significance of the study

In developing countries in Africa, conditions such as asthma are sidelined because of competing conditions such as malnutrition and infectious disease. Teachers are often recognised as *in loco parentis* at school. This study provides information about the primary school teachers' knowledge of asthma and its management which previously did not exist for the Umdoni subdistrict. International literature has shown that asthma education is important for schoolteachers (Bell *et al.*, 2000 and Sapien *et al.,* 2004). Studies have also shown that it is important to have a baseline as to what teachers know about the condition in order to establish training needs.

1.5. Aim and objectives of the study

The aim of this study was to elucidate asthma knowledge and management in primary schools in Umdoni subdistrict.

1.5.1 Specific objectives of the study

1. To determine how asthma is managed at primary schools in Umdoni subdistrict.
2. To determine primary schoolteachers' knowledge of asthma in Umdoni subdistrict, KwaZulu-Natal, South Africa.
3. To determine if primary schoolteachers have had any training in asthma management.
4. To determine if primary schoolteachers are confident to assist a child presenting with asthma symptoms in the classroom.
5. To determine if schools have a written asthma policy.

1.5.2 Implementation Objective

1. To make recommendations to the education and health authorities on the implementation of asthma education program for schoolteachers as identified by the study.

1.6 Outline of the thesis

Chapter one provides the background to the study, the problem statement, significance of the study, the aim and objectives.

Chapter two provides a literature review highlighting the importance of this research topic.

Chapter three describes the research methodology of this study.

Chapter four is a presentation of the results of this study.

Chapter five entails the discussion and limitations of the study.

Chapter six provides the recommendations and conclusion to the study.

1.7 Summary

The Bill of Rights in the South African Constitution (1997) states that “everyone has a right to an environment that is not harmful to their health and wellbeing.” The South African government is a signatory to the United Nations Convention of the Rights of the Child and has vowed to ‘Put Children First’ (NDOH, 2003). The health of children is a vital and contributing factor to the health of any nation.

The health care needs of children from rural communities are often overlooked (Rodenhorst, 2003). An exploratory study of this nature is essential to assess schoolteachers’ asthma knowledge and management. The findings of such a study are needed to identify areas of support and resources that are important in the provision of optimal school health. The researchers will be afforded the opportunity to compare the findings to similar studies conducted abroad and thus enhance generalisability of the study. This will also afford health promotion specialists the opportunities to take into consideration the interventions tried and tested internationally when making recommendations for South Africa.

Teachers knowledge of asthma and their misconceptions surrounding the disease is important to provide the best support for asthmatic schoolchildren. In the school environment, teachers are the guardians of the children of our nation and this places them in an ideal position to promote the health and well being of these children.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents literature relevant to the study. The literature review provides evidence of asthma being an important medical condition affecting children.

The literature review also discusses previous research on this topic and it is from this information that the researcher noted that limited research has been conducted in rural and semi urban areas in South Africa to investigate schoolteachers' knowledge of asthma and asthma management.

The literature review also provided the researcher with guidance to developing the questionnaire to evaluate the primary schoolteachers' knowledge of asthma and its management.

The following topics are covered in this literature review:

- *Asthma mortality.*
- *Asthma mortality in schools*
- *Social and Ethnic Inequalities.*
- *Parent or guardian perceptions and knowledge of asthma.*
- *Experiences of the asthmatic school child.*
- *School teachers' knowledge and perceptions about asthma.*
- *Demographic characteristics and schoolteachers' knowledge on asthma.*
- *School health services and asthma.*
- *Asthma education for school personnel.*
- *School asthma policy and asthma friendly schools.*
- *Theoretical framework*

2.2 Asthma Mortality

Asthma is responsible for one in every 250 deaths globally (Singh, 2005). The GINA Dissemination Committee Report compared worldwide asthma mortality rates in the 5 to 34 year age group (Masoli *et al*., 2004). The rationale for using this age group was that asthma mortality was firmly established in that age group. According to Masoli *et al.* (2004), the false positive reporting and false negative reporting of asthma deaths was low in the 5 – 34 year age category.

Asthma mortality is highest in socially deprived societies (Ninan and Russell, 2000). China had, according to this source, the highest case fatality rate (36.7 per 100 000 asthmatics) followed by Russia (28.6 per 100 000 asthmatics), Uzbekistan (27.2 per 100 000 asthmatics) and Albania (20.8 per 100 000 asthmatics). Akinbami and Schoendorf (2002, p319) reported that in the US "the burden of asthma on the paediatric population as measured by asthma prevalence, ambulatory visits, and mortality increased dramatically during the past 2 decades".

Zar *et al.* (2001) examined the incidence of fatal and near fatal asthma amongst adults and children in an urban area of South Africa from 1980 to 1997. Asthma mortality was noted to be much higher outside the health care unit (Zar *et al.,* 2001). Zar *et al.* (2001) cited the following reasons that contribute to high asthma mortality outside the health care unit: availability and accessibility to health care, transport, emergency care services, poor asthma control at home and the poor judgement of the severity of the attack. According to Weinberg (1994), most of the asthma mortality in South Africa occurs in low socioeconomic communities.

Table 2: Asthma fatality rates worldwide (deaths/100 000 asthmatics in the 5 to 34 year age group).

China	36.7	Switzerland	7.1	Republic of Ireland	3.6
Russia	28.6	Portugal	6.9	Italy	3.6
Uzbekistan	27.2	Poland	6.6	Chile	3.5
Albania	20.8	France	6.5	England	3.2
South Africa	18.5	Thailand	6.2	Scotland	3.0
Singapore	16.1	Argentina	5.8	Estonia	3.0
Romania	14.7	Hong Kong	5.6	Wales	2.9
Mexico	14.5	USA	5.2	Austria	2.6
Malta	11.6	Germany	5.1	Ecuador	2.3
Colombia	10.1	Spain	4.9	Greece	2.1
Denmark	9.3	South Korea	4.9	Uruguay	2.1
Ukraine	8.7	Czech Republic	4.8	Sweden	2.0
Japan	8.7	Israel	4.7	Brazil	1.8
FYR Macedonia	8.2	New Zealand	4.6	Canada	1.6
Belgium	7.7	Costa Rica	3.9	Finland	1.6
Latvia	7.1	Australia	3.8	Cape Verde	0.0

Source: Masoli M, Fabian D, Holt S, & Beasely, R. (2004).

South Africa has the 5th highest asthma case fatality rate amongst the five to 34 year age group (Masoli *et al*., 2004). There are 18. 5 deaths for every 100 000 asthmatics in South Africa.

2.3 Asthma mortality in schools

There is very little literature on asthma mortality in schools. Thus this has not been a well researched topic. Grieling *et al*. (2005) conducted a study to identify asthma deaths in US schools between 1990 and 2003. The researchers collected their data through newspaper articles in the LexisNexis database and death certificates. Findings of the study include that 38 asthma deaths within the school setting were reported; 16 of the asthma deaths occurred while the asthmatic children were participating in physical activities and twelve died while waiting for medical assistance. Becker (2003) studied asthma deaths during sports in the US. In this study, 263 possible cases of asthma deaths attributable to sports were identified but only 61 met the inclusion criteria for the study. Becker (2003) also identified that most individuals who had a fatal asthma attack during a sporting activity were between the 10-14 years old age group. According to Becker (2003, p.264), "fifty-one percent (18 out of 35) of the competitive athletes had their fatal event while participating in organised sport, 14 in a practice situation and 4 deaths during a game or meeting setting. Basketball and track were the 2 most frequent activities performed at the time of the fatal event".

There is no available South African literature on asthma mortality amongst schoolchildren within the school environment. However the review of the international literature demonstrates that asthma attacks do occur in the school environment and an inappropriate or poor response from school personnel can be tragic for the asthmatic child.

2.4 Social and Ethnic Inequalities

Litonjua *et al.* (1999) investigated the relationship between race, socio-economic factors and area of residence and asthma in a Boston area cohort of families. In this study, the researchers found that in poverty stricken areas, the prevalence of asthma in children was high. The prevalence of asthma was greater in Black and Hispanic individuals as compared to Whites. A relationship has been demonstrated between race, income, asthma morbidity and mortality (Akinbami and Schoendorf, 2002). Individuals from low income homes are more likely to suffer high asthma mortality and

morbidity. Neuhart-Pritchett and Getch (2006) also identified that asthma is most prevalent in children from low socio-economic status and who have inadequate access to healthcare.

Diagnosing childhood asthma in low socioeconomic areas is usually a problem in South Africa (Weinberg, 1994). Socioeconomic barriers to healthcare cannot be isolated from cultural/linguistic barriers (2006a). Levin (2006b) argues that “Disease is closely linked to the social context in which we live. Difficulty with communication, cultural and incompatibility between patients and health care providers and socioeconomic obstacles are important barriers to quality health care”.

Schlemmer and Mash (2006) reported on a study relating to the effects of a language barrier in Hottentots Holland Hospital in the Cape Metropolitan district. The study design involved the use of focus group interviews with staff and patients. The main languages spoken by staff were Afrikaans and English while most patients were Xhosa speaking. These authors have also described language as a barrier that can easily distort sound interpretation and in most instances erroneous interpretation may have a detrimental impact on the rapport between patients and staff hence affecting access and quality of care. Language is conflicting issue in accessing appropriate quality care. This is a relevant issue in adherence and compliance to treatment. The study by Schlemmer and Mash (2006) further emphasises the impact of language as an ethnic factor that can lead to inequity in access to healthcare services, mainly due to issues surrounding the miscommunication between patients, healthcare providers and to an extent translators. These factors must be considered in the light of asthma management.

The definitions of medical terminology of patients, their caregivers and health care practitioners may differ due to culture and language. Inaccurate translation of medical terminology will have an impact on diagnosis and medical care (Levin, 2006a). Language, culture and socioeconomic status as a barriers to quality health care were demonstrated by a South African study, at the Red Cross War Memorial Children’s hospital in the Western Cape which used a questionnaire to identify the common barriers to accessing quality health care (Levin, 2006b). Fifty three Xhosa speaking parents of children at the Red Cross Children’s hospital participated in this study. The

results of the study indicated that main barriers to health care were language and culture. The patients and their caregivers/parents first language was Xhosa and it was found that only 6% of medical interviews were conducted in Xhosa. These findings are significant as it may also be applicable to spheres of medical care including access to quality asthma care. The study by Levin (2006b) also demonstrates language as a factor that can further improve inequality in health care access.

Asthma terminology also varies greatly and definition of asthma terminology of patients, their caregivers and medical practitioners differs. (Levin, 2007).

In South Africa, there is also a relationship between ethnicity and socioeconomic status and access to appropriate asthma care (Zar *et al.,* 2001). This further elaborates that asthmatic children from low socio-economic status may have limited access to health care.

Exposure to indoor air pollution has been identified as a risk factor for asthma. In disadvantaged and rural settlements, coal, wood, paraffin and gas are still utilised. Khan (2006, p30) found that "there is a strong association between exposure to domestic energy and the indicators of poverty in rural dwellings". Low socioeconomic status has also been identified as a risk factor for asthma in urban areas of Africa (Nriagu *et al.,* 1999).

2.5 Parent or guardian perceptions and knowledge of asthma

A study conducted in Pakistan on carers' knowledge of asthma and current perceptions of asthma management revealed that most carers had limited knowledge of asthma (Hazir *et al.,* 2002). Hazir *et al.* felt that *c*arers of asthmatic children should have a sound knowledge about asthma and its management to ensure good quality of life for these children. The role of the carer in an asthmatic child's life would encompass ensuring that medication is administered appropriately and controlling precipitating factors in the environment that is likely to aggravate asthma. This study showed that there were many myths amongst the carers surveyed about asthma, which included that it was a communicable disease and that an evil or bad omen was responsible for

the disease. The carers' perceptions of trigger factors of asthma included that it was caused by the consumption of rice and oily foods. The findings of this study demonstrated that carer's had poor knowledge of asthma and many misconceptions surrounding the disease. However this particular study was conducted in a hospital and the findings may not be a true reflection of the community's general perception about asthma.

According to Green *et al.* (2001), a study of asthma management and perceptions in rural South Africa revealed that 68% of the parents of asthmatic children indicated they were afraid of asthma fatality amongst their children. Only 27 parents of asthmatic children were interviewed. This was a relatively small sample for this type of study to draw inferences on the rural communities' perceptions about asthma.

A South African study of relevance when discussing parents' perceptions of asthma include the Levin (2007) study on the use of asthma terminology by Xhosa-speaking patients in South Africa and its impact on asthma-control questionnaires and questionnaire –based epidemiological studies. Although the sole focus of the study was the effects language on the impact of epidemiological studies, parents have different perceptions of asthma terminology and definitions. In his earlier study, Levin (2006b) which was the questionnaire survey on 53 Xhosa speaking parents at the Red Cross Children's hospital revealed that 69% of parents reported negative sentiments regarding communication between themselves and their doctors while 47% of parents were worried about the unhealthy impact of distorted communication on them and their children. The 2007 survey by Levin was similar to the 2006 survey in its approach to assessing the impact of language on health care but the emphasis was difference in perceptions of the respiratory/asthma terminology of 33 Xhosa parents of asthmatic children and the 8 English speaking doctors interviewed.

The results found that the Xhosa speaking parents could not provide definitions of wheeze. Wheeze was not part of the Xhosa vocabulary. There were different definitions of asthma among parents. The study revealed that most parents did not know that asthma is a precise definition of disease of the chest so they interpreted and defined chest symptoms and signs. Thus parents may not correctly be describing "true asthma". Parents used isufuba and reversed its translation to asthma/i-esma. Isufuba is

defined in Xhosa language as chest, difficulty in breathing or used as a non specific name for any chest disease (Levin, 2007).

The use of medical terminology on parent's perceptions about asthma cannot be underestimated. Thus more studies are required in relation to understanding the larger communities (caregivers and guardians of asthmatic children) general perceptions and knowledge of asthma for health education needs.

2.6 Experiences of the asthmatic school child

Asthmatic schoolchildren are prone to psychosocial problems such as low self-esteem, demotivation to participate in physical and other social activities (Hamm, 2004). Similar to what has been stated above, an earlier study by Carruthers (1996) also found that asthmatic schoolchildren may feel embarrassed and self conscious about using their inhaler pumps in the school setting. This situation could be detrimental to the asthmatic school child who may then avoid taking the asthmatic medication as necessary.

Shohat *et al.* (2004) conducted a study in Israel to determine how asthma affected school absenteeism, participation of asthmatic schoolchildren in school activities and attitudes of school personnel towards these children. The researchers used the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire for this study. Shohat *et al.* added questions to the questionnaire about current diagnosis of asthma, absenteeism, participation in school activities and involvement of the school nurse and personnel in assisting them with the disease at school. A total of 10057 asthmatic schoolchildren between 13-14 years of age from 114 schools were included in this study. They reported higher school absenteeism (73.1%) than non asthmatic schoolchildren (56.9%). More than a third (38.2%) of the asthmatic schoolchildren in this study reported that their condition was not reported to anyone at school while only 44.3% of the asthmatic schoolchildren reported that the school nurse was aware of their condition. A small proportion of asthmatic schoolchildren (13.8 %) reported having discussions with the school nurse about their condition.

Various researchers have shown substantial evidence about the association between high rates of school absenteeism and asthma (Green, Davis and Price, 2008; Hamm, 2004; Harris, 2002; Jeena *et al.*, 2004 and Rodenhorst, 2003). Asthmatic schoolchildren also reported participating much less in school physical and social activities as compared to non-asthmatic schoolchildren (Shohat *et al*., 2004).

Schools might tend to be overprotective of asthmatic schoolchildren by curtailing their participation in physical and social activities (Carruthers, 1996). This results in asthmatic children feeling secluded (Rodenhorst, 2003).

Therefore schoolteachers' knowledge and perceptions about asthma and the treatment would provide insight into asthma related practices within schools.

2.7 School teachers' knowledge and perceptions about asthma

Several studies have been conducted to determine what schoolteachers understand about asthma and asthma management. Most of these studies have been conducted in North America, Europe and Asia.

Bevis and Taylor (1990) conducted a study to assess the knowledge of asthma amongst primary schoolteachers' in the Paddington area of London. Only 98 schoolteachers of a total of 122 completed the questionnaire used to assess the schoolteachers' knowledge of asthma. These researchers noted that 33% of the primary schoolteachers' knew that asthma medication can be taken prior to physical education to help prevent an asthma attack. Ninety-five percent of primary school teachers felt they had inadequate knowledge to assist the asthmatic school child. Results of the study showed that teachers had limited knowledge about asthma and its management. However this study used a small sample size compared to similar studies.

Studies by Brook (1990) in an asthma knowledge questionnaire survey of 69 high schoolteachers in Holon, Israel and Madsen, Storm and Johansen (1992) amongst schoolteachers in 13 primary schools in Randers (Denmark) found that 87% and 94% of schoolteachers, respectively, wanted more information on asthma to improve their confidence in assisting asthmatic children.

Researchers found schoolteachers knowledge regarding asthma medication to be deficient in studies conducted in Perth, Australia (French and Caroll, 1997), Dublin, Ireland (Hussey *et al.,* 1999), South Auckland, New Zealand (Seto, Wong and Mitchell, 1992) and Hong Kong (Tse and Yu, 2002). In the study conducted in New Zealand, 52% of teachers from 42 primary schools believed that repeated use of asthma

medication leads to a reduction in the efficacy of the medication (Seto, Wong and Mitchell, 1992).

The study involving primary schoolteachers in 13 primary schools in Perth, Western Australia, which adapted the asthma questionnaire from that used by Bevis and Taylor (1990), found that, in the asthma medication section of the questionnaire, there was a high response of the "don't know" option (French and Caroll, 1997). A significant number of teachers did not know that weather could provoke an asthma attack. Various other researchers have shown that most teachers' knowledge of asthma trigger factors is deficient (Latif, 2004 and Ones *et al.,* 2006).

In a national asthma knowledge survey in Hong Kong, only 41.4% of the primary schoolteachers' were able to identify that blue discoloration of the lips was associated with a severe asthma attack and some of these teachers in this study had a misconception that asthmatic learners were not competent academically and in physical activities as well (Tse and Yu, 2002). Teachers in Hong Kong were unaware that emotions could provoke an asthma attack and anti-asthma medication taken prior to sports could prevent an asthma attack. These findings are similar to those from a study of asthma knowledge conducted in 790 primary schoolteachers randomly selected from 73 primary schools in Instanbul, Turkey by Ones *et al.* (2006). Only 56% of teachers in this study identified exercise as a provoking factor for asthma while 48% identified aspirin as a common trigger of asthma attacks. Very few Turkish teachers (19.7%) responded correctly to emotions being a trigger factor of asthma attacks, similarly to those in the Hong Kong study.

Due to the high prevalence of asthma in Malaysian children and the lack of permanent full time school nurses, Bahari and Rahman (2003) undertook a survey among primary schoolteachers in the district of Kota Bharu, to determine their knowledge of asthma and its management. The schoolteachers' knowledge of the effects of smoking and weather conditions on asthma was also poor (Bahari and Rahman, 2003). Similarly to the French and Caroll (1997) study, Bahari and Rahman (2003), found that there was a high response of the "don't know" option in the asthma medication section of the survey. Only 62.5% of the Malaysian primary schoolteachers' identified that salbutamol inhaler assists in the opening of the airways during asthma attacks.

Another asthma knowledge survey in Asia, using a self administered questionnaire among schoolteachers from a random sample of 49 schools in the Kingdom of Bahrain, revealed that Bahraini schoolteachers' knowledge of asthma was limited (Latif, 2004). Teachers scored between 5.16 and 2.185 out of a possible score of 10.

While these studies focused on schoolteachers in urban and suburban settings, Rodenhorst (2003) conducted a questionnaire study of rural elementary schoolteachers' knowledge of asthma and its management. Rodenhorst's study focused on the relationships among selected situational variables such as knowledge, social support, self efficacy, attitude and the schoolteachers' intent to manage the asthmatic school child when the need arises. Most teachers' scores for knowledge on asthma and its management were between 50%-59%. As with other studies, schoolteachers' knowledge on asthma medication and prevention of asthma attacks was poor. Rodenhorst focused on the theory of planned behaviour as a conceptual framework to predicting schoolteachers' intent to manage asthmatic schoolchildren with asthma symptoms in the classroom. In her conceptual framework, she examined attitude, subjective norm and perceived behavioural control. Attitude in this study focused on beliefs and knowledge, subjective norm focused on social support (support from family, friends and co-workers) and perceived behavioural control encompassed confidence and self-efficacy. The measurement tool in the Rodenhorst's study focused very little on specific information about teachers' knowledge of asthma.

Only one unpublished study has been conducted in South Africa by Khan (2006) for the Centre for Health and Environmental Health. This study looked at teachers' knowledge of asthma and its management in 6 primary schools in the disadvantaged south and west subdistricts of the Ethekwini Municipality. The findings of the study revealed that teachers' knowledge on asthma and its management was deficient. This was a relatively small study in which only 6 primary schools were surveyed and only 115 primary schoolteachers participated. The questionnaire used in this study only allowed for a "yes" and "no" option. An "unsure" option is important in a knowledge questionnaire as it circumvents guessing. This study also did not investigate if schools had their own asthma policies in place.

The difference between knowledge on chronic asthma management and management of an acute exacerbation was explored in very few of the previous studies. Bell *et al.*

(2000) found that Irish teachers had poor knowledge on both preventative and reliever medication. Bell *et al.* (2000) therefore stated that this limitation in knowledge may hinder teachers' actions when assisting a child during an acute severe asthma attack. The difference in teachers' knowledge between preventative and reliever medication was noticeable with only 7% being able to correctly identify two preventative medication and 42.9% being able to correctly identify one or more reliever medication. Tse and Yu (2003) found no difference between Hong Kong teachers' knowledge on chronic asthma management and management of an acute exacerbation.

2.8 Demographic characteristics and asthma knowledge.

Brook (1990) found that variables such as age, gender, academic qualifications, the number of children at home and asthma within the family was related to schoolteachers' knowledge of asthma ($p<0.01$). Biology teachers in the Holon study (Brook, 1990) had more knowledge of asthma than other teachers. This study was conducted in only 69 schoolteachers and the finding of this relatively small sample makes it difficult to draw inferences.

However Tse and Yu (2002) also found these demographic variables influenced schoolteacher's knowledge of asthma. Most importantly, in the Hong Kong study there was a significant relationship between asthma knowledge and teaching experience (Tse and Yu, 2003). This is in contrast with the earlier Bevis and Taylor (1990) study, which found that there was no significant relationship between teachers' knowledge of asthma and teachers teaching experience. The sample size in the Bevis and Taylor (1990) study was only 98 schoolteachers.

Ones *et al.* (2006) found that there was no significant relationship between the variables of age, academic qualifications, teaching experience and location of primary school in Turkey. However, they did find that female teachers were better informed than male teachers ($p=0.003$).

2.9 School health services and asthma

The ability of schools to provide for health needs of schoolchildren is an important public health issue (Hillemeier, Gusie and Yu Bai, 2006). In a study by Seto, Wong and Mitchell (1992), of the 42 primary schools surveyed in South Auckland, New Zealand, only 13% had nebulisers.

The World Health Organization developed a framework for the Health Promoting School Initiative (WHO, 2006). Education is a key essential to ensuring that schools reach their health promoting status. The six important guidelines formulated by WHO in 1995 to assist schools in promoting health include "1) school health policies, 2) the physical environment of the school, 3) the social environment of the school, 4) school/community relationships, 5) the development of personal health skills and 6) school health services" (WHO, 2006, p15). These guidelines can assist schools in effectively assisting in the management of asthmatic children.

Connor (1997) states that the school health services are not adequately utilized. Brook (1990) emphasises the need for effective communication between schoolteachers and school health personnel (nurses and physicians). School nurses have an important role to play in ensuring that school personnel receive instruction on how to assist asthmatic schoolchildren (Neuharth –Pritchett and Getch (2001).

The establishment of school health services can be achieved through a partnership between the relevant health authorities and Department of Education (Tse and Yu, 2002). There is a need for partnerships between schoolteachers' and the school health services supplemented by asthma education programs to ensure in more effective management of asthmatic schoolchildren (Ones *et al.,* 2006).

Hillemeier, Gusie and Yu Bai (2006) conducted a study on a stratified random sample of school nurses from Pennsylvania school districts to determine if school health services were meeting the needs of rural and urban asthmatic schoolchildren with regards to the availability of asthma equipment, emergency plans for severe asthma attacks, strategies for the identification of asthmatic children, storage, access of anti-

asthma medication at school and support services for asthmatic schoolchildren. The sample comprised of 365 nurses from rural schools and 392 nurses from urban schools. This study aimed to determine asthma policies and practices in rural and urban settings and to correlate them with the National Heart, Lung and Blood Institute recommendations current at that time. Nurses identified many problems in asthma management at schools. Few schools had support services for asthmatic children and their families. Lack of time was considered as a barrier to asthma management in schools and schools did not have asthma policies in place. Nurses in both urban and rural schools reported that school personnel lacked knowledge of emergency asthma management. There were no formal strategies for the identification of asthmatic schoolchildren. These authors recommended that there was a paramount need for school health services to improve in order to meet the requirements of asthmatic schoolchildren in both rural and urban areas.

There is no literature on asthma and school health services in South Africa. In the South African context, school health services prioritise nutritional problems and infectious diseases which are evident in the National School Health Policy (NDOH, 2003).

2.10 Asthma education for school personnel

There have been intervention studies to assist schoolteachers to improve their understanding of asthma and its management. Asthma education programs have not been limited to schoolteachers but also targeted at the school health nurses as well (Anderton and Broady, 1999).

Surveys in London (Bevis and Taylor, 1990) and Hong Kong (Tse and Yu) have shown that schoolteachers have reported limited or no training in asthma. Asthma intervention studies in Northern Ireland (Bell *et al*., 2000) and New Mexico (Sapien *et al*., 2004) have shown that training improves knowledge of asthma amongst teachers. In the asthma intervention study by Bell *et al* (2000) in Northern Ireland, 52 primary schools participated in part one of the study. In part one of the study, the self administered Newcastle Asthma Knowledge Questionnaire (NAKQ) was used to assess the primary

schoolteachers' knowledge of asthma and its management. In the second part of the study, a new set of primary schools were matched according to the number of teachers, schoolchildren and geographical location. The schools were then randomly assigned to either a control or intervention group. There were five schools in the control group and five schools in the intervention group. Schools that were randomly assigned to the control group received no asthma education training for its teachers. The intervention group and control group for this part of the study also filled out the NAKQ. The intervention group in this study then received asthma education training from a trained asthma educator associated with the National (UK) Asthma and Respiratory Training Centre. The investigators visited both the intervention and control groups four weeks later. Both the intervention and control groups were asked to fill out the NAKQ again. In part one of the study, Bell *et al.* found that the primary schoolteachers' knowledge of asthma trigger factors and medication was limited. Few teachers (14%) knew that chest infections could provoke asthma. The same authors also found that the intervention groups' knowledge prior to training was also limited in respect of asthma trigger factors, exercise induced asthma and asthma medication but improved post training.

The asthma education intervention study by Sapien *et al.* (2004) in New Mexico focused on teaching schoolteachers from elementary public schools to recognise respiratory distress in asthmatic schoolchildren. Prior to the education session, teachers' knowledge of asthma and asthma distress symptoms were evaluated by a questionnaire. A one-hour asthma education in-service, based on National Institute of Health (NIH) Asthma Guidelines, was delivered by a trained asthma educator to teachers at six primary schools. The asthma education programme intervention in New Mexico focused on the pathophysiology of asthma, trigger factors, asthma distress symptoms and asthma management. The study found that post intervention scores for the teachers were much higher compared to pre-intervention. The schoolteachers' ability to recognise respiratory distress in asthmatic schoolchildren improved through the video sessions in the training.

Similar findings were reported in a school asthma project that was developed by the Mancunian Community Health NHS Trust and the Manchester Educational Authority which focused on training school health nurses in asthma management (Anderton and Broady, 1999).

The Minnesota Department of Health in the USA developed a strategic plan for addressing asthma in that state (Keyser *et al.,* 2006). The focus of the strategic plan was to address asthma management in schools. Due to a previous study of school nurses' knowledge of asthma in 2003, a joint advisory group was formed by the Minnesota Department of Health and the Minnesota Department of Education to develop an asthma training manual for schools. The training manual was piloted before it was used for statewide training for Minnesota school personnel. The training was delivered to school personnel in the form of PowerPoint presentations, videos and group discussions. Prior to the asthma training, school personnel's knowledge of asthma was tested. Post training scores on asthma knowledge were significantly higher (pretest =66.8 +/- 11.8% correct; posttest=84.1+/- 9.6% correct, $p<0.0001$). This study concluded that collaboration between various stakeholders such as the Departments of Education and Health in the development of an asthma training manual for schools can significantly improve school personnel's asthma knowledge.

Harris (2002), a school nurse and mother to an asthmatic child, also identified that asthmatic schoolchildren and school personnel often lack adequate knowledge of the disease. As a result, the concept of the "Airtopia" program was designed to assist asthmatic learners to manage their asthma properly and to educate school personnel on asthma and its management. This well structured program for school personnel included education on the disease, allergies, exercise induced asthma and their role in assisting in the management of the affected learners. Similar to the findings by Anderton and Broady (1999), Harris (2000) found that after the education intervention, schools teachers reported feeling more empowered to deal with asthma in the school setting.

Asthma education programs can assist teachers', school nurses' and learners' to better understand that asthma is a disease that can be controlled (Anderton and Broady, 1999; Harris, 2000, Keyser *et a*l., 2006).

2.11 School asthma policy and asthma friendly schools

National policy for asthma management is important for schools (Henry, Lough and Mellis, 2006). Asthma policies can guide asthma management in schools and clearly indicate roles and responsibilities of all stakeholders (Connor, 1997).

A study by MacLehose *et al.* (2001) on 135 primary schools in South Essex, United Kingdom, reported that only 18.6% of the schools surveyed had a school asthma policy. Hillemeier, Gusie and Yu Bai (2006) also found in that most schools in Pennsylvania, USA, had no asthma polices in place.

Anderton and Broady (1999) reported success in the school asthma project that was developed by the Mancunian Community Health NHS Trust and the Manchester Educational Authority, which focused on assisting schools in ensuring effective asthma care for asthmatic schoolchildren by training school nurses' and school teachers' on asthma management. Fifty three school nurses and 159 schools participated in the study. The project was aimed at assisting schools in ensuring effective asthma care for asthmatic schoolchildren and in the development of school asthma policies. This study also focused on motivating schools to have proper asthma guidelines in place. Trained paediatric asthma nurse specialists assisted the Trust in designing two questionnaires to assess school nurses and schoolteachers knowledge of asthma. The school nurses first completed a pretest questionnaire and then received asthma education training. Following the training, school nurses completed a post-training questionnaire. School nurses' knowledge of asthma post-training was much higher (75.8%) compared to pre-training (67.5%). The trained school nurses then chose schools they were responsible for to deliver asthma education training. School personnel also filled out pre-training questionnaires on the knowledge of asthma and its management. School personnel's knowledge of asthma and its management post training was not assessed but the schools' approach to managing asthma was assessed after 6 months. Teachers who received asthma education training from school nurses were more proactive regarding asthma and started instituting asthma policies in their setting. This study achieved its purpose of motivating schools to have proper asthma guidelines in place in order to promote asthma friendly schools through the use of asthma education interventions. This study also proved that if school personnel are educated about a chronic disease such as asthma, they will better understand the impact of the disease and the need to

have guidelines to assist affected children in the school setting, demonstrating a clear link between information (knowledge) and motivation, and finally behaviour change.

Other studies have shown similar findings with asthma education interventions (Bell *et al.,* 2000 and Sapien *et al.,* 2004). Henry, Lough and Mellis (2006) describe the following guidelines in a position paper for developing an Asthma Friendly School: there should be thorough record keeping of every asthmatic child, a first aid kit, accessibility and availability of asthma medication and delivery devices and asthma education for school personnel.

2.12 Theoretical framework

According to Glanz and Rimer (2005, p4), a "theory presents a systematic way of understanding events or situations. It is a set of concepts, definitions, and propositions that explain or predict these events or situations by illustrating the relationships between these variables".

The Information Motivation Behavioural Skills Theory (IMB) has emerged as an important tool for health promotion purposes (Munro *et al,* 2007). According to Munro *et al.* (2007), the Information Behavioural Skills Theory was originally developed to encourage the use of contraception and hence avert the spread of HIV. In HIV/AIDS health promotion and prevention, the IMB theory assumes that information and motivation can influence HIV/AIDS preventative behaviour (Hawa, Munro and Doherty-Poirier, 1998).

The Information Motivation Behaviour Skills Theory was developed by Fisher and Fisher (1992). The IMB constitutes the following: health related information, motivation and behavioural skills (Fisher, Fisher and Harman 2003). According to Fisher and Fisher (1992), "information" is a very important component of this theory. Information relates to knowledge which is important for behaviour change. Motivation relates to the individuals' insight into the condition, management, behaviour and social support (Fisher, Fisher and Harman, 2003). Behavioural Skills encompasses the skills required to improve self efficacy and ultimately lead to behaviour change (Fisher and Fisher

1992). The IMB theory thus posits the development of a highly informed individual, equipped with the necessary skills and both high personal and social motivation to act to bring about desired health behaviour.

According to the IMB theory, the constructs of information and motivation influence behavioural skills to support desired health behaviour (Misovich, Fisher, Martinez and Bryan *et al*., 2003). In a study by Misovich *et al.* (2003), the IMB model predicted that although breast self-examination required a high level of behavioural skills, motivation would have a profound effect on behaviour. A woman who was extremely motivated was more likely to show sincere interest about breast health and take action such as having a mammogram.

In a study by Amico, Toro-Alfonso and Fisher (2005), the IMB theory was used to show that there was a relationship between the components of adherence-related information on antiretroviral therapy (ART), motivation and adherence-related behavioural skills on adherence behaviour. The researchers found that those patients who had good knowledge (information) on ART adherence, strong motivation (social support), and adequate behavioural skills, had most favourable adherence.

Osborn and Egede (2009) investigated the use of the IMB theory in self-management of diabetes on diabetic outpatients. This study focused on patients' diabetes knowledge (information), diabetes fatalism (personal motivation), social support (social motivation) and diabetes self management (behaviour).The results of the study revealed significant relationships between diabetes knowledge ($r = 0, 22$, $p<0.05$), fewer fatalistic attitudes ($r = -0.20$, $p<0.05$) and good social support ($r = 0, 27$, $p<0.05$) in relation to diabetes self management. The results of this study underpinned the assumptions of the IMB theory that having more knowledge (information), motivation (good attitudes towards the behaviour), social motivation and behavioural skills results in favourable behaviour.

The IMB is applicable to the current study. In the current study, the elements of the IMB used are the following, as depicted in Figure 1: information (knowledge of asthma and asthma management), motivation (positive personal perceptions about managing asthmatic children), the support of the environment in terms of asthma policy, resources (assessment and asthma medication-delivery tools, visits by school health nurse) and behavioural skills (previous asthma training, skills on how to use asthma

metered dose inhalers) and self efficacy (confidence with assisting a child during an asthma attack).

The IMB theory, when applied to health promotion interventions, encourages a baseline or situational analysis of information, motivation and behavioural skills by conducting surveys (Fisher and Fisher, 2003 & Harman, 2008).

In this study, it was assumed that the levels of information, motivation and behavioural skills are essential determinants of schoolteachers' asthma related practices towards asthmatic schoolchildren

This study thus set out to establish a baseline of the information, motivation and behavioural skills of primary schoolteachers in Umdoni subdistrict.

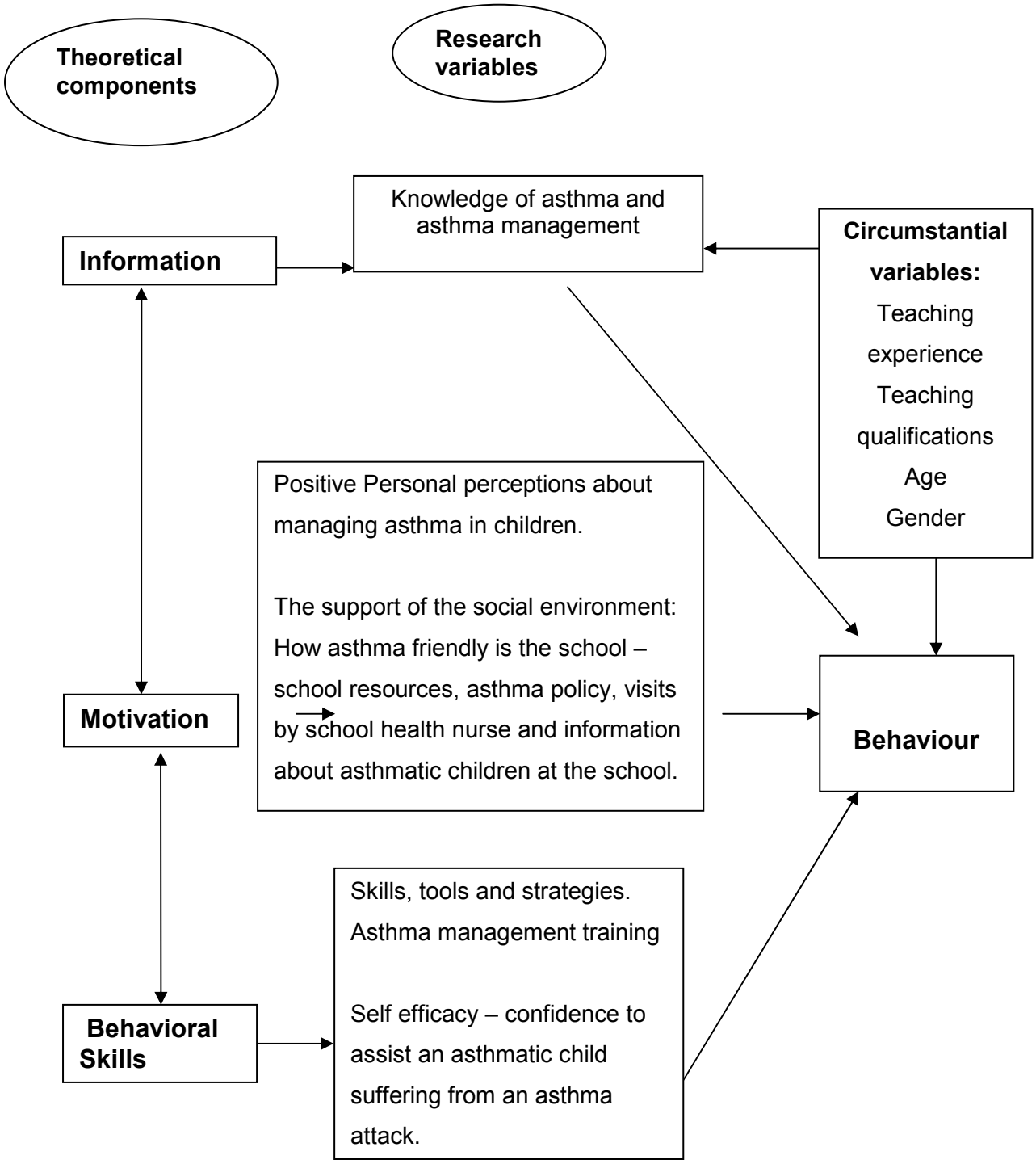


Figure 1: A proposed theoretical perspective predicting the variables that can influence a teachers' behaviour towards managing asthmatic children within the school environment (adapted from Theory of Information Motivation Behavioural Skills).

2.13 Conclusion

It is clearly evident from this literature review that knowledge of asthma and its management is deficient amongst schoolteachers. However this has been ascertained from more international studies than national studies. There is a paucity of literature on schoolteachers' knowledge of asthma and its management in South Africa. The methods used in this study will be discussed in the following chapter.

CHAPTER THREE: RESEARCH METHODS

3.1 Introduction

This study examined the management of asthma in primary schools and schoolteachers' knowledge and confidence in managing asthmatic schoolchildren.

Chapter three describes the research methods employed, including the definition of terms relating to the study, type of research, study design, the study setting, research population, the sampling design, sample size, exclusion and inclusion criteria, pilot study, data collection, measures to reduce bias and data analysis.

3.1.1 Definition of terms

Asthma is defined as "a disease characterised by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. In an individual, they may occur from hour to hour and day to day. This condition is due to inflammation of the air passages in the lungs and affects the sensitivity of the nerve endings in the airways so they become easily irritated. In an attack, the lining of the passages swell causing the airways to narrow and reducing the flow of air in and out of the lungs" (WHO, 2009).

In this study, a child will be considered asthmatic if his or her diagnosis has been reported to the teacher.

In this study, both international and national definitions of urban and rural were obtained. The United Nations (undated) defined urban areas as localities that have a population of 2000 or more persons and rural areas as localities with a sparse population or population of less than 2000. The Rural Health Strategy for South Africa (RUDASA, 2006, p5) defines urban areas as "a local municipality that includes a city or large town and has mostly piped water and flush sanitation, and a wide choice of services". Close rural is defined in the same document as "local municipality that has

small towns, >50 percent of people live within 5km of tarred road, most have piped water but a limited choice of services within local municipality". Deep rural area is defined as "local municipality that has small town and/or old resettlement areas, >50 percent of people live more than 5km from a tarred road, >25 percent of people use water from streams, rivers, dams or rainwater tanks and people have a very limited choice of services within that municipality".

Ugu district is designated as rural according to the Integrated Rural Development Strategy (IRDS) Node but Umdoni subdistrict is suburban.[2]

Currently no standardised National Department of Health definitions exist for the terms "rural" and "urban". The most acceptable definitions used are those developed by the Rural Doctors Association of South Africa (RUDASA) and cited above.

3.2 Type of research

This study constituted epidemiological research**.**

3.3 Study design

An observational descriptive cross sectional study design was used.

3.4 Study location

3.4.1 Background of Ugu District

Ugu district is located in southern KwaZulu-Natal. The Ugu district is made up of six municipalities: Umiziwabantu, Ezinquoleni, Umzumbe, Umdoni, Hibiscus Coast and Vulamehlo. Only 16% of Ugu's population is located in the urban coastal strip while 84% of the population resides in rural areas.

[2] Personal communication: Mrs S Govender, Deputy District Manager, Ugu District (June 21, 2009)

The ethnic composition of the district is 89% African, 1% Coloured, 3% Indian and 5% White.

Administratively, the Ugu district is divided into Ugu North and Ugu South. Ugu North is made up of the following municipalities: Umzumbe, Umdoni and Vulamehlo. Umzumbe and Vulamehlo represent deep rural nodes.[3]

For this study, Umdoni subdistrict was chosen. Umdoni is situated in Ugu North on the KwaZulu-Natal South Coast. Umdoni subdistrict is surrounded by Umzumbe subdistrict on the south and Vulamehlo subdistrict on the west. Parts of Umdoni include poor communities with low socio-economic status and poor access to basic services. Umdoni has a total population of 56 042 and is made up of the coastal urban centres of Pennington, Scottburgh, Umzinto North, Mtwalume, Sezela, Bazely and Ifafa. The inland towns are Umzinto North, Shayamoya and Esperanza. The traditional authorities of Tete, Zamke and Emalangeni and commercial farmlands make up the rural areas. Umdoni is thus a mixture of urban and rural settlements**.**

3.5 Study population

3.5.1 Selection of study population group

The population of interest was primary schoolteachers in Umdoni. Umdoni was chosen for this study because it is typical of a South African sub-district, presenting a typical mix of urban and rural settings.

The study frame was constructed from a registry of all primary schools in Umdoni, provided by the Department of Education, Port Shepstone office. The registry showed that there were 25 primary schools in Umdoni at that time. Thereafter, the number of primary schoolteachers in the Umdoni area was obtained by contacting all the school principals of the 25 listed primary schools. A total of 389 primary schoolteachers was identified in this manner, which was considered to be more accurate than the figures

[3] Personal communication: Mrs S Govender, Deputy District Manager, Ugu District (June 21, 2009)

obtainable from the Department of Education's Information Office in the Ugu District. The average number of teachers in each school was 10.

3.5.2 Sample size

Although an opinion was obtained from Mrs Tonya Estherhuizen, biostatistician from University of KwaZulu Natal to the effect that statistical significance and power was not critical to this purely descriptive research, a sample size determination was performed using RightSize version 2.0.0.0.2 (2002).

The following assumptions were used to calculate the sample size:

- 50% of teachers were expected to have limited knowledge of asthma (i.e. a score below 50% in the knowledge section of the survey).
- A 10% level of precision was sufficient.

Based on these assumptions, the sample size of 19 clusters (schools) and a total of 190 responses were determined. The design effect was estimated at 3.6.[4]

Calculating the sample size using the formula for precision is more valid when trying to estimate a parameter in a population from a sample.

As a result, 20 primary schools were randomly selected for the study and the targeted sample size was 190 primary schoolteachers.

[4] A design effect of 3.6 is large (as compared to 1 which means no intracluster correlation of knowledge) since it is logical to assume that teachers within a particular school are more similar to each other than those from different schools with regard to their asthma knowledge. Since no other studies similar to this have published design effects it is prudent to estimate a large design effect, as it is better to have results on the conservative side rather than results that overestimate the outcomes.

3.5.3 Inclusion and Exclusion criteria

Inclusion criteria:

- All primary schoolteachers in the study area.
- Male and female teachers

Exclusion criteria:

- Student teachers placed at schools for practical training**.**

3.6 Data Sources

3.6.1 Measurement instruments and data collection techniques.

A questionnaire was developed by the researcher, based on previous examples from the literature (French and Caroll, 1997; Hussey *et al.,* 1999; Seto, Wong and Mitchell, 1992; MacLehose *et al.,* 2001 and Tse and Yu, 2002). Advice was obtained from Professor Prakash Jeena, a paediatric asthma specialist at the Nelson R Mandela School of Medicine, University of KwaZulu-Natal. Professor Jeena provided expertise on type of questions that should included in the questionnaire, especially the knowledge of asthma management, medication, identifying signs and symptoms of a severe acute asthma attack and the use of a metered dose inhaler. The questionnaire was developed to determine primary schoolteachers' knowledge of asthma and its management. It was determined prior to the data collection and analysis that limited knowledge would be quantified by the number/percentage of correct responses to the knowledge section of the questionnaire. A score of less than 50% correct answers to these questions would be defined as limited knowledge. The correct answers were decided on the basis of available evidence from the literature. Each correct response would be rated as one point; absence of knowledge (unsure option) as zero, and a wrong answer as zero.

The following categories of information were requested in the asthma knowledge questionnaire (see Appendix F):

- Section A: Personal Details
- Section B: Understanding of Asthma.
- Section C: Education Background and Training in Asthma Care.
- Section D: Asthma management in the school.
- Section E: Coping with children who have asthma.
- Section F: General knowledge of asthma.
- Section G: Recognition of signs and symptoms of a severe acute asthma attack.
- Section H: Identifying factors that exacerbate asthma in children.
- Section I: Knowledge on asthma medication and management.
- Section J: Knowledge on how to use a metered dose inhaler (PUMP).
- Section K: Asthma and Sports.
- Section L: Personal perceptions about handling asthmatic children.

3.6.2 The application of the IMB theory to the questionnaire

Information

A total of 55 questions were developed to determine teachers' knowledge of asthma. The questions were directed at determining teachers' level of relevant asthma specific information (general knowledge and management of asthma). Questions assessed if teachers had the information to enact a positive behaviour towards asthmatic children. Questions on the correct metered dose inhaler technique and the signs and symptoms of a severe acute asthma attack were included to assess teachers' knowledge of asthma. This includes information on asthma management, which is critical in asthma emergencies.

Motivation

Teachers' motivation to care for and assist asthmatic children was explored in terms of questioning them on their personal perceptions towards managing asthmatic children (their personal perception of their own asthma knowledge, concerns for asthmatic

children, their preferred plan of action for uncontrolled asthma in children and their rating on the need for in-service training asthma).The support within the school environment was assessed through questions on the school health nurse visits and resources (asthma policy, assessment and medication-delivery tools).

Behavioural Intention and Skills

Teachers' self-efficacy was assessed through a question on their confidence to assist an asthmatic child during an asthma attack. In the questionnaire, perceived behavioural skills was assessed through grading of principal concerns when dealing with asthmatic children such as administering asthma treatment, coping with an emergency and disruption to other pupils. Items in the questionnaire also include previous training in asthma management and skills on the use of a metered dose inhaler.

3.6.3 Use of the true and false scale with an unsure option

The questionnaire comprised of a true and false scale with an "unsure" option. This was done to circumvent guessing and make analysis of knowledge more valid. The unsure response is also universally accepted as lack of knowledge. An "unsure" option will also eliminate missing data as respondents are not pressurised to choose between two binary variables (e.g. yes/no or true/false) or options in multiple choice they do not agree with. The True-False with "unsure option" formats in this study will be analysed as follows: correct answers denoted presence of knowledge, incorrect answers denoted misconceptions and "unsure" denoted absence of knowledge.

3.6.4 Reliability of the measurement instrument.

The content of the asthma knowledge questionnaire was checked by a paediatrician, a clinical psychologist and a pharmacist. The construct of the questionnaire was also discussed with a biostatistician.

In addition, the questionnaire was piloted to test reliability (see 3.8 below). The Mobile Researcher mobile application channel has been successfully used by the Medical Research Council to conduct surveys (www.clyral.com, 2009).

3.6.5. Fielding the questionnaire

The questionnaire was fielded using the Mobile Researcher mobile application channel, provided by Clyral. The survey instrument was submitted to Clyral, for uploading to a web-based system. This allowed the instrument to be created as an electronic survey, which could be transmitted wirelessly to a series of cellular telephones. Mobile Researcher allowed the input of free text, multiple choice questions, numeric questions, date questions, time questions, required and optional questions.

3.6.6 Training of data collectors

Two fieldworkers were trained by the researcher on the contents of the questionnaire, the inclusion and exclusion criteria, the use of the consent form and ethical issues involved in obtaining informed consent.

The principal researcher and fieldworkers received one days' training (27 January 2010) on the use of the Mobile Researcher interface from a Clyral consultant. Training was provided on the use and care of the cellular telephone, care of the phone, the Mobile Researcher software and accessing the survey on the telephone. Training was conducted at the Department of Therapeutics and Medicines Management, Nelson R Mandela School of Medicine. Training occurred in a formal systematic manner to ensure that the fieldworkers had the basic skills required for the purposes of the research.

3.7 Measures taken to reduce bias

3.7.1 Selection Bias

All primary schools were included to be randomly selected to participate in the study**.**

3.7.2 Information Bias

The fieldworkers underwent intensive training on the contents of the survey and on the use of the mobile technology.

3.7.3 External Validity

This study is likely to have fair generalisability to primary schoolteachers from areas similar to Umdoni subdistrict, KwaZulu-Natal.

3.8 Pilot Study

The pilot study was conducted to ensure face validity and improve the contents of the questionnaire. The pilot study was conducted prior to the main study at one primary school in Umdoni, which was not included for the final study. This also allowed for an assessment of the fieldworkers' skill in using the Mobile Researcher mobile application channel to conduct the survey.

The primary schoolteachers at the pilot site were given information leaflets and provided individual written informed consent. Six primary school teachers agreed to participate in the pilot study. The average time taken for each teacher to respond to the survey, as administered by the researcher or fieldworker, was 9 minutes. The completed responses to the survey were then uploaded to the web-based "Research Centre", where responses could be viewed by the researcher.

Information obtained from the pilot test was used to determine the user friendliness of the contents of the questionnaire and determined the time for completion of the

questionnaire through the use of Mobile Researcher. The pilot study also identified problems the fieldworkers and researcher had in using this technology. These problems included opening the survey document in the software and navigating through the web-based survey. These problems were remedied prior to the fielding of the questionnaire in the randomly selected schools.

3.9 Data Collection

3.9.1 Preparation and Administration

All 20 primary schools that were randomly selected to participate in the study were visited. The school principals were given copies of the letter of permission to conduct the study issued by the Department of Education, KwaZulu Natal, and copies of the ethics approval letter from the Biomedical Research Ethics Committee of the University of KwaZulu-Natal. A date was fixed on which the researcher and/or fieldworkers could visit each school.

The Mobile Researcher mobile application channel was installed on three cellular telephones that were issued to two field workers and the researcher. The technology chosen allowed the survey to be conducted even without network coverage. This was important because network reception was poor in remote areas of Umdoni.

Information and written informed consent documents were issued to the participating primary school teachers on the day of the survey. The venue of the survey was the school itself.

A face-to-face approach was used to collect data once signed informed consent was obtained from participants. The completed surveys were uploaded using general packet radio service (GPRS) to the web-based “Research Centre”. In areas with poor network reception, the completed surveys were stored on the fieldworkers’ and researcher’s cellular telephones. Once network reception was found, these stored surveys were uploaded to the web-based “Research Centre”, where responses could be viewed by the researcher. The data uploaded was then exported as a Microsoft Excel spreadsheet, after data cleaning

3.9.2 Data Handling

Clyral, the service provider responsible for Mobile Researcher, took responsibility for maintenance of the web-based “Research Centre”, which included data backups, disaster recovery and security. Data was exported to a Microsoft Excel spreadsheet, cleaned and then imported into SPSS 15.10. (SPSS Inc., Chicago, Illinois, United States of America) for analysis.

3. 10 Data analysis

Descriptive statistical analysis was conducted to express the independent variables as frequencies and percentages. Data were analysed according to the hypotheses, aims and objectives of the study; the researcher investigated the relationship between the independent variables (age, gender, teaching experience, previous asthma education, teachers’ confidence in managing asthmatic children) and the dependent variable (asthma knowledge).

Analyses were done on the full sample population. Chi-square tests were conducted to explore the data.

Correlation analysis was conducted to determine the association between the primary schoolteachers’ knowledge of asthma and the following items: age, qualification of teachers. Cross tabulation was conducted to determine the association between the primary schoolteachers’ knowledge of asthma and the following items: gender and years of teaching experience.

3.11 Ethical and financial considerations

The research protocol for this study was approved by the Post-Graduate Education Committee (Appendix A) and the Biomedical Research Ethics Committee of the University of KwaZulu-Natal (Appendix B).

The Department of Education, KwaZulu-Natal, granted permission to conduct this research in schools from the Umdoni sub-district (Appendix C).

Permission was also obtained from each of the school principals to conduct the study at their schools (Appendix D).

All participants were provided with information and informed consent documents (Appendix E). Individual informed consent was obtained from each participating schoolteacher. Participants were informed of their right to withdraw at any time of the study, as also noted in the consent document.

All participants were assured of strict confidentiality. No schools or participants were identified by name during the survey. Participants and their schools remained anonymous.

The cost of Mobile Researcher technology was covered by the researcher's supervisor, using research reward funds. The researcher used her own funds for the fieldworker salaries, printing of information and consent documents and transport costs.

3. 12 Summary

This chapter provided an in-depth explanation of how the research was conducted from the sampling phase to the data collection for the final study. There is also information provided on the Mobile Researcher technology recruited to use in this study. This is a new technology that uses cellular telephones to conduct surveys. This technology has

been used by the Medical Research Council of South Africa and other South African Universities.

Details of the ethical and financial considerations were also included in this chapter.

CHAPTER 4: RESULTS

4.1 Introduction

This study was undertaken to answer the following question: What do primary schoolteachers in Umdoni subdistrict know about asthma and its management?

This chapter is a compilation of all the findings of the study. The results of this study are presented in a descriptive and analytical format. Teachers' knowledge of asthma, asthma management within the school and their personal perceptions about managing asthmatic schoolchildren are described. The results are further presented in age and sex differentials.

Initially all 20 schools agreed to participate in the study. Prior to the study commencing, one school declined to participate. The principal of that school was initially not enthusiastic about allowing his staff to participate in the research, but granted permission once the principal investigator provided him with more information about the benefits of the study.

The principal investigator contacted the principal about scheduling the time and venue for the research in early February 2010. The principal had changed his decision about allowing his staff to participate in the research and would not provide a reason. Thus 19 out of 20 schools participated. The response rate for schools was 95%. A total of 276 teachers were thus included in the sample, giving a response rate of 81% for the final study sample. The reason for some teachers not participating includes absenteeism. Other teachers that were present during the study but refused to participate in study did not divulge the reasons for non participation..

The results are presented under the following headings:

- *Demographic characteristics.*
- *Background and knowledge about asthma.*
- *Asthma related practices in schools.*

4.2 Socio-demographic characteristics of the study sample

The socio-demographic characteristics include age, sex, post description, length of teaching tenure, teachers educational qualification, asthmatic status, contact with asthmatic individuals in the near family, friends and co-workers.

4.2.1 Primary schoolteachers' age

The participating teachers' ages ranged from 18 to 64 years with a mean of 43 years (SD=8.2 yrs) as shown in Table 3.

Table 3: Age distribution of teachers.

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age	226	46	18	64	43	8.2

4.2.2 Primary schoolteachers' sex distribution

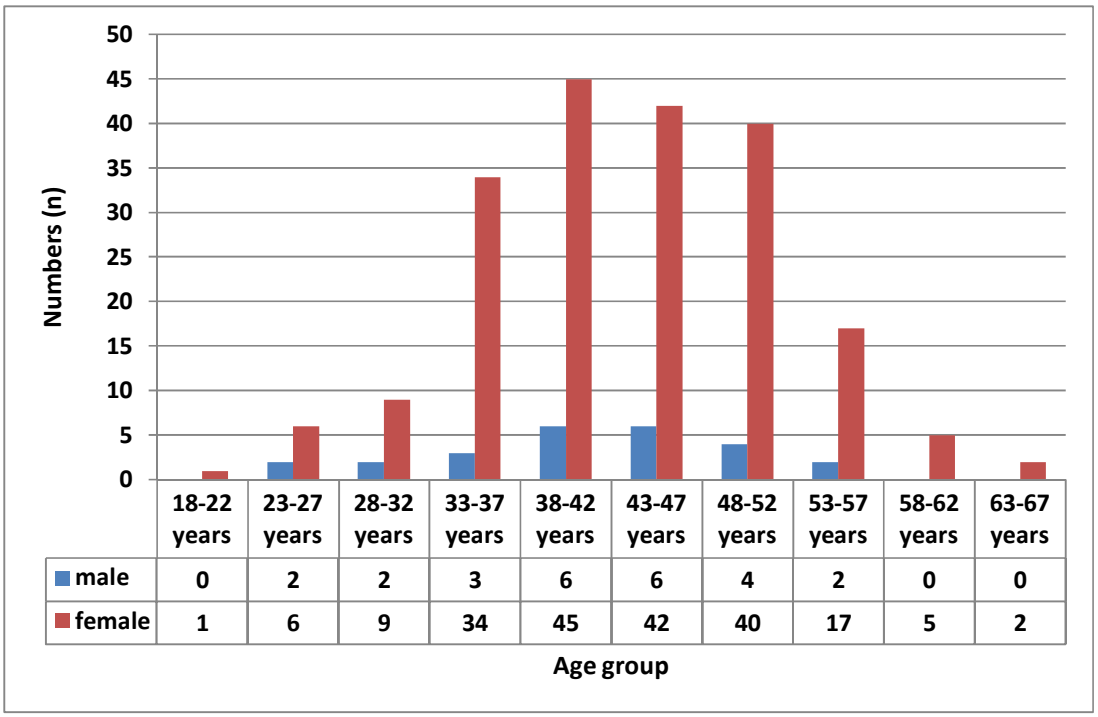
Of the 226 participants, the majority (88.9%; n=201) were female teachers (Table 4).

Table 4: Sex distribution (number and %) of the primary schoolteachers.

Sex	n (%)
Male	25 (11.1)
Female	201 (88.9)
Total	226 (100)

4.2.3 Primary schoolteachers' age distribution by sex

Figure 2 shows the age and sex distribution of the participating teachers. Most of the female teachers were in the age groups 38-42 (20%; n=45/226), 43-47 (18.5%; n=42/226) and 48-52 (17.7%; n=40/226) years. Similarly the highest number of male teachers were in age groups 38-42 (2.7%; n=6/226) and 43-47 (2.7%; n=6/226) years. There were no male teachers in the following age groups 18-22, 58-62 and 63-67 years.



	18-22 years	23-27 years	28-32 years	33-37 years	38-42 years	43-47 years	48-52 years	53-57 years	58-62 years	63-67 years
male	0	2	2	3	6	6	4	2	0	0
female	1	6	9	34	45	42	40	17	5	2

Figure 2: Age and Sex distribution of the respondents (n=226)

4.2.4 Primary schoolteachers' rank or post description

In terms of rank or post description, 82.3% (n=186) of the respondents were class teachers. Only 17 of the 19 headteachers (principals) participated in this study but all 19 deputy headteachers participated in this study as shown in Table 5.

Non class teachers were defined as those teachers who were not responsible for a set group of students but taught on various subject matters.

Table 5: Distribution of the rank or post description (number and %) amongst the schoolteachers'.

Teachers' rank or post description in school	n (%)
Headteacher	17 (7.5)
Deputy headteacher	19 (8.4)
Class teacher	186 (82.3)
Non class teacher	4 (1.8)
Total	226 (100)

4.2.5 Primary schoolteachers' rank or post description by age

It is observed from Table 6 that the majority of class teachers was amongst those aged 34-42 years (19%; n=44/226). This was followed by those aged 43-47 (17.3%; n=39/226) and then those aged 33-37 years (15.9%; n=36/226). Most headteachers (principals) were amongst those aged 43-47 years (2.7%; n=6/226). The majority of the deputy headteachers were amongst those aged 48-52 years (4%; n= 9/226).

4.2.6 Primary schoolteachers' rank or post description by sex

Most class teachers (93%; n=173/186) were females, while males comprised only 7% (n=13/186) of class teachers (Figure 3). Of the headteachers, females comprised 71% (n=12/17) while 29% (n=5/17) were males. Similarly, of the 19 deputy headteachers, the majority were females (68%; n=13/19).

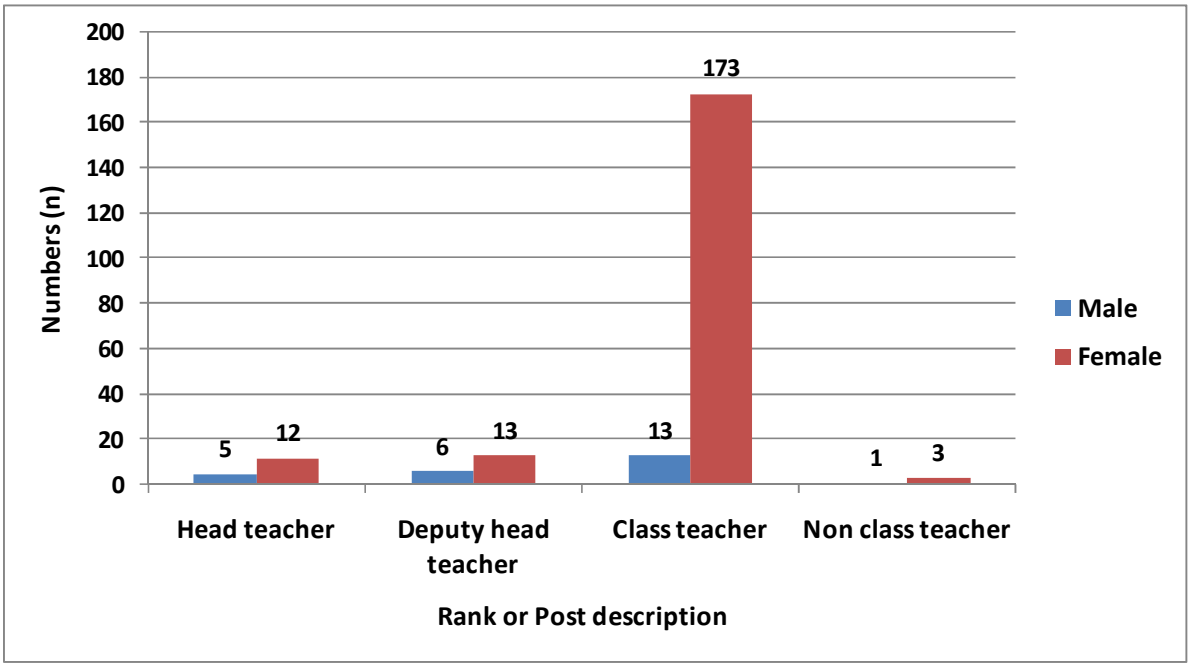


Figure 3: Distribution of rank or post description of the participating teachers by sex (n=226)

Table 6: Distribution of rank or post description (number and %) amongst the schoolteachers' by age group.

	Rank or Post Description				
Age group	**Head teacher**	**Deputy head teacher**	**Class teacher**	**Non class teacher**	**Total**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**
18 - 22 years	0 (0)	0 (0)	1 (0.4)	0 (0)	1 (0.4)
23 - 27 years	0 (0)	0 (0)	7 (3.1)	1 (0.4)	8 (3.5)
28 - 32 years	0 (0)	0 (0)	11 (4.9)	0 (0)	11 (4.9)
33 - 37 years	0 (0)	1 (0.4)	36 (16)	0 (0)	37 (16.4)
38 - 42 years	5 (2.2)	0 (0)	44 (19.5)	2 (0.9)	51 (22.6)
43 - 47 years	6 (2.7)	2 (0.9)	39 (17.3)	1 (0.4)	48 (21.2)
48 - 52 years	5 (2.2)	9 (4)	30 (13)	0 (0)	44 (19.5)
53 - 57 years	1 (0.4)	5 (2.2)	13 (5.8)	0 (0)	19 (8.4)
58 - 62 years	0 (0)	2 (0.9)	3 (1.3)	0 (0)	5 (2.2)
63 - 67 years	0 (0)	0 (0)	2 (0.9)	0 (0)	2 (0.9)
Total	17 (7.5)	19 (8.4)	186 (82.2)	4 (1.7)	226 (100)

4.2.7 Respondents teaching experience.

The majority (41.6%; n=94/226) of the primary schoolteachers reported they had more than ten years of teaching experience (Figure 4). Only 6.6% (n=15) of the respondents had more than 30 years of teaching experience. A total of 10.6% (n=24) of the primary schoolteachers had 5 years or less teaching experience.

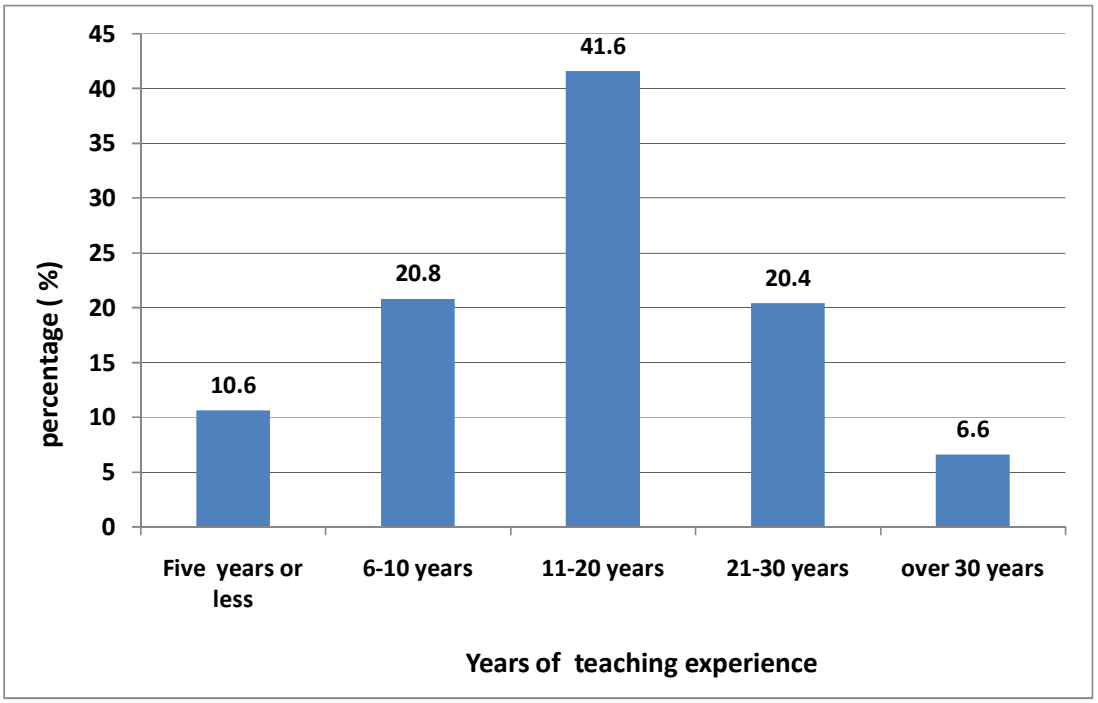


Figure 4: Respondents years of teaching experience (n=226).

4.2.8 Distribution of teaching experience of the teachers by age group

Table 7 shows that most of the respondents who had more than 10 years of teaching experience was amongst those aged 33-37 (7.5%; n=17/226), 38-42 (13.7%; n=31/226), 43-47 (11.5%; n=26/226) and 48-52 years (7.1%; n=16/226). Only 10.2% (n=23) of the respondents aged 48-52 years had over 20 years of teaching experience.

Table 7: Distribution of teaching experience (number and %) of the teachers by age group.

	Teaching Experience					
Age group	**Less than 5 years**	**6-10 years**	**11-20 years**	**21-30 years**	**over 30 years**	**Total**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
18 - 22 years	1 (0.4)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.4)
23 - 27 years	5 (2.2)	2 (0.9)	1 (0.4)	0 (0)	0 (0)	8 (3.5)
28 - 32 years	4 (1.8)	7 (3.1)	0 (0)	0 (0)	0 (0)	11 (4.9)
33 - 37 years	6 (2.7)	14 (6.2)	17 (7.5)	0 (0)	0 (0)	37 16.4)
38 - 42 years	5 (2.2)	13 (5.8)	31 (13.7)	2 (0.9)	0 (0)	51 (22.6)
43 - 47 years	3 (1.3)	7 (3.1)	26 (11.5)	12 (5.3)	0 (0)	48 (21.2)
48 - 52 years	0 (0)	3 (1.3)	16 (7.1)	23 (10.2)	2 (0.9)	44 (19.5)
53 - 57 years	0 (0)	1 (0.4)	3 (1.3)	9 (4)	6 (2.7)	19 (8.4)
58 - 62 years	0 (0)	0 (0)	0 (0)	0 (0)	5 (2.2)	5 (2.2)
63 - 67 years	0 (0)	0 (0)	0 (0)	0 (0)	2 (0.9)	2 (0.9)
Total	24 (10.6)	47 (20.8)	94 (41.6)	46 (20.4)	15 (6.6)	226 (100)

4.2.9 Distribution of teaching experience by sex

Most of the female teachers (43.3%; n=87/201) had 11-20 years of teaching experience as shown in Figure 5. In this study, 36.0% (n=9/25) of the males had 21-30 years of teaching experience.

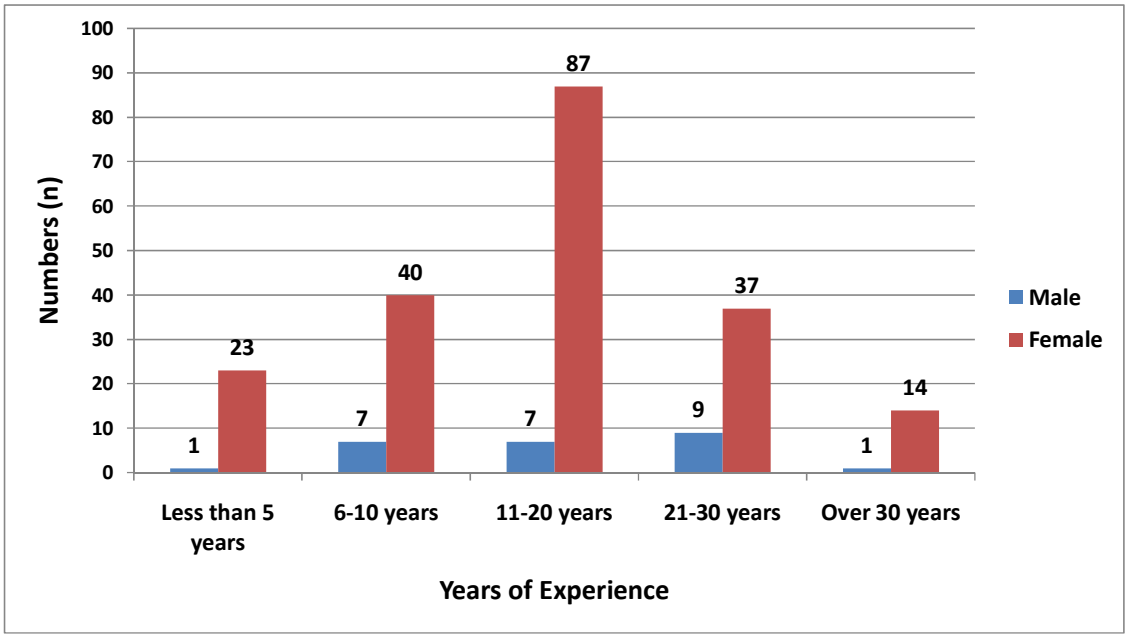


Figure 5: Distribution of participants teaching experience by sex (n=226)

4.2.10 Respondents educational qualification

The majority of the teachers (44.7%; n= 101/226) had a four years education diploma while 6.6% (n=15) had an undergraduate degree (Table 8). Eleven (4.9%) of the teachers reported they had a lesser qualification (matriculation certificate). Only 37 (16.4%) of the participating teachers had a university postgraduate degree.

Table 8: Respondents level of educational qualification.

Qualification	n (%)
University postgraduate degree	37 (16.4)
University undergraduate degree and education diploma	27 (11.9)
University undergraduate degree	15 (6.6)
Four years education diploma	101 (44.7)
Three years education diploma	35 (15.5)
Lesser qualification	11(4.9)
Total	226 (100.0)

4.2.11 Distribution of participants' educational qualification by age group

Table 9 shows that most of the respondents with postgraduate qualifications were amongst those aged 43-47 (5.3%; n=12/226). Only 10.6% (n=24) of the respondents aged 38-42 had a four year teaching diploma. Amongst those aged 33-47, 1.3% (n=3) had lesser qualifications.

Table 9: Distribution of educational qualifications (number and %) of the teachers by age group.

	Qualification						
Age group	**University post graduate degree**	**University under graduate degree and education diploma**	**University under graduate degree**	**Four year education diploma**	**Three year education diploma**	**Lesser qualification**	**Total**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
18-22 years	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.4)	1 (0.4)
23 - 27 years	0 (0)	1 (0.9)	3 (1.3)	2 (0.9)	1 (0.4)	1 (0.4)	8 (3.5)
28 – 32 years	0 (0)	0 (0)	2 (0.9)	6 (2.7)	2 (0.9)	1 (0.4)	11 (5)
33 – 37 years	5 (2.2)	3 (1.3)	2 (0.9)	18 (8)	6 (2.7)	3 (1.3)	37 (16.4)
38 – 42 years	10 (4.4)	6 (2.7)	5 (2.2)	24 (10.6)	6 (2.7)	0 (0)	51 (22.6)
43 – 47 years	12 (5.3)	7 (3.1)	1 (0.4)	23 (10.2)	3 (1.3)	2 (0.9)	48 (21.2)
48 – 52 years	7 (3.1)	3 (1.3)	1 (0.4)	21 (9.3)	10 (4.4)	2 (0.9)	44 (19.5)
53 – 57 years	2 (0.9)	5 (2.2)	1 (0.4)	5 (2.2)	6 (2.7)	0 (0)	19 (8.4)
58 – 62 years	1 (0.4)	2 (0.9)	0 (0)	1 (0.4)	0 (0)	1 (0.4)	5 (2.2)
63 – 67 years	0 (0)	0 (0)	0 (0)	1 (0.4)	1 (0.4)	0 (0)	2 (0.9)
Total	37 (16.4)	27 (12)	15 (6.6)	101 (44.7)	35 (15.5)	11 (4.9)	226 (100)

4.2.12 Distribution of participants' educational qualification by sex

It was found that most of the female teachers had a four years education diploma (45.3%; n=91/201). None of the males had a lesser qualification while 11 females had a lesser qualification (Figure 6).

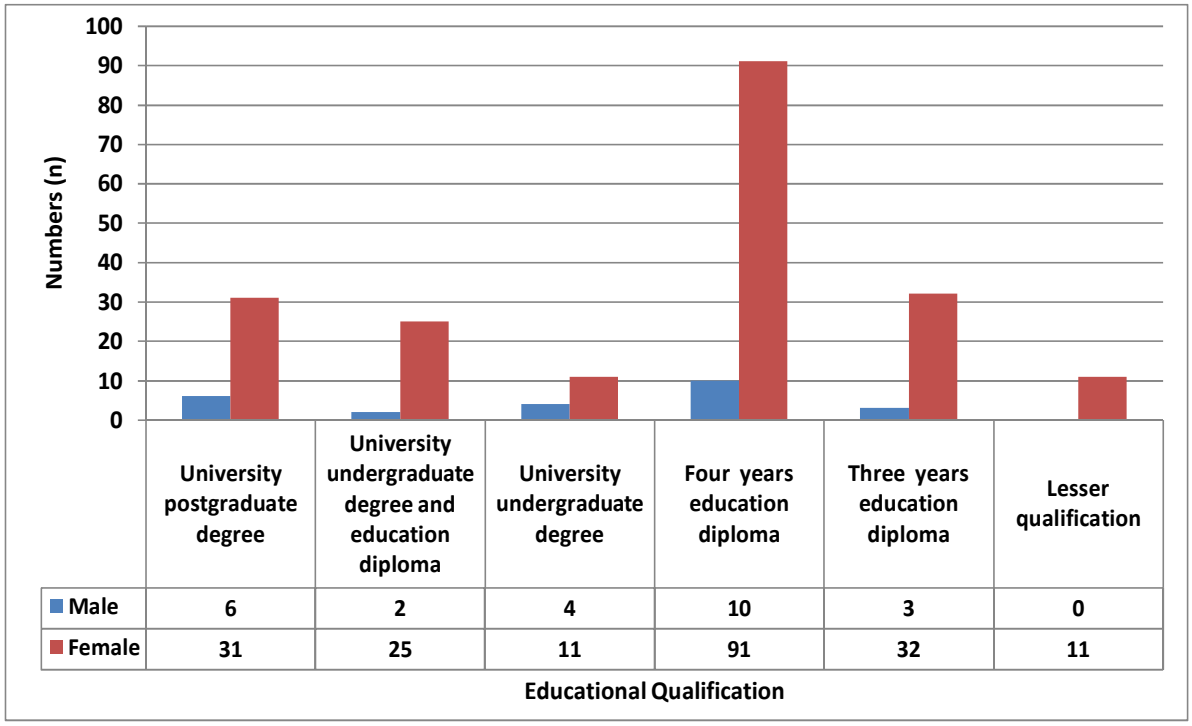


Figure 6: Distribution of participants' educational qualification by sex (n=226).

4.2.13. Primary schoolteachers with asthma

Among the 226 schoolteachers', 14 (6.2%) declared they were suffering from asthma and three (1.3%) were not sure about their asthmatic status (Figure 7).

Amongst those teachers suffering from asthma, the highest proportion (1.8%, 4/226) was seen in the age group 48-52 years (Table 10).

Only one male teacher reported to be suffering from asthma while 13 female teachers reported they were asthmatic (Figure 8)

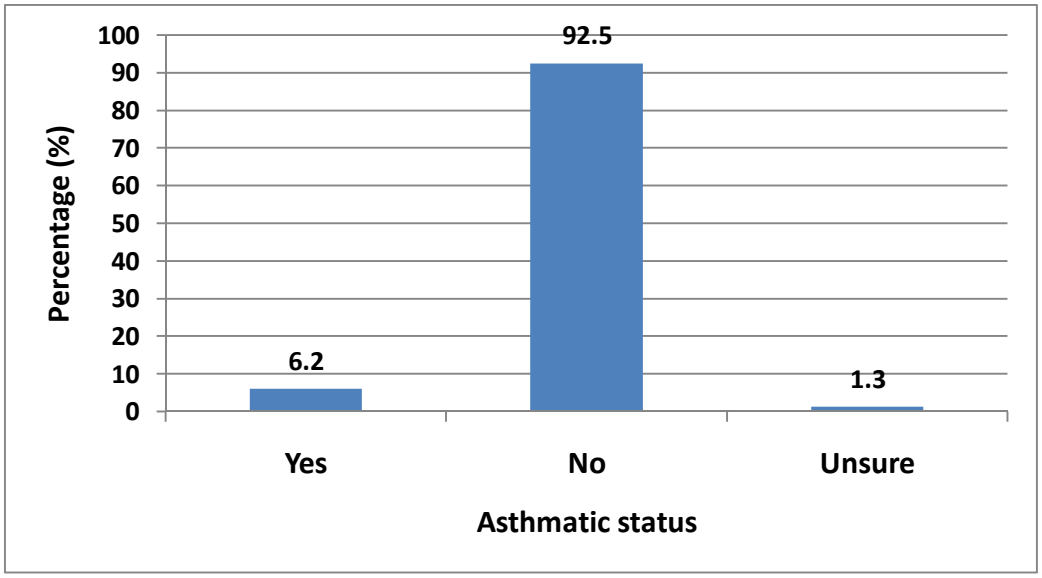


Figure 7: Respondents suffering with asthma (n=226).

Table 10: Distribution of teachers' asthmatic status (number and %) by age group.

Age group	Teacher suffering from Asthma			Total
	Yes	No	Unsure	
	n (%)	n (%)	n (%)	n (%)
18 - 22 years	0 (0)	1 (0.4)	0 (0)	1 (0.4)
23 - 27 years	0 (0)	8(3.5)	0 (0)	8 (3.5)
28 - 32 years	1 (0.4)	10(4.4)	0 (0)	11 (4.9)
33 - 37 years	3 (1.3)	34(15)	0 (0)	37 (16.4)
38 - 42 years	3 (1.3)	47(20.7)	1(0.4)	51 (22.6)
43 - 47 years	2 (0.9)	46(20.4)	0 (0)	48 (21.2)
48 - 52 years	4 (1.8)	40(17.7)	0 (0)	44 (19.5)
53 - 57 years	0 (0)	17(7.5)	2 (0.9)	19 (8.4)
58 - 62 years	1 (0.4)	4(1.8)	0 (0)	5 (2.2)
63 - 67 years	0 (0)	2(0.9)	0 (0)	2 (0.9)
Total	14 (6.1)	209(92.3)	3 (1.3)	226 (100)

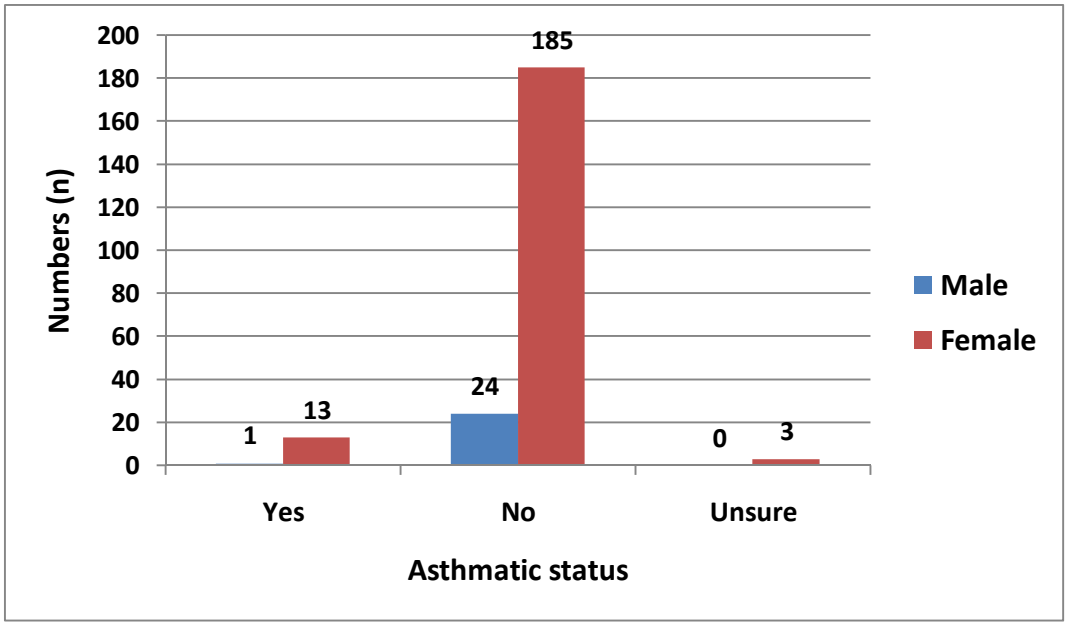


Figure 8: Respondents with asthma by sex (n=226).

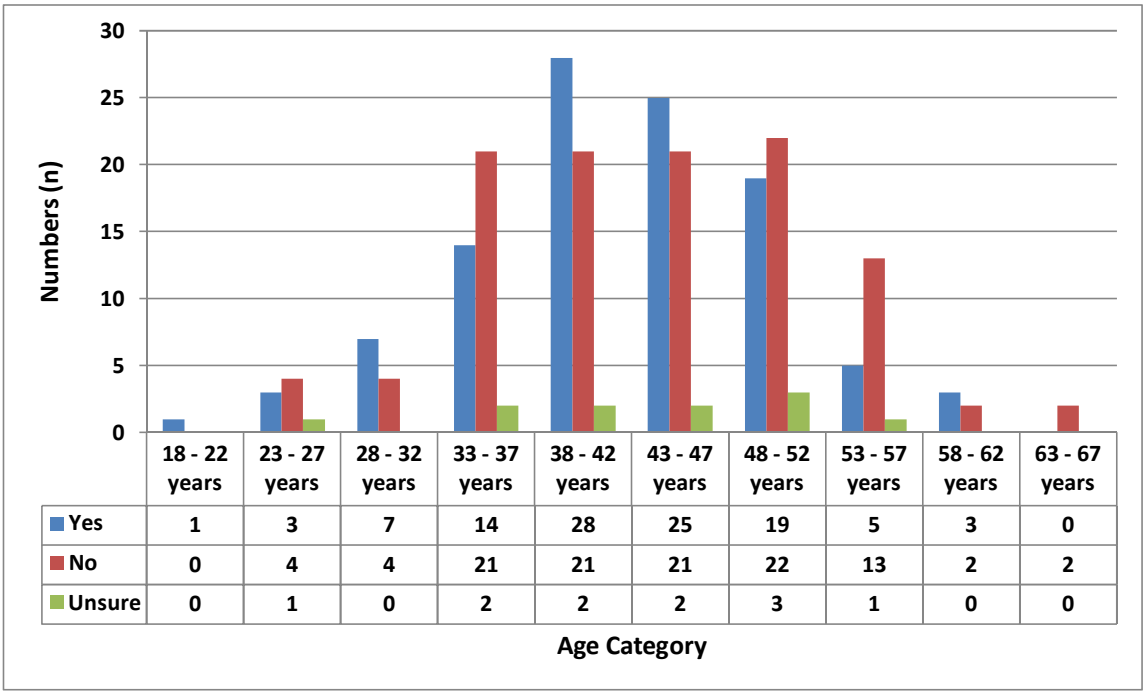
4.2.14. Primary schoolteachers' contact with an asthmatic individual.

Majority of the respondents (46.5%; n=105/226) knew of someone close to them who were suffering from asthma (Table 11).

Table 11: The existence of asthma in the teachers' near family / friends / co-workers.

Existence of asthma	n (%)
Yes	105 (46.5)
No	110 (48.7)
Unsure	11 (4.9)
Total	226 (100)

Most teachers who reported knowing an asthma sufferer was amongst those aged 38-42 (12.4%; n=28/226), 43-47 (11.1%; n=25/226), 48-52 (8.4%; n=19/226) and 33-37 years (6.2%; n=14/226) (Figure 9). None of the teachers in the age group 63-67 years knew of asthma sufferers in their near family, friends and co-workers.



	18 - 22 years	23 - 27 years	28 - 32 years	33 - 37 years	38 - 42 years	43 - 47 years	48 - 52 years	53 - 57 years	58 - 62 years	63 - 67 years
Yes	1	3	7	14	28	25	19	5	3	0
No	0	4	4	21	21	21	22	13	2	2
Unsure	0	1	0	2	2	2	3	1	0	0

Figure 9: Analysis of respondents contact with an asthma sufferer according to age category (n=226).

Most of the female teachers (48.3%; n=97/201) had reported knowing of an asthma sufferer amongst near family, friends and co-workers (Figure 10). Only 32.0% (n=8/25) of the male teachers reported knowing an asthma sufferer amongst family, friends and co-workers.

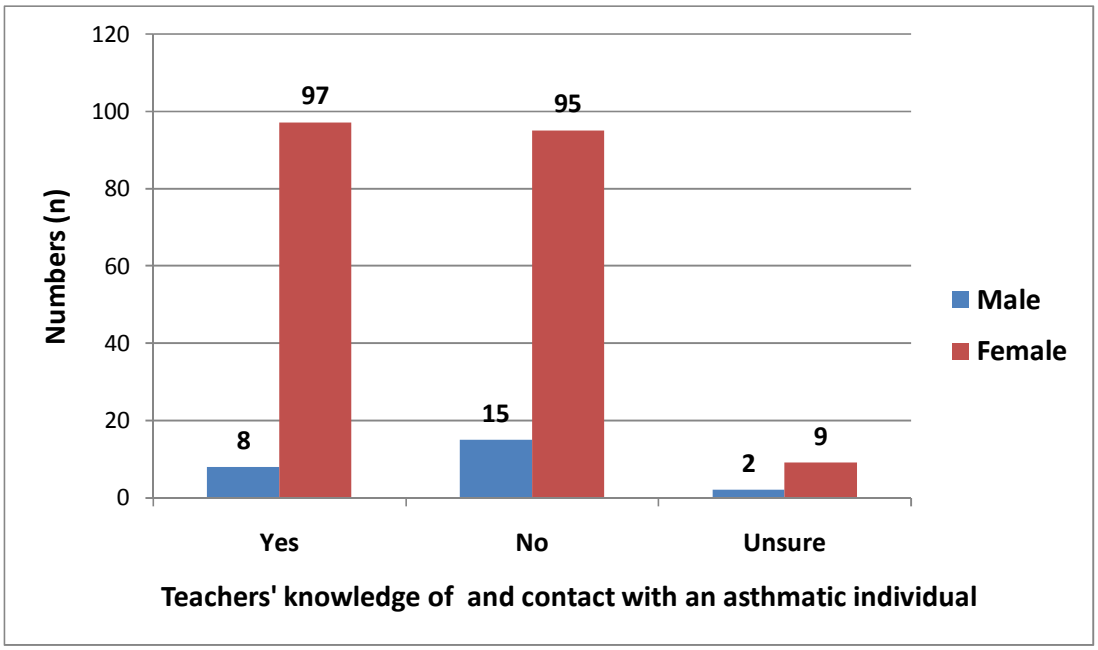


Figure 10: Analysis of respondents contact with an asthma sufferer according to sex (n=226).

The results showed that those teachers who indicated they knew someone suffering from asthma, among them 38.1% (n=40) mentioned their children while 28.6% (n=30) mentioned they had asthmatic siblings and 22.8% (n=24) reported they had asthmatic parents (Table 12).

Table 12: Those known to the teachers' who were suffering from asthma (n=105)*

Person/s suffering from asthma	n (%)
Spouse	6 (5.7)
Children	40 (38.1)
Parents	24 (22.8)
Siblings	30 (28.6)
Friends	14 (13.3)
Co-workers	8 (7.6)
Total	108** (116)

* This question was applicable to 105 respondents.

** Response not equal to 105 because of the multiple response option

4.3 Background and knowledge about asthma

4.3.1 Exposure to training about asthma

Only 6 respondents mentioned that they had received training in asthma care. The majority of the teachers (97%; 220/226) had no training in asthma care (Table 13).

Table 13: Primary schoolteachers' responses to whether they have received training in asthma care.

Trained in asthma care/management	n (%)
Yes	6 (2.7)
No	220 (97.3)
Total	226 (100.0)

4.3.2 Respondents' exposure to asthma training according to age category

Four of the teachers from the 6 who reported they received training in asthma management were in the age groups 33-37 years, 38-42 years, 43-47 years and 48-52 years (Figure 11).

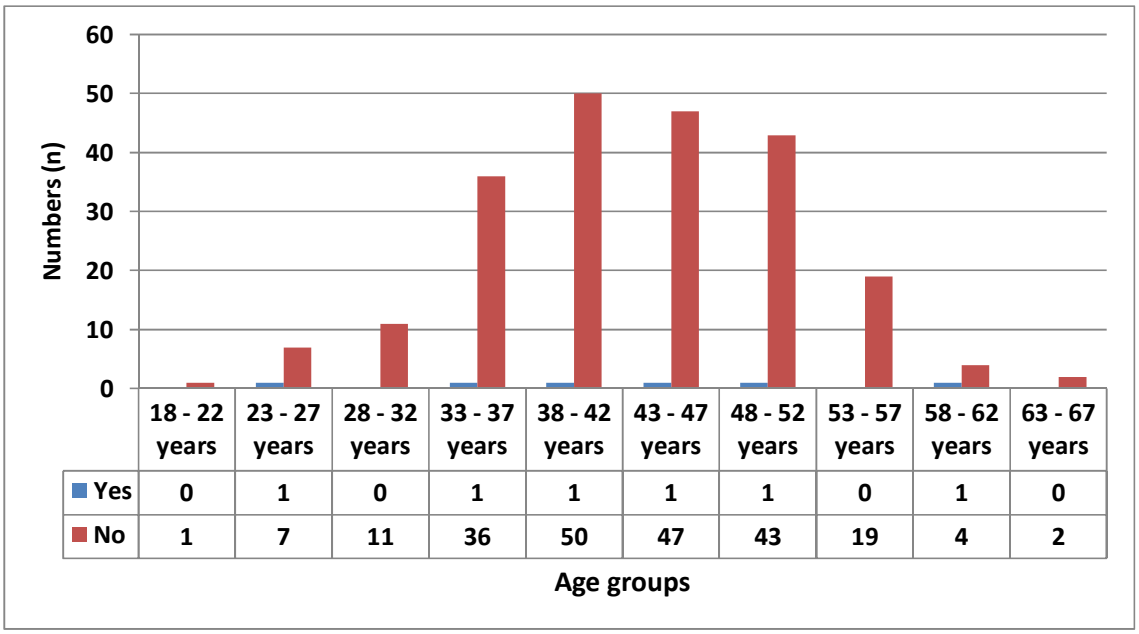


Figure 11: Analysis of respondents' exposure to asthma training according to age category (n=226).

4.3.3 Respondents' exposure to asthma training according to rank or post description.

Only 1 headteacher from the 17 received training in asthma management while none of the nineteen deputy headteachers received training in asthma management. Of the 6 respondents who reported training in asthma management, 5 were class teachers (Figure 12).

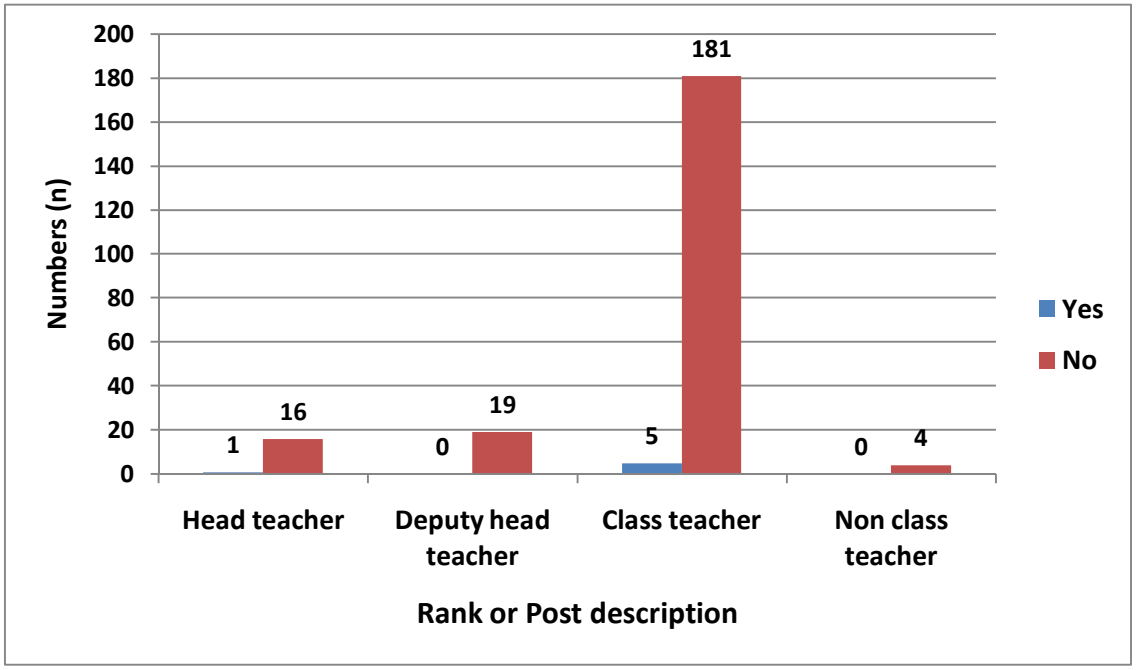


Figure 12: Analysis of respondents' exposure to asthma training according to rank or post description (n=226).

4.3.4 Respondents' exposure to asthma training according to sex

Of the six respondents who indicated they received training in asthma management, 5 were females and 1 was male (Figure13).

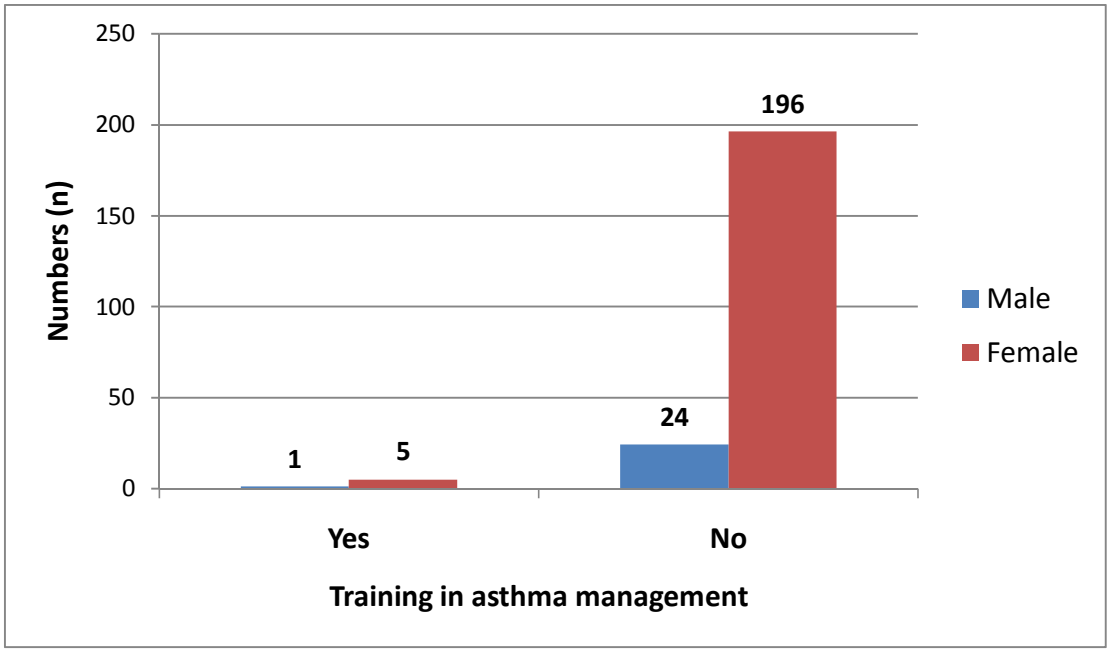


Figure 13: Analysis of the respondents' exposure to asthma training according to sex (n=226).

4.3.5 Sources of training/information on asthma

Three respondents received training in asthma care from first aid courses (Table 14). Other sources of training on asthma care mentioned by the other three respondents included school nurse/doctor, parents of asthmatic children and the National Asthma Education Programme (NAEP).

Table 14: Source from where the respondents received training in asthma care (n=6)*

Source/Facility	n (%)
School nurse/Doctor	1 (16.7)
Parents with children with asthma	1 (16.7)
First aid training	3 (50.0)
National asthma campaign	1 (16.7)
Total	6 (100)

* This question was applicable to only 6 respondents who reported training in asthma care.

4.3.6 Knowledge about asthma

The viewpoints held by male and female teachers in reference to asthma knowledge was analysed from each group (according to sex).

4.3.6.1 Primary schoolteachers' understanding of asthma.

Teachers were asked questions to ascertain their understanding of asthma. Seven signs and symptoms were presented in the questions and the teachers had to state whether each of the following is associated with asthma (Table 15). True, false and unsure options were available to teachers

The majority of the respondents knew the factors that were associated with asthma (cough, breathless, wheezing, tight chest and production of chest secretions). However almost half (45.6%; n=103/226) of the respondents incorrectly mentioned that fever is associated with asthma as shown in Table 16. One in 10 teachers (10.2%; n=23/226) also incorrectly mentioned that asthma is associated with an ear discharge. The results also showed that 12.4% (n=28) of teachers were unsure about the association between wheezing and asthma. Overall, 80.5% (n=182) of the respondents had answered four or more questions correctly out of seven questions.

Table 15: Questions to ascertain teachers' understanding of asthma

State whether each of the following is associated with asthma?	Correct answer
1. Cough	True
2. Breathlessness	True
3. Wheezing	True
4. Tight chest	True
5. Production of chest secretions	True
6. Ear discharge	False
7. Fever	False

Table 16: Teachers' understanding of asthma (n=226 for all questions).

Associated with asthma	True n (%)	False n (%)	Unsure n (%)
Cough	163(72.1)	42(18.6)	21(9.3)
Breathlessness	200(88.5)	12(5.3)	14(6.2)
Wheezing	188(83.2)	10(4.4)	28(12.4)
Tight chest	207(91.6)	4(1.8)	15(6.6)
Production of chest secretions	94(41.6)	66(29.2)	66(29.2)
Ear discharge	23(10.2)	127(56.2)	76(33.6)
Fever	103(45.6)	59(30.5)	54(23.9)

4.3.6.2 Primary schoolteachers' understanding of asthma by sex

Both male and female teachers were able to identify factors associated with the understanding of asthma (Table 17). Of the male primary schoolteachers, 12.0% (n=3/25) believed that an ear discharge was associated with asthma while 9.9% (n=20/201) of female primary schoolteachers thought that an ear discharge was associated with asthma.

Table 17: Primary schoolteachers' understanding of asthma by sex (total n=226 for all questions).

	Male (n=25)			Female (n=201)		
Associated with asthma	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Cough	16 (64.0)	6 (24.0)	3(12.0)	147 (73.1)	36 (17.9)	18 (8.9)
Breathlessness	21(84.0)	1(4.0)	3 (12.0)	179 (89)	11 (5.5)	11 (5.5)
Wheezing	21 (84.0)	1(4.0)	3 (12.0)	167 (83)	9 (4.5)	25 (12.4)
Tight chest	21 (84.0)	2 (8.0)	2 (8.0)	186 (93)	2 (0.9)	13 (6.5)
Production of chest secretions	10 (40.0)	10 (40.0)	5 (20.0)	84 (42)	56 (27.9)	61 (30.3)
Ear discharge	3 (12.0)	13 (52.0)	9 (36.0)	20 (9.9)	114 (56.7)	67(33.3)
Fever	6 (24.0)	14 (56.0)	5 (20.0)	97 (48.3)	55 (27.4)	49 (24.4)

4.3.6.3 General knowledge of asthma among the participants

Teachers were asked 19 general knowledge questions on asthma (Table 18). A true, false and unsure option was made available to the participants. The general knowledge questions focused on the global extent of the problem of the disease, mortality, growth and asthma. Questions on misconceptions surrounding asthma was also included in the general knowledge section of the survey. These misconceptions included IQ levels of asthmatic children, asthma is curable and asthma is a psychological disorder that needs counselling.

Table 18: Questions to ascertain teachers' general knowledge of asthma

Answer the following questions	Correct answer
1. Asthma is a common respiratory disease in children worldwide	True
2. There is an increase in the number of people suffering from asthma in South Africa	True
3. The number of asthma deaths is high in South Africa	True
4. Asthma is usually genetic or familial	True
5. Allergies are associated with asthma	True
6. Asthma can cause slow or poor growth	True
7. Asthmatic children have low IQs	False
8. .Asthma is not curable	True
9. Asthma is controlled by appropriate medication.	True
10. Asthma is an emotional disorder that needs psychological counseling.	False

The majority of the participants (73.5%; n=166/226) knew that asthma is a common respiratory disease in children globally and about a third (34.5%; n=78/226) mentioned that asthma death is high in South Africa (Table 19). The majority (50.2%; n=114/226) of the participants were unsure about the high asthma mortality in South Africa. Only a fifth (19.9%; 45/226) indicated that asthma is not curable. The study also showed that 27% (n=61/226) of teachers thought that asthma is an emotional disorder that needs psychological counselling. Twenty three percent (n=52/226) of teachers indicated that asthmatic children have low IQ levels. Thirty percent (30.5%; n=69/226) were unsure about the association between asthma and allergies. With regards to asthma and slow growth, only 40.3% (n=91/226) knew the association existed. Out of ten questions on general knowledge, 69.5% answered five or more questions correctly.

4.3.6.4 Primary schoolteachers' general knowledge of asthma by sex

Of the male teachers 52.0% (n=13/25), 48.0% (n=12/25) and 68.0% (n=17/25) correctly identified that asthma is responsible for slow or poor growth, that asthma is associated with allergies, and that asthma is genetic or familial, respectively (Table 20). Twenty six percent (n=52/201) of female teachers incorrectly believed asthma is an emotional disorder that needs psychological counselling. Twenty one percent (n=43/201) of the female teachers also incorrectly thought that asthmatic children have low IQ levels. Thirty six percent (n=9/25) of the male teachers were under the false impression that asthmatic children had low IQ levels.

Table 19: Teachers' responses (number and %) to general knowledge questions (n=226 for all questions).

Statements	True n (%)	False n (%)	Unsure n (%)
Asthma is common respiratory disease in children worldwide	166 (73.5)	24 (10.6)	36 (15.9)
There is an increase in the number of people suffering from asthma in South Africa.	169 (74.8)	10 (4.4)	47 (20.8)
The number of asthma deaths is high in South Africa.	78 (34.5)	34 (15.0)	114 (50.4)
Asthma is usually genetic or familial	167 (73.9)	22 (9.7)	37 (16.4)
Allergies are associated with asthma	116 (51.3)	41 (18.1)	69 (30.5)
Asthma can cause slow or poor growth	91 (40.3)	59 (26.1)	76 (33.6)
Asthmatic children have low IQs	52 (23.0)	108 (47.8)	66 (29.2)
Asthma is not curable	45 (19.9)	136 (60.2)	45 (19.9)
Asthma is controlled by appropriate medication	189 (83.6)	15 (6.6)	22 (9.7)
Asthma is an emotional disorder that needs psychological counselling	61 (27.0)	114 (50.4)	51 (22.6)

Table 20: Teachers' general knowledge of asthma by sex (total n=226 for all questions)

	Male (n=25)			Female (n=201)		
Statements	**True n (%)**	**False n (%)**	**Unsure n (%)**	**True n (%)**	**False n (%)**	**Unsure n (%)**
Asthma is common respiratory disease in children worldwide	17 (68.0)	3 (12.0)	5 (20.0)	149 (74.1)	21 (10.4)	31 (15.4)
There is an increase in the number of people suffering from asthma in South Africa.	18 (72.0)	1(4.0)	6 (24.0)	151 (75.1)	9 (4.5)	41 (20.4)
The number of asthma deaths is high in South Africa.	9 (36.0)	4 (16.0)	12 (48.0)	69 (34.4)	30 (14.9)	102(50.7)
Asthma is controlled by appropriate medication	21 (84.0)	1 (4.0)	3 (12.0)	168 (83.5)	14 (6.9)	19 (9.5)
Asthma is not curable	5 (20.0)	14 (56.0)	6 (24.0)	40 (19.9)	122 (60.7)	39 (19.4)
Asthmatic children have low IQs	9 (36.0)	13 (52.0)	3 (12.0)	43 (21.4)	95 (47.3)	63 (31.3)
Asthma can cause slow or poor growth	13 (52.0)	5 (20.0)	7 (28.0)	78 (38.8)	54 (26.9)	69 (34.3)
Allergies are associated with asthma	12 (48.0)	9 (36.0)	4 (16.0)	104 (51.7)	32 (15.9)	65 (32.3)
Asthma is usually genetic or familial	17 (68.0)	3 (12.0)	5 (20.0)	150 (74.6)	19 (9.5)	32 (15.9)
Asthma is an emotional disorder that needs psychological counselling	9 (36.0)	12 (48.0)	4 (16.0)	52 (25.9)	102 (50.7)	47 (23.4)

4.3.6.5 Recognition of signs and symptoms of a severe acute asthma attack.

Teachers were asked to identify 6 signs and symptoms of a severe acute asthma attack (Table 21). They were allowed the following: true, false and unsure options.

Table 21: Questions to ascertain teachers' ability to recognise signs and symptoms of a severe acute asthma attack.

Which of the following are serious clinical features of an asthma attack?	Correct answer
1. Difficulty in speech	True
2. Agitation	True
3. Drowsiness	True
4. Chest and Neck Skin pulled in	True
5. Confusion	True
6. Blue discoloration of the lips	True

The majority of participants (60.6%; n=137/226) were able to identify chest and neck retraction is a sign of a severe acute asthma attack. Difficulty in speech, confusion and blue discoloration as signs and symptoms of a severe acute asthma attack were also known to participants (Table 22). There were a significant number of unsure responses in this section regarding signs and symptoms of a severe acute asthma attack. Overall, teachers' knowledge regarding signs and symptoms of a severe acute asthma attack was low as 63.3% (n=143/226) could only indicate three or less symptoms out of six.

Table 22: Teachers' responses (number and %) to knowledge on signs and symptoms of a severe acute asthma attack (n=226 for all questions).

Statements	True n (%)	False n (%)	Unsure n (%)
Difficulty in speech	119 (52.7)	52 (23.0)	55 (24.3)
Agitation	123 (54.4)	35 (15.5)	68 (30.1)
Drowsiness	94 (41.6)	69 (30.5)	63 (27.9)
Chest and Neck Skin pulled in	137 (60.6)	26 (11.5)	63 (27.9)
Confusion	69 (30.5)	86 (38.1)	71 (31.4)
Blue discoloration of the lips	82 (36.3)	55 (24.3)	89 (39.4)

There were no significant differences between male and female teachers' ability to recognise signs and symptoms of a severe acute asthma attack (Table 23). A similar proportion of the male teachers (52.0%; n=13/25) and female teachers (61.7%; n=124/201) identified chest and neck skin retraction as a sign of a severe acute asthma attack. Both male and female teachers struggled to correctly identify confusion, drowsiness and blue discoloration of the lips as signs and symptoms of a severe acute asthma attack.

Table 23: Teachers' knowledge on the signs and symptoms of a severe acute asthma attack by sex (total n=226 for all questions).

	Male (n=25)			Female (n=201)		
Statements	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Difficulty in speech	13 (52.0)	4 (16.0)	8 (32.0)	106 (52.7)	48 (23.9)	47 (23.3)
Agitation	15 (60.0)	4 (16.0)	6 (24.0)	108 (53.7)	31 (15.4)	62 (30.8)
Drowsiness	7 (28.0)	7 (28.0)	11 (44.0)	87 (43.3)	62 (30.8)	52 (25.8)
Chest and Neck Skin pulled in	13 (52.0)	3 (12.0)	9 (36.0)	124 (61.7)	23 (11.4)	54 (26.9)
Confusion	9 (36.0)	7 (28.0)	9 (36.0)	60 (29.8)	79 (39.3)	62 (30.8)
Blue discoloration of the lips	9 (36.0)	6 (24.0)	10 (40.0)	73 (36.3)	49 (24.4)	79 (39.3)

4.3.6.6 Identifying factors that exacerbate asthma in children

Teachers were asked to identify 14 trigger factors that exacerbate asthma (Table 24). Many of the trigger factors that were asked about in the questionnaire survey were relevant to the school environment. True, false and unsure options were available to respondents.

Table 24: Questions to determine teachers' knowledge of asthma trigger factors.

Which of the following are common triggers of asthma?	**Correct answer**
1. Smoke	True
2. Perfumes	True
3. Chalk dust	True
4. Paint fumes	True
5. Exercise	True
6. Cold weather	True
7. Common Cold	True
8. laughing	True
9. Animal Dander/Pets	True
10. Pollen	True
11. Food	True
12. Menstruation	True
13. Stress	True
14. House dust mites	True

Only 8.4% (n=19/226) of the teachers knew that menstruation can exacerbate asthma and another 23.5% (n=53/226) of the teachers mentioned that laughing could exacerbate asthma in children. Just under half of the teachers (42.5%; n=96/226)) knew that exercise can trigger an asthma attack. There were a significant number of unsure responses regarding knowledge on the following asthma trigger factors: perfumes, chalk dust, exercise, laughing, foods, menstruation and stress.

Overall, teachers' knowledge on factors that exacerbate asthma in children was above 50% correct answers as majority of the teachers (75.7%; n=171/226) identified correctly seven or more factors from a total of fourteen factors (Table 25).

Table 25: Teachers' responses (number and %) to trigger factors that exacerbate asthma (n=226 for all questions).

Common triggers of asthma	True n (%)	False n (%)	Unsure n (%)
Smoke	201 (88.9)	12 (5.3)	13 (5.8)
Perfumes	172 (76.1)	16 (7.1)	38 (16.8)
Chalk dust	161 (71.2)	28 (12.4)	37 (16.4)
Paint fumes	201 (88.9)	10 (4.4)	15 (6.6)
Exercise	96 (42.5)	90 (39.8)	40 (17.7)
Cold weather	154 (68.1)	42 (18.6)	30 (13.3)
Common cold	154 (68.1)	31 (13.7)	41 (18.1)
Laughing	53 (23.5)	123 (54.4)	50 (22.1)
Animal dander/Pets	179 (79.2)	19 (8.4)	28 (12.4)
Foods	118 (52.2)	54 (23.9)	54 (23.9)
Pollen	162 (71.7)	31 (13.7)	33 (14.6)
Menstruation	19 (8.4)	127 (56.2)	80 (35.4)
Stress	119 (52.7)	58 (25.7)	49 (21.7)
House dust mites	166 (73.5)	28 (12.4)	32 (14.2)

Both male and female teachers had knowledge of asthma trigger factors. Male and female teachers had difficulty identifying menstruation as an asthma trigger factor as only 8.0% (n=2/25) of males and 8.5% (n=17/201) of females could correctly identify menstruation as an asthma trigger factor (Table 26).

Table 26: Teachers' knowledge of factors that trigger asthma by sex (total n=226 for all questions)

	Male (n=25)			Female (n=201)		
Statements	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Smoke	22 (88.0)	1 (4.0)	2 (8.0)	179 (89)	11 (5.5)	11 (5.5)
Perfumes	20 (80.0)	1 (4.0)	4 (16.0)	152 (75.6)	15 (7.5)	34 (17)
Chalk dust	18 (72.0)	2 (8.0)	5 (20.0)	143 (71.1)	26 (12.9)	32 (15.9)
Paint fumes	22 (88.0)	0 (0)	3 (12.0)	179 (89)	10 (4.9)	12 (5.9)
Exercise	16 (64.0)	6 (24.0)	3 (12.0)	80 (39.8)	84 (41.8)	37 (18.4)
Cold weather	18 (72.0)	4 (16.0)	3 (12.0)	136 (67.6)	38 (18.9)	27 (13.4)
Common cold	12 (48.0)	4 (16.0)	9 (36.0)	142 (70.6)	27 (13.4)	32 (15.9)
Laughing	8 (32.0)	12 (48.0)	5 (20.0)	45 (22.4)	111 (55.2)	45 (22.4)
Animal dander/Pets	17 (68.0)	3 (12.0)	5 (20.0)	162 (80)	23 (11.4)	20 (9.9)
Foods	15 (60.0)	3 (12.0)	7(28.0)	103 (51.2)	51 (25.4)	47 (23.3)
Pollen	15 (60.0)	5 (20.0)	5 (20.0)	147 (73.1)	26 (12.9)	28 (13.9)
Menstruation	2 (8.0)	10 (40.0)	13 (52.0)	17 (8.5)	117 (58.2)	67 (33.3)
Stress	12 (48.0)	7 (28.0)	6 (24.0)	107 (53.2)	51 (25.4)	43 (21.4)
House dust mites	19 (76.0)	1 (4.0)	5 (20.0)	147 (73.1)	27 (13.4)	27 (13.4)

4.3.6.7 Knowledge of asthma medication and management

Teachers were asked to identify medication used to relieve an asthma attack. Three different medications were listed and a true, false and unsure option was available for each. Questions on preventative medication, oxygen therapy, side effects of medication and misconceptions which is important in asthma management formed the core of the questions (Table 27).

Table 27: Questions to ascertain teachers' knowledge on asthma medication and management

Questions	Correct answer
Which of the following medication is used to relieve an asthma attack:	
1. Antibiotics	False
2. Aspirin	False
3. Ventolin®/Asthavent®	True
4. Do you think preventative medication is needed for most asthmatic children	True
5. Oxygen therapy is required in very severe asthma attacks	True
6. Ventolin can cause a rapid pulse rate, palpitations and tremors	True
7. Asthma medications are addictive and weaken the heart	False

Teachers' knowledge of asthma medication delivery devices was also examined. Four questions were asked about asthma delivery devices namely the nebuliser, metered dose inhaler and spacer (Table 28)

Table 28: Questions to determine teachers' knowledge on asthma delivery devices

Questions	Correct answer
Which of the following can deliver asthma medication to the lungs	
1. Nebulisers	True
2. Pressurized aerosol inhaler (metered dose inhaler)	True
3. Spacer	True
4. Asthma medication delivered through a pressurized aerosol inhaler and spacer is as good as using asthma medication through a nebuliser	True

A large proportion of teachers (56.2%; n=127/226) incorrectly believed that an antibiotic is used to relieve an asthma attack and 31% (n=70/226) of the respondents also incorrectly thought that aspirin is used to relieve an asthma attack (Table 29). Almost half of the teachers (48.7%; n=110/226) incorrectly believed that asthma medications are addictive and weaken the heart. The numbers of unsure responses regarding teachers' knowledge of asthma medication and management was significant. The majority of teachers (57.1%; n=129/226) were unsure of the side effect of Ventolin® This is a common misconception about asthma medication. The majority (89.4%; n=202/226) indicated that oxygen therapy is required in a severe asthma attack.

Table 29: Teachers' responses (number and %) to knowledge on asthma medication and management (n=226 for all questions).

Medication is used to relieve an asthma attack	True n (%)	False n (%)	Unsure n (%)
Antibiotics	127 (56.2)	43 (19.0)	56 (24.8)
Aspirin	70 (31.0)	65 (28.8)	91 (40.3)
Ventolin®/Asthavent®	153 (67.7)	6 (2.7)	67 (29.6)
Preventative medication is needed for most asthmatic children	161 (71.2)	24 (10.7)	41 (18.1)
Oxygen therapy is required in very severe asthma attacks	202 (89.4)	11 (4.8)	13 (5.8)
Ventolin® can cause a rapid pulse rate, palpitations and tremors	61 (27.0)	36 (15.9)	129 (57.1)
Asthma medications are addictive and weaken the heart	110 (48.7)	32 (14.1)	84 (37.2)

The majority of teachers were able to identify the nebuliser and pressurised metered dose inhaler as asthma medication delivery devices (Table 30). Only 22.1% (n=50/226) knew that a spacer is an asthma medication delivery device. Of the 226 teachers, only 26.5% (n=60/226) correctly indicated that asthma medication delivered through a pressurized aerosol inhaler and spacer is as good as using asthma medication through a nebuliser. The unsure option pertaining to questions on the spacer as an asthma delivery device was high amongst respondents. Overall, out of eleven questions regarding asthma medication and management, only 49.1% (n=111/226) of the primary schoolteachers answered six or more questions correctly.

Table 30: Teachers' responses (number and %) knowledge on asthma delivery devices (n=226 for all questions)

Device	True	False	Unsure
Nebulisers	186 (82.3)	11 (4.9)	29 (12.8)
Pressurized aerosol inhaler	207 (91.6)	6 (2.6)	13 (5.8)
Spacer	50 (22.1)	10 (4.4)	166 (73.5)
Asthma medication delivered through a pressurized aerosol inhaler and spacer is as good as using asthma medication through a nebuliser	60 (26.5)	31 (13.8)	135 (59.7)

In terms of teachers' knowledge on asthma medication and management according to sex, similarities existed (Table 31). However, a widely different proportion of male (72.0%; n=18/25) and female teachers (54.2%; n=109/201) incorrectly thought that antibiotics relieves an asthma attack. Thirty six percent (n=9/25) of males and 30.3% (n=61/201) of females incorrectly believed aspirin can also relieve and asthma attack. In terms of the misconception of asthma medication being addictive and can weaken the heart, 52.0% (n=13/25) of males and 48.3% of females (n=97/201) answered incorrectly.

Both male and female teachers were able to identify nebulisers and pressurised aerosol inhalers as devices that could deliver asthma medication to the lungs (Table 32). Only 28.0% (n=7/25) of males and 21.4% (n=43/201) of females knew that a spacer is a device that delivers asthma medication to the lungs.

Table 31: Teachers' knowledge on asthma medication and management by sex (total n=226 for all questions)

	Male (n=25)			Female (n=201)		
Statements:	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
Medication is used to relieve an asthma attack	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Antibiotics	18 (72.0)	4 (36.0)	3 (12.0)	109 (54.2)	39 (19.4)	53 (26.4)
Aspirin	9 (36.0)	7 (28.0)	9 (36.0)	61 (30.3)	58 (28.9)	82 (40.8)
Ventolin®/Asthavent®	17 (68.0)	1 (4.0)	7 (28.0)	136 (67.6)	5 (2.5)	60 (29.9)
Preventative medication is needed for most asthmatic children	16 (64.0)	3 (12.0)	6 (24.0)	145 (72.1)	21 (10.4)	35 (17.4)
Oxygen therapy is required in very severe asthma attacks	23 (92.0)	1 (4.0)	1 (4.0)	179 (89)	10 (4.9)	12 (5.9)
Ventolin can cause a rapid pulse rate, palpitations and tremors	8 (32.0)	7 (28.0)	10 (40.0)	53 (26.4)	29 (14.4)	119 (59.2)
Asthma medications are addictive and weaken the heart	13 (52.0)	3 (12.0)	9 (36.0)	97 (48.3)	29 (14.4)	75 (37.3)

Table 32: Teachers' knowledge on asthma delivery devices by sex (total n=226 for all questions)

	Male (n=25)			Female (n=201)		
Statements:	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
Which of the following can deliver asthma medication to the lungs	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Nebulisers	20 (80.0)	2 (8.0)	3 (12.0)	166 (82.6)	9 (4.5)	26 (12.9)
Pressurized aerosol inhaler	21 (84.0)	2 (8.0)	2 (8.0)	186 (92.5)	4 (1.9)	11 (5.5)
Spacer	7 (28.0)	3 (12.0)	15 (60.0)	43 (21.4)	7 (3.5)	151 (75.1)
Drugs delivered through a pressurized aerosol inhaler and spacer is as good as using drug through a nebuliser	7 (28.0)	4 (16.0)	14 (56.0)	53 (26.4)	27 (13.4)	121 (60.1)

4.3.6.8 Knowledge on how to use a metered dose inhaler (pump)

Teachers' knowledge on the use a metered dose inhaler was examined. If they mentioned they knew how to use the metered dose inhaler, they were then asked to place the steps in the correct order (Table 33). Regarding the use of a metered dose inhaler, about a quarter (24.8%; n=56/226) of the teachers mentioned that they knew how to use a metered dose inhaler (Table 34) and among them, none could correctly indicate the method to use the inhaler. The absence of knowledge on the use an asthma pump was high with 63.3% (n=143) stating they did not know how to use an inhaler while 11.9% (n=27) were unsure if they had knowledge regarding the use of an inhaler. According to sex category of respondents, 24.0% (n=6/25) of male teachers and 24.9% (n=50/201) of the female teachers stated that they knew how to use an asthma pump (Figure 14).

Table 33: Question to ascertain teachers' knowledge of the correct use of a metered dose inhaler

Rank the following steps in the correct order 1 – 5 if you have stated you know how to use a metered dose inhaler	**Correct order**
Breathe out gently	2
Put mouth piece in mouth and at start of inspiration, which should be slow and deep, press canister down and continue to inhale deeply	3
Remove the cap and shake inhaler	1
Hold breath for 10 seconds, or as long as possible then breathe out slowly	4
Wait for a few seconds before repeating	5

Table 34: Teachers' responses on their knowledge of how to use an asthma pump.

Know how use an asthma pump	n (%)
Yes	56 (24.8)
No	143 (63.3)
Unsure	27 (11.9)
Total	226 (100.0)

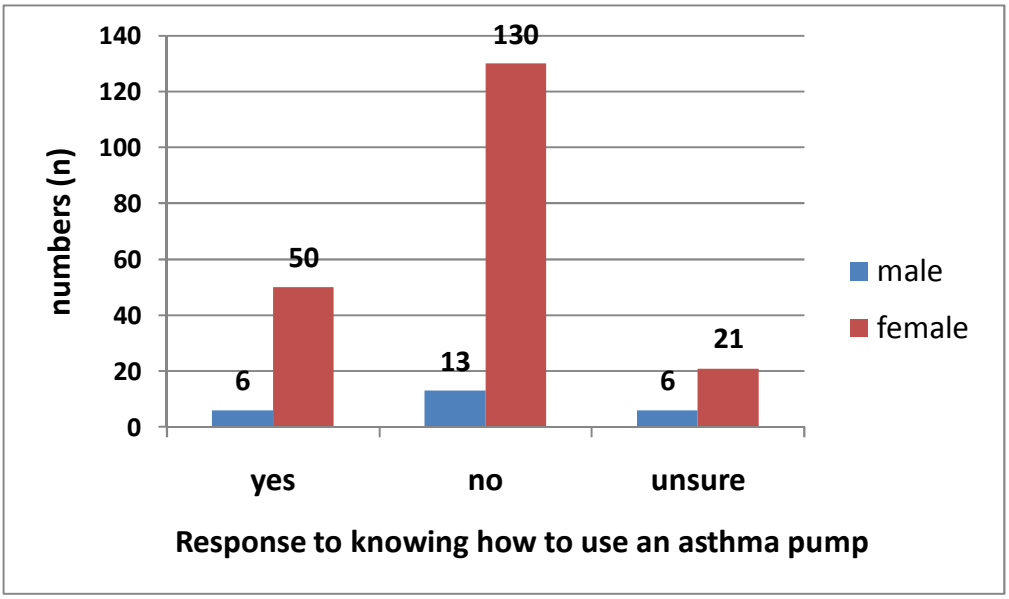


Figure 14: Teachers' knowledge of how to use an asthma pump by sex (n=226).

Of the six teachers who reported they had training in asthma management, only 3 reported they knew how to use an asthma pump while 2 stated they did not know how to use an asthma pump (Table 35). Only 1 respondent who reported receiving training in asthma management was unsure of how to use an asthma pump.

Table 35: Knowledge of how to use an asthma pump by training in asthma management

Question : Do you know how to Use an asthma pump	Asthma Management Training (n)		
	Yes	No	Total
Response	n (%)	n (%)	n (%)
Yes	3 (1.3)	53 (23.5)	56(24.8)
No	2 (0.9)	141 (62.8)	143 (63.3)
Unsure	1 (0.4)	26 (11.5)	27 (11.9)
Total	6 (2.7)	220 (97.3)	226 (100)

4.3.6.9 Knowledge of asthma control

Regarding asthma control, 85.4% (n=193/226) of participants indicated that if a child's asthma is not controlled then the asthmatic would be absent frequently (Table 36). In terms of sex, 72.0% (n=18/226) of the males and 87.1% (n=175/226) of the females correctly identified that if child's asthma is not controlled, he would be absent frequently (Table 37). More than half (55.8%; n=126/226) of the respondents were able to identify that frequent coughing in an asthmatic child denotes poor asthma control. However 27% (n=61) were unsure of the association between asthma control and frequent coughing. Three questions were asked to determine knowledge on asthma control and 72.6% (n=164/226) respondents answered two or three questions correctly. Both male and female teachers had knowledge of asthma control and scored above 50% correct answers for most questions on asthma control.

Table 36: Questions to ascertain teachers' knowledge on asthma control.

Questions	Correct answer
1. If a child's asthma is not controlled, he would be coughing a lot?	True
2. if a child's asthma is not controlled, he would be very sedentary	True
3. If a child's asthma is not controlled, he would be absent frequently	True

Table 37: Teachers' responses (number and %) to knowledge on asthma control (n=226 for all questions)

Statements	True n (%)	False n (%)	Unsure n (%)
If a child's asthma is not controlled, he would be coughing a lot?	126 (55.8)	39 (17.2)	61 (27.0)
if a child's asthma is not controlled, he would be very sedentary	152 (67.3)	29 (12.8)	45 (19.9)
If a child's asthma is not controlled, he would be absent frequently	193 (85.4)	12 (5.3)	21 (9.3)

Table 38: Teachers' knowledge on asthma control by sex (total n=226 for all questions).

	Male (n=25)			Female (n=201)		
Statements on Asthma control	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
If a child's asthma is not controlled, he would be coughing a lot?	17 (68.0)	3 (12.0)	5 (20.0)	109 (54.2)	36 (17.9)	56 (27.9)
if a child's asthma is not controlled, he would be very sedentary	15 (60.0)	3 (12.0)	7 (28.0)	137 (68.2)	26 (12.9)	38 (18.9)
If a child's asthma is not controlled, he would be absent frequently	18 (72.0)	1 (4.0)	6 (24.0)	175 (87.1)	11 (5.5)	15 (7.5)

4.3.6.10 Asthma and Sports

Teachers were asked three questions on asthma and sports (Table 39). The questions focused on misconceptions about sports and asthma and preventative medication.

Table 39: Questions to ascertain teachers' knowledge on asthma and sports.

Questions	Correct answer
Asthmatic children should avoid exercise and sports	False
Preventative medication can be taken by the asthmatic child before exercise/sports	True
Swimming is the best sport for asthmatics	True

Teachers' knowledge regarding asthma and sports was poor as only 30.1% (n=68/226) knew that swimming is an acceptable and beneficial sport for asthmatic children (Table 40).

Almost one third of teachers (38.9%) thought that asthmatic children should avoid exercise and sports.

Choice of the unsure option was high regarding preventative medication and sports (31.4%; n=71/226) (Table 40). Only 12.4 % (n=28/226) could answer all the three questions correctly.

Table 40: Teachers' responses (number and %) to questions on knowledge of asthma and sports (n=226 for all questions).

Statements	True	False	Unsure
Asthmatic children should avoid exercise and sports	88 (38.9)	103 (45.6)	35 (15.5)
Preventative medication can be taken by the asthmatic child before exercise/sports	108 (47.8)	47 (20.8)	71 (31.4)
Swimming is the best sport for asthmatics	68 (30.1)	68 (30.1)	90 (39.8)

In terms of sex, the 30.1% of teachers who agreed that swimming is an acceptable and beneficial sport for asthmatics included 36.0% (n=9/25) of the male teachers and 29.4% (n=59/201) of the female teachers (Table 41). In total, 38.9% of teachers incorrectly thought that asthmatic children should avoid exercise and sports, including 40.0% (n=10/25) of males and 38.8% (n=78/201) were females. Although 46.8% (n=94/201) of female teachers correctly indicated that preventative medication can be taken by the asthmatic child before exercise/sports, a significant proportion of the females teachers were unaware about preventative medication, asthma and sports. Both male and female teachers' knowledge of sports and asthma was limited.

Table 41: Teachers' knowledge on asthma and sports by sex (total n=226 for all questions).

	Male (n=25)			Female (n=201)		
Statements about asthma and sports	**True**	**False**	**Unsure**	**True**	**False**	**Unsure**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Asthmatic children should avoid exercise and sports	10 (40.0)	11 (44.0)	4 (36.0)	78 (38.8)	92 (45.8)	31 (15.4)
Preventative medication can be taken by the asthmatic child before exercise/sports	14 (56.0)	5 (20.0)	6 (24.0)	94 (46.8)	42 (20.9)	65 (32.3)
Swimming is the best sport for asthmatics	9 (36.0)	7 (28.0)	9 (36.0)	59 (29.4)	61 (30.3)	81 (40.3)

4.3.6.11. Overall asthma knowledge scores

A total of 55 questions were asked to evaluate the overall knowledge regarding asthma among the participants. The minimum possible score was thus zero and the maximum score 55, as each correct answer is awarded one point and zero for the incorrect answer or unsure option.

Overall the average score for knowledge on asthma was 30.3 (SD=9.3), ranging from 2 to 51 (Table 42). Almost two-third (61.5%; n=140/226) of the participants scored more than 27 points indicating they had above 50% correct answers for the asthma knowledge test (Figure 15). However 38.5% (n=87/226) of participants scored less than 27 points, which denoted limited knowledge of asthma and its management. A score of less than 27 points means a score below 50%.

Table 42: Overall score on the knowledge of asthma and its management

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Overall score	226	2.00	51.00	30.3	9.3

Figure 15 shows the overall score distribution amongst the 226 participants.

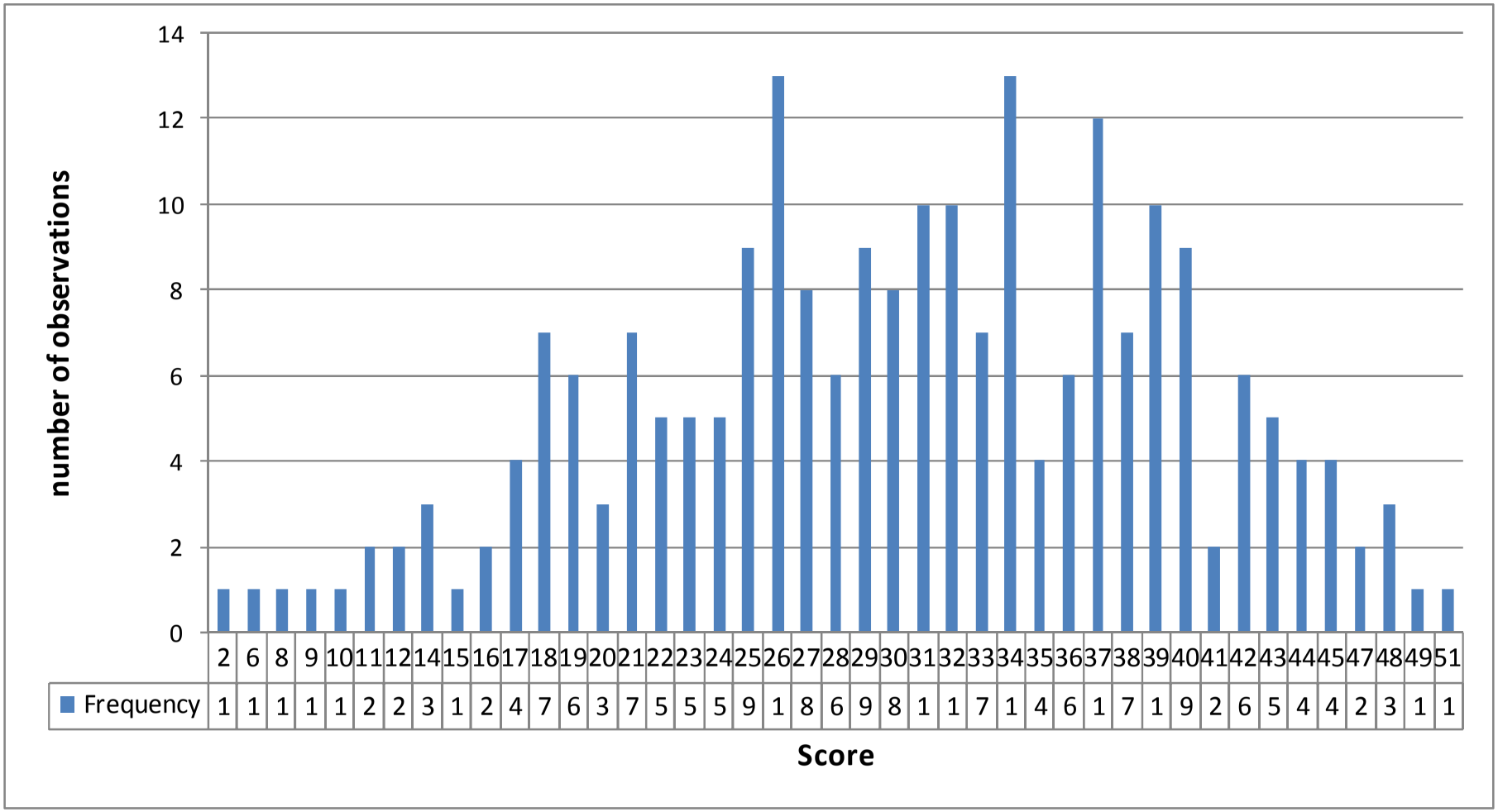


Figure 15: Distribution of overall asthma knowledge score (n=226).

4.3.6.12. Demographic characteristics and asthma knowledge

Age and asthma knowledge

Pearson's correlation analysis was conducted to determine the association between age and the overall knowledge of asthma and its management. The overall asthma knowledge score was not significantly associated with the age of the participants (r= -0.095, p=0.153), (Table 43).

Table 43: Association between age and the overall asthma knowledge score.

Variable	N	Score (mean +/- SD)	P value	Pearson's r
Age	226	30.3+/- 9.3	0.153	-0.095

Sex and asthma knowledge

Cross tabulation was done to explore the relationship between respondents sex and the overall asthma knowledge score (Table 44). The results revealed that the overall asthma knowledge score was not significantly associated with the sex of the participants (chi-square value = 0.027, p = 0.870).

Table 44: Association between sex and the overall asthma knowledge score

Variable	Categories	All (n=226)	Chi-square value	p-value
		n (%)		
Sex	Male	25 (11.1%)	0.027	0.870
	Female	201 (89%)		

Years of teaching experience and asthma knowledge score

Cross tabulation was also conducted to examine the association between teachers' years of teaching experience and the overall asthma knowledge score. The overall asthma knowledge score was not significantly associated with years of teaching experience of the participants (Chi-square value = 8.664, p = 0.070), (Table 45).

Table 45: Association between years of experience and the overall asthma knowledge score

Variable	Categories	All (n=226)	Chi-Square value	p-value
		n (%)		
Years of Teaching Experience	Less than 5 years	24 (10.6)	8.664	0.070
	6-10 years	47 (20.8)		
	11-20 years	94 (41.6)		
	21-30 years	46 (20.4)		
	Over 30 years	15 (5.6)		

Teachers' qualification and asthma knowledge

Correlation analysis was done to explore the association between the levels of teachers' qualifications and the overall asthma knowledge score (Table 46). The overall knowledge score was not significantly associated with the qualification of the participants (chi-square value = 9.762, p = 0.082).

Table 46: Association between teachers' educational qualification and overall asthma knowledge score

Variable	Categories	All (n=226)	Chi-Square value	p-value
		n (%)		
Teaching Qualification	University postgraduate degree	37 (16.4)	9.762	0.082
	University undergraduate degree and education diploma	27 (11.9)		
	University undergraduate degree	15 (6.6)		
	Four years education diploma	101 (44.7)		
	Three years education diploma	35 (15.5)		
	Lesser qualification	11(4.9)		

Association between knowing someone with asthma and asthma knowledge score

Cross tabulation in Table 47 showed no association between the level of asthma knowledge and those that knew someone with asthma and those who did not know someone with asthma (Chi-square value =3.48, p=0.176).

Table 47: Association between having contact with an asthmatic individual and the overall asthma knowledge score.

Variable	Categories	n=105	Chi-square value	p-value
		n (%)		
Knowing someone with asthma	yes	105 (46.5)	3.48	0.176
	no	110 (48.7)		
	unsure	11 (4.9)		

4.4 Asthma related practices in the schools

4.4.1 Asthma policy in the school

Almost three-quarters (73.9%; n=167) of the teachers indicated that there was no written policy for managing children with asthma in their schools (Table 48). Although 4.4% (n=10) of teachers indicated there is a written asthma policy in their schools, 14 of the headteachers indicated there is no written asthma policy in their schools and 3 headteachers were unsure (Figure 16).

Table 48: Written policy on asthma in school.

Policy available	n (%)
Yes	(10) 4.4
No	167(73.9)
Unsure	49 (21.7)
Total	226 (100.0)

In terms of sex, of the 10 teachers who stated that their schools had a school asthma policy, 2 were male teachers while 8 were females teachers (Figure 17). None of the schools had a written policy for managing asthmatic schoolchildren.

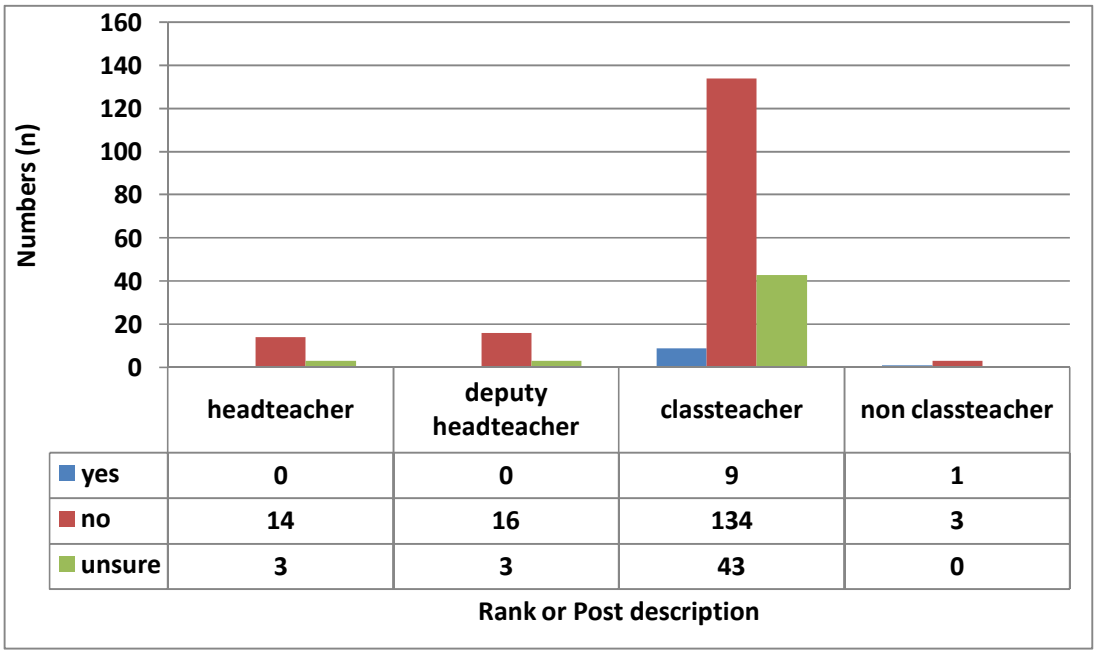


Figure 16: Teachers' response to their school having an asthma policy by rank post description (n=226).

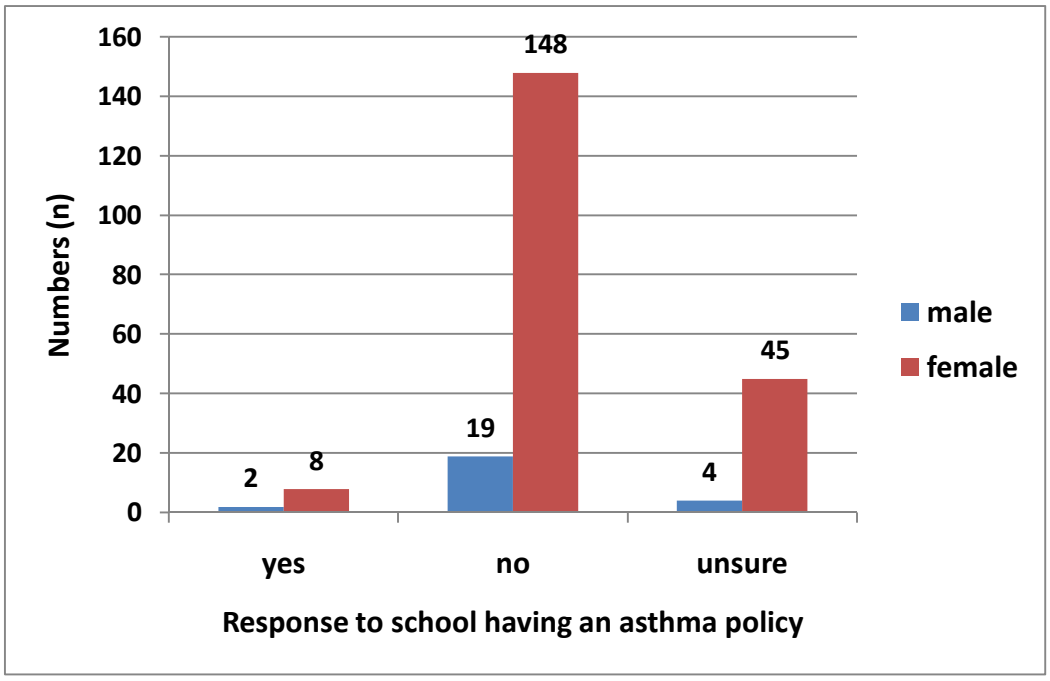


Figure 17: Teachers' response to their schools having an asthma policy by sex (n=226)

4.4.2 Visits by school health nurse to the schools

Over half (53.1%; n=120/226) of the teachers mentioned that the school health nurse had not visited their school in the three months prior to data collection (Table 49). Only 14.2% (n=32/226) of teachers were unsure of school health nurse visits to the schools.Those teachers who reported that the school health nurse had never visited their schools, represented 60.0% (n=15/25) of male teachers and 52.2% (n=105/201) of female teachers (Figure 18). Only 10.6% (n=24/226) of teachers reported that the school health nurse visited their school more than once. Of the 17 headteachers, 6 reported that school health nurse visited their school once only in the last three months while 8 reported that the school health nurse had not visited their school in the three months prior to data collection (Figure 19). Fourteen of the 19 deputy headteachers also reported that the school health nurse had not visited their school in the three months prior to data collection.

Table 49: Teachers' reports of visits by school health nurse to schools in last three months (prior to data collection)

No of times visited	n (%)
Once	50 (22.1)
More than once	24 (10.6)
Never	120 (53.1)
Unsure	32 (14.2)
Total	226 (100.0)

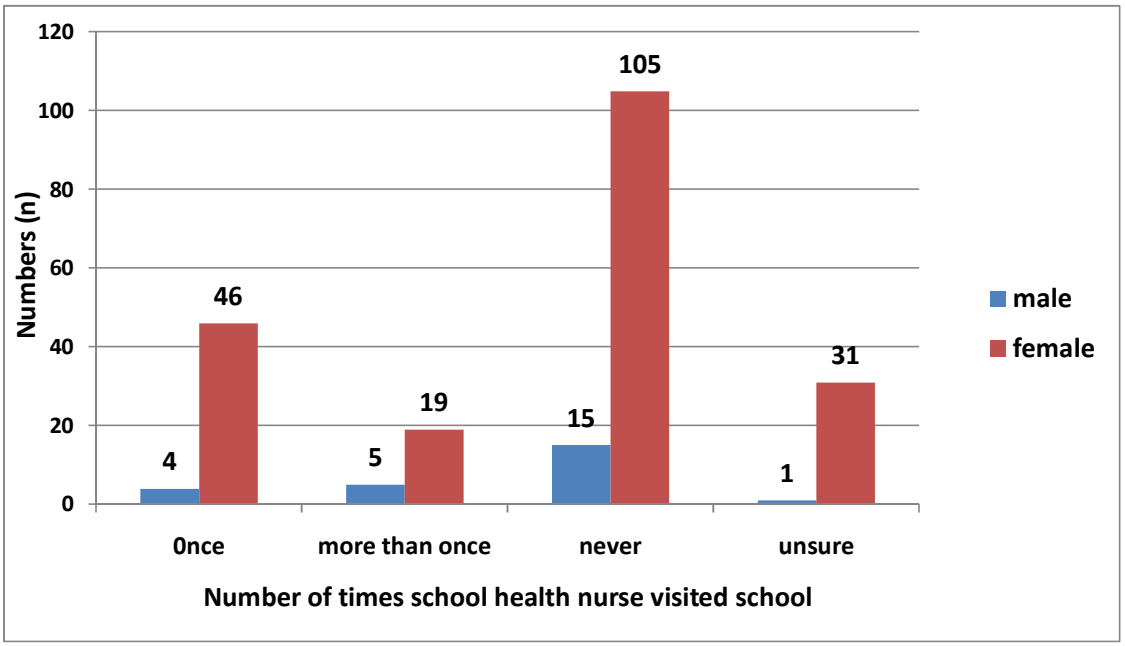
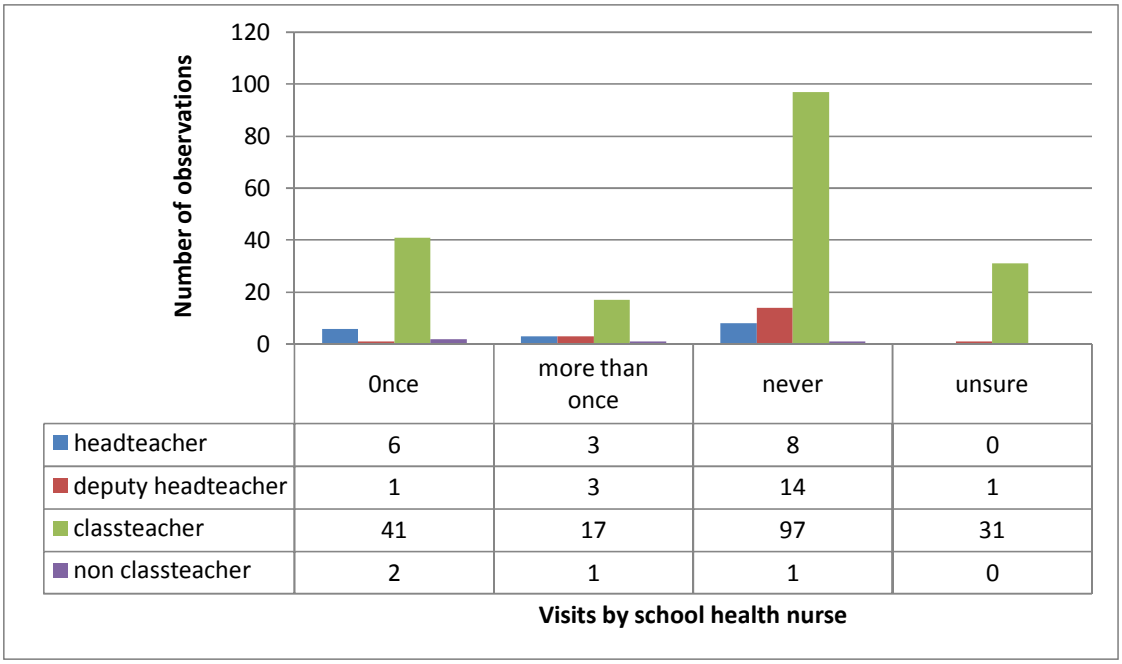


Figure 18: Teachers' response to the number of times the school health nurse visited school in last 3 months by sex (n=226),



	0nce	more than once	never	unsure
headteacher	6	3	8	0
deputy headteacher	1	3	14	1
classteacher	41	17	97	31
non classteacher	2	1	1	0

Figure 19: Teachers' response to the number of times school health visited their school in last 3 months by rank or post description (n=226)

4.4.3 Known self declared asthmatic children in the schools

Of the teachers polled 50.4% (n=114/226) reported that they have self declared asthmatic children in their schools while 25.7% (n=58) were unsure if there are asthmatic children in their schools (Table 50). In terms of sex, 64.0% (n=16/25) of male teachers and 48.8% (n=98/201) of female teachers knew of self declared asthmatic children in schools (Figure 20).

Table 50: Teachers' responses to knowing self declared asthmatic children in their schools.

Have self declared asthmatic children	n (%)
Yes	114 (50.4)
No	54 (23.9)
Unsure	58 (25.7)
Total	226 (100.0)

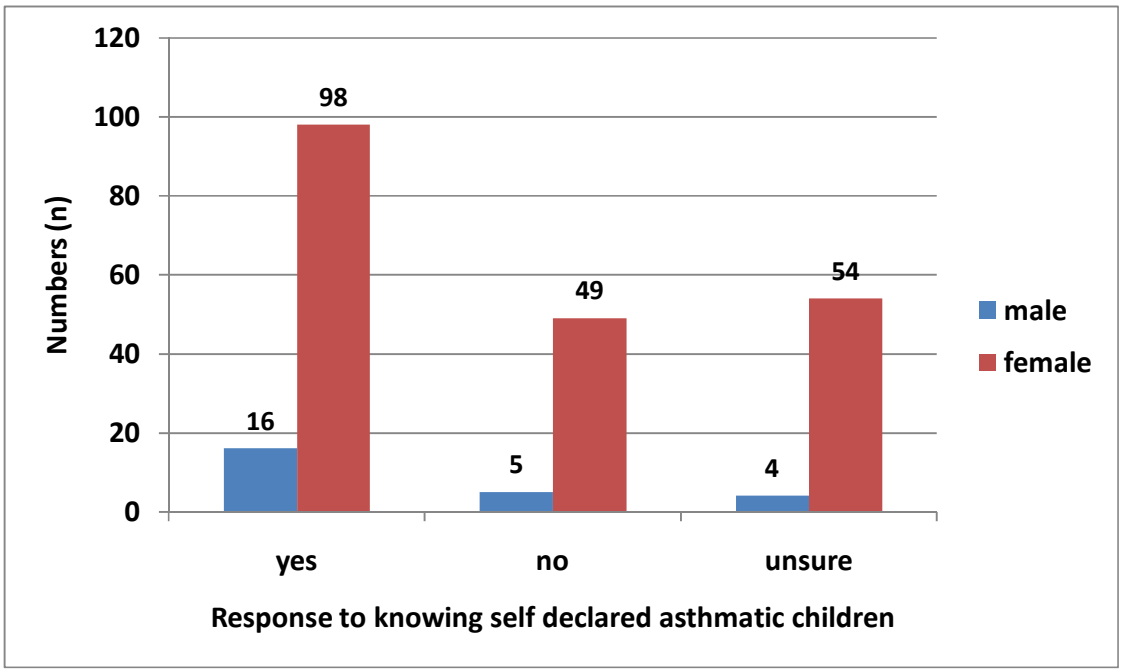


Figure 20: Teachers' knowledge of self declared asthmatic children by sex (n=226),

.

4.4.4 Number of self declared asthmatic children in school

The average number of primary schoolchildren in each school was 440. Of those teachers who reported to have self declared asthmatic children in their school, only 15.8% (n=18/114) indicated that they had between 6-10 asthmatic children in their schools and another 8.8% (n=10/114) reported they had between 11-20 asthmatic children in their schools (Figure 21). Almost a third of teachers (31%; n=36/114) did not know how many asthmatic children were in their schools.

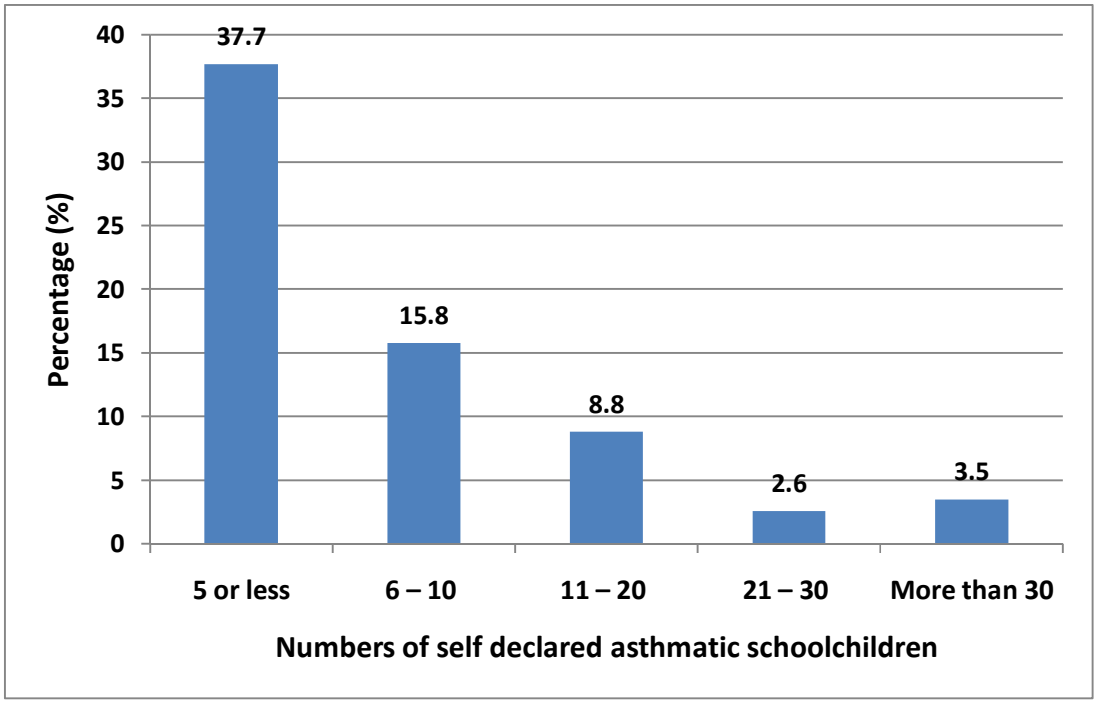


Figure 21: Teachers' responses to the number of known self declared asthmatic children in their schools (n=114)*

* This question is only applicable to 114 of the respondents who knew of asthmatic children in their schools

4.4.5 Persons who inform or notify teachers of asthmatic children in the school

Almost two thirds (62.3%; n=71/114) of teachers who knew of asthmatic children in their schools reported that the parent or caregiver informed them of the child's asthmatic status while 50.9% (n= 58/114) reported to get the information from the asthmatic schoolchildren themselves (Table 51).

In terms of sex, of the 50.9% of teachers who reported asthmatic children themselves notify them of their status, 75.0% (n=12/16) were males while 46.9% (n=46/98) were females (Figure 22). Of the 62.3 % of teachers who were informed by parents of children's asthmatic status, 43.8% (n=7/16) were males and 65.3% (n=64/98) were females.

Table 51: Teachers' responses regarding the sources where they get information on asthmatic children (n=114).

Source of information	n (%)
Child	58 (50.9)
Parent/caregiver	71 (62.3)
Child's previous teacher	14 (12.3)
Member of support staff	2 (1.8)
School Nurse	1 (0.9)
Local Clinic	2 (1.8)
Not informed	11 (9.6)
Total	149*

* The total exceeds 114 because this a multiple response question

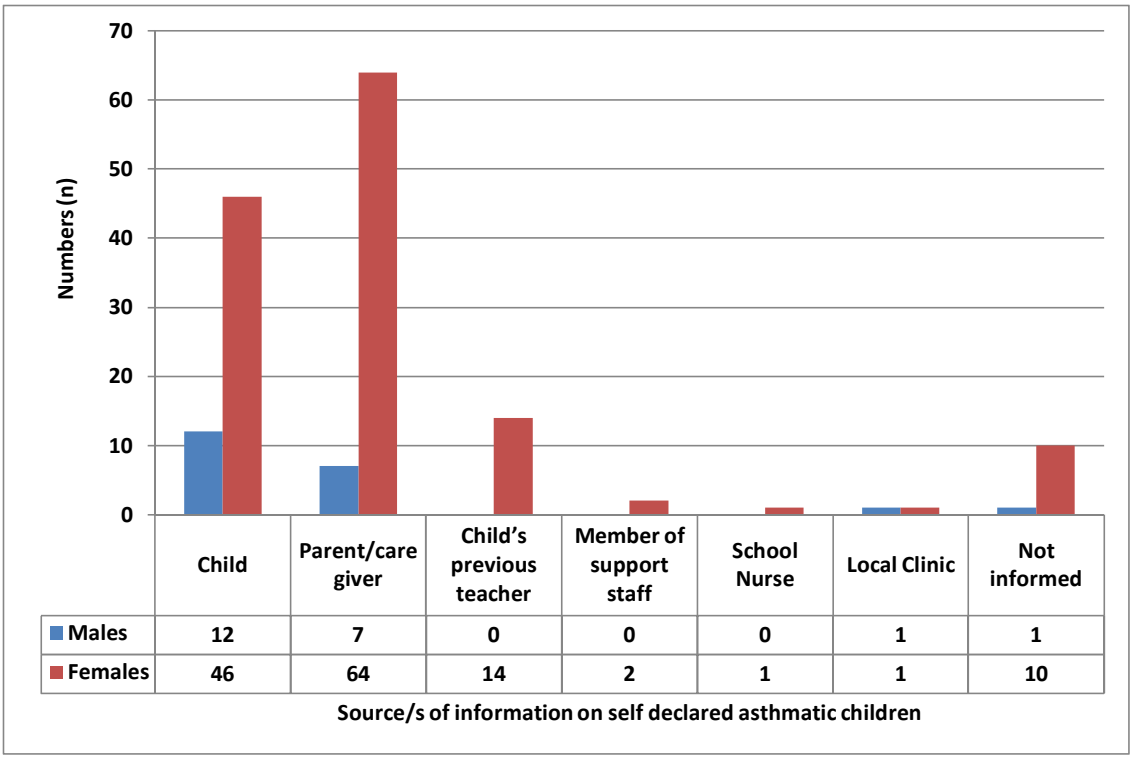


Figure 22: Teachers responses to sources of information on self declared asthmatic children by sex (n=114).*

* This question is only applicable to 114 of the respondents who knew of asthmatic children in their schools

4.4.6 Persons who look after child's asthma medication

Almost thirty percent (29.6%; n=67/226) of teachers reported that children themselves look after their asthma medication, whereas only 20.8% (n=47/226) indicated that school office staff look after the children's asthmatic medication (Figure 23). Of the 29.6% (n=67/226) of teachers who reported that the children themselves look after their own asthmatic medication, 52.0% (n=13/25) were males and 26.9% (n=54/201) were females. A significant proportion (29.6%; n=67/226) of teachers reported that they did not know who looked after the asthmatic children's' medication. Of the respondents, only 16.4% (n=37/226) reported that they themselves look after the children's asthma medication. Only 6.2% (14/226) of respondents mentioned that the first aiders who are allocated health officers look after the asthmatic child's medications. Of the 37 teachers who reported they themselves look after the children's asthma medication, only 1 was a male teacher while 36 were females (Table 52).

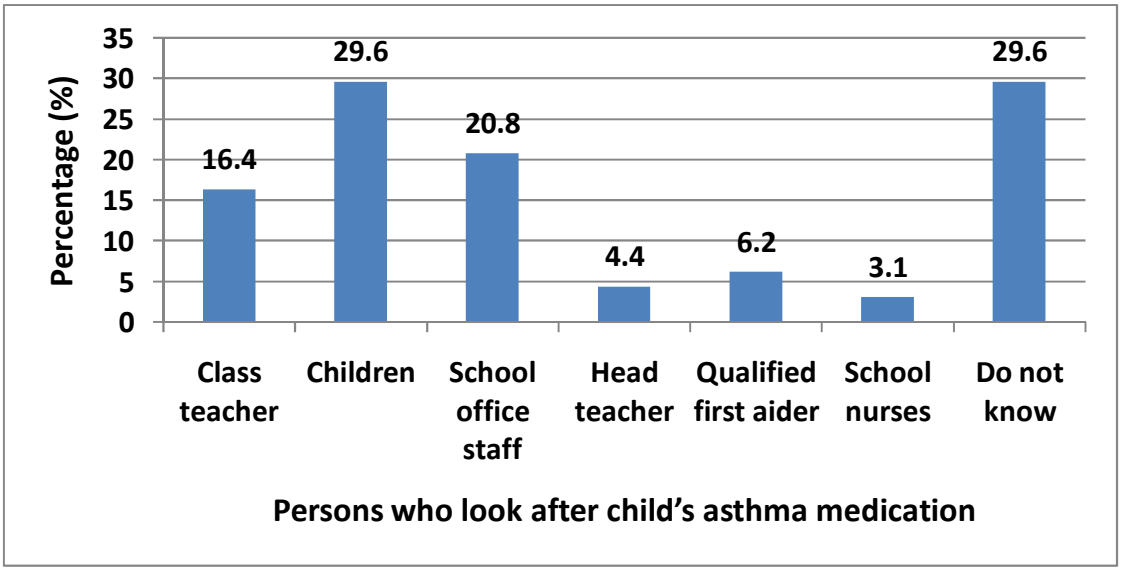


Figure 23: Persons responsible for the care of the child's asthmatic medication at schools (n=226)*

*The percentage total exceeds 100 because teachers' could chose more than one option as this was a multiple response question.

In total there were 249 responses exceeding 226.

Table 52: Teachers' responses with regards to who looks after child's asthma medication by sex (n=226).

Person responsible for care of child's asthma medication	Male	Female	Total
	n	n	n
Class teacher	1	36	37
Child	13	54	67
School office staff	3	44	47
Head teacher	2	8	10
Qualified first aider	1	13	14
School Nurse	1	6	7
Do not know	5	62	67
Total	26	223	249

* The total exceeds 226 because teachers' could chose more than one option.

4.4.7 Nebulisers at schools

Only 5 (2.2%) of the teachers reported that there was a nebuliser in their schools. The majority of teachers (85.1%; n=193/226) indicated they had no nebulisers in their schools (Table 53). Although 5 teachers reported that their schools had nebulisers, this contradicted the reports from all the headteachers who indicated they had no nebulisers in their schools (Figure 24). The contradiction refers to the inconsistency related to the responses of the teachers vs the headteachers.

Table 53: Participants' reports of whether their schools have nebuliser.

Nebuliser in school	n (%)
Yes	5 (2.2)
No	193 (85.4)
Unsure	28 (12.4)

Nebuliser in school	n (%)
Yes	5 (2.2)
No	193 (85.4)
Unsure	28 (12.4)
Total	226(100.0)

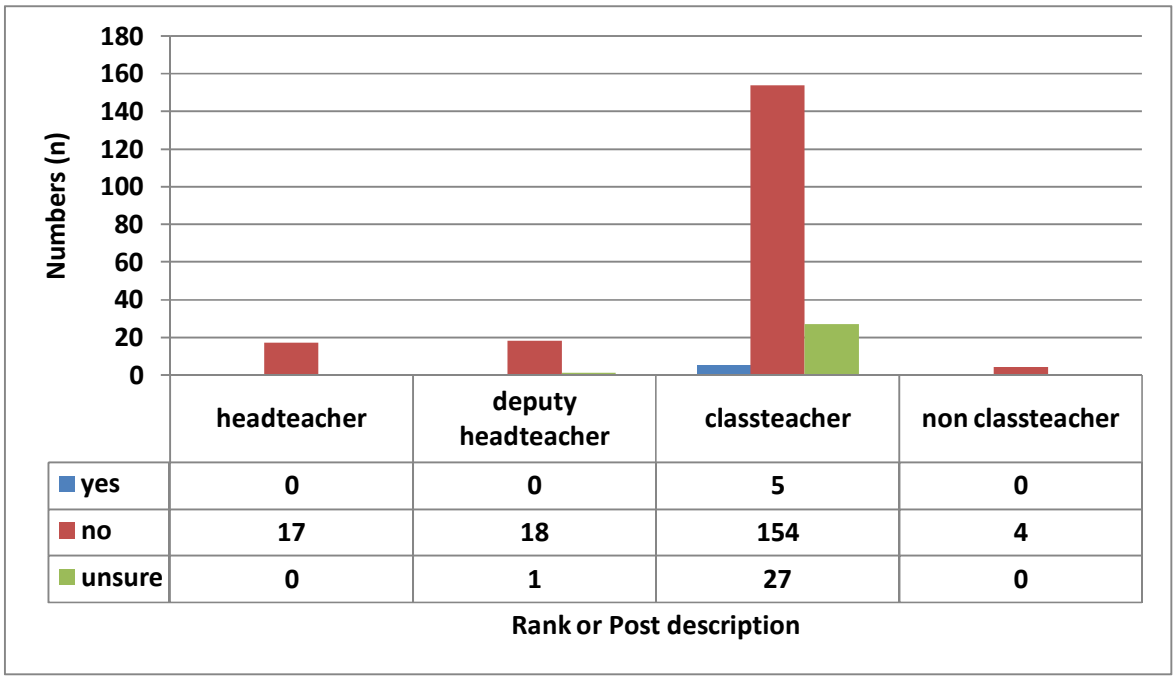


Figure 24: Responses by rank or post description of participants as to whether their schools have nebulisers (n=226).

4.4.8 Peakflow meters at schools

The majority of teachers (73%; n=165/226) mentioned that there is no peak flow meter in their schools (Table 54). None of the headteachers mentioned their schools had a peakflow meter (Figure 25).

Table 54: Participants' reports of having a peakflow meter in their schools.

Peakflow meter in school	n (%)
Yes	2 (0.9)
No	165 (73.0)
Unsure	59 (26.1)
Total	226 (100.0)

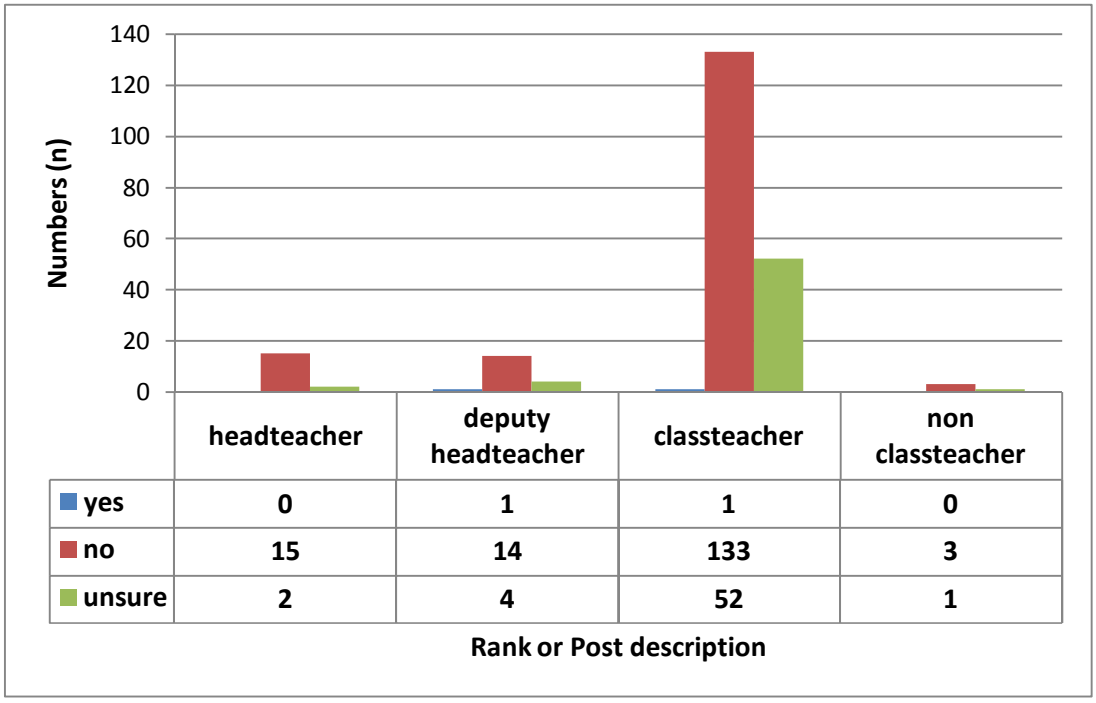


Figure 25: Responses by rank or post description of participants as to whether their schools have a peak flow meter (n=226).

4.4 9 Coping with children who have asthma

Respondents were asked questions about their experiences with asthmatic schoolchildren. Over a third (35.4%; n=80/226) of teachers reported to have witnessed a child having an asthma attack in class or during school hours (Table 55). Of these 35.4% (n=80/226) of teachers who reported to have witnessed an asthma attack, 32.0% (n=8/25) were males and 35.8% (n=72/201) were female teachers (Figure 26)

Table 55: Participants who witnessed asthma attack in class or during school hours.

Witnessed an asthma attack	n (%)
Yes	80 (35.4)
No	138 (61.1)
Unsure	8 (3.5)
Total	226 (100.0)

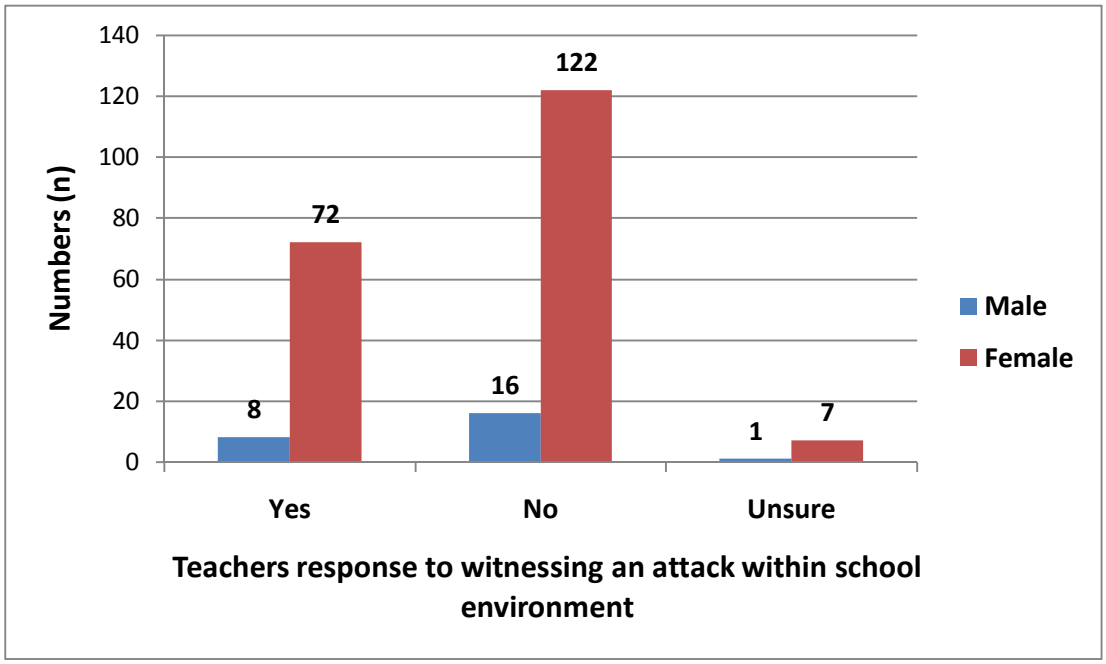


Figure 26: Participants who witnessed asthma attack in class or during school hours by sex (n=226)

Among the 80 teachers who reported they had witnessed an asthma attack, the majority (87.5%; n=70/80) indicated they assisted the asthmatic children (Table 56). Of the 80 teachers who assisted the asthmatic child during an asthma attack, 7 were male teachers and 63 were females (Figure 27).

Table 56: Teachers who assisted the asthmatic children during an asthma attack (n=80).

Assisted asthmatic child during attack	n(%)
Yes	70 (87.5)
No	10 (12.5)
Total	80 (100)

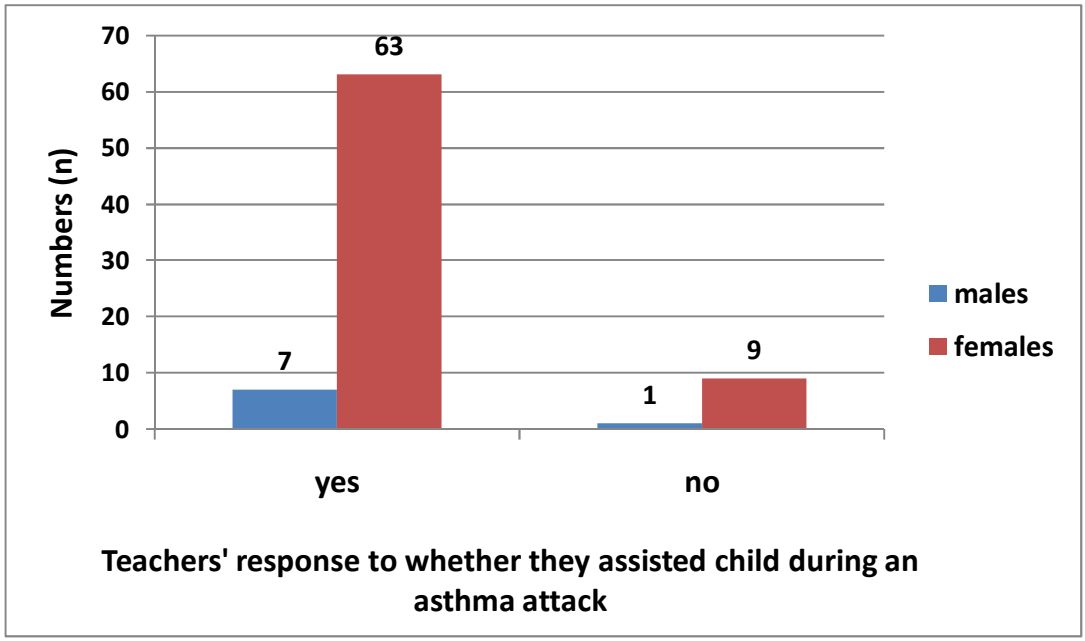


Figure 27: Teachers who assisted the asthmatic children during an asthma attack by sex (n=80)*

*Only 80 teachers reported they witnessed an asthma attack and thus this question was only applicable to them.

Almost half (47.1%; n=33/70) of the teachers who assisted the asthmatic child during an asthma attack indicated that they called the parents or caregivers and another 32.9% (n=23/70) assisted by calling for medical assistance (Figure 28). Almost 19% (n=13/70) of teachers reported that they took the child to a medical centre (clinic/hospital/GP). Twenty percent (20.1%; n=14/70) of teachers reported that they

administered medication. Of the 7 male teachers who assisted a child during an asthma attack, none administered medication or took the child to clinic/GP/hospital. Male teachers only reported assisting the child by calling for medical assistance or contacting the parents (Table 57). It was only female teachers who reported administering medication.

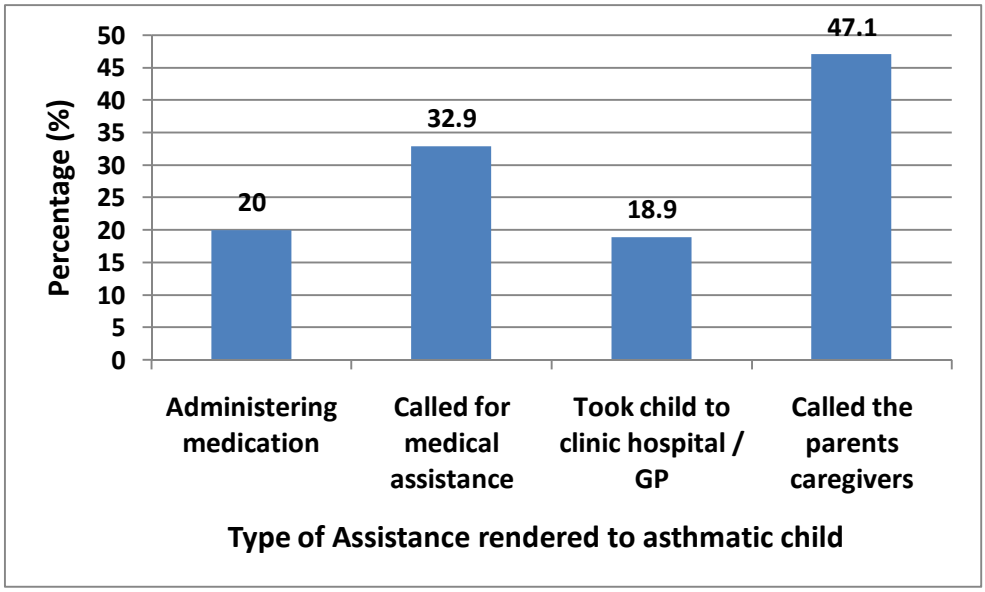


Figure 28: Methods of assistance rendered to asthmatic children by participants during an asthma attack (n=70)*

*Only 70 teachers reported they assisted a child during an asthma attack and thus this question was only applicable to them.

Thirteen out of fourteen teachers indicated that they administered reliever inhaler medication (Table 58). Figure 29 shows that no male teachers administered medication to an asthmatic child during an attack.

.

Table 57: Method of assistance rendered by teachers to the asthmatic children by sex (n=70)*

Method of assistance rendered to asthmatic child	Male	Female	Total
	n	n	n
Administered medication	0	14	14 (20.0)
Called for medical assistance	3	20	23 (32.9)
Took child to clinic/GP/Hospital	0	13	13 (18.9)
Called the parents/caregivers	4	29	33 (47.1)
Total	7	76	80**

*Only 70 teachers reported they assisted the child during an asthma attack.

**Total exceeds 70 because this was a multiple response question.

Table 58: Type of medication administered by teachers to asthmatic children while assisting them during the asthma attack (n=14)*

Type of medication	n (%)
Panado syrup	1 (7.1)
Reliever inhaler medication	13 (92.9)
Preventer Pump	3 (21.4)
Total	16**

*Only 14 teachers reported administered medication during an attack and thus this question was only applicable to them.

** Total exceeds 14 because this was a multiple response question.

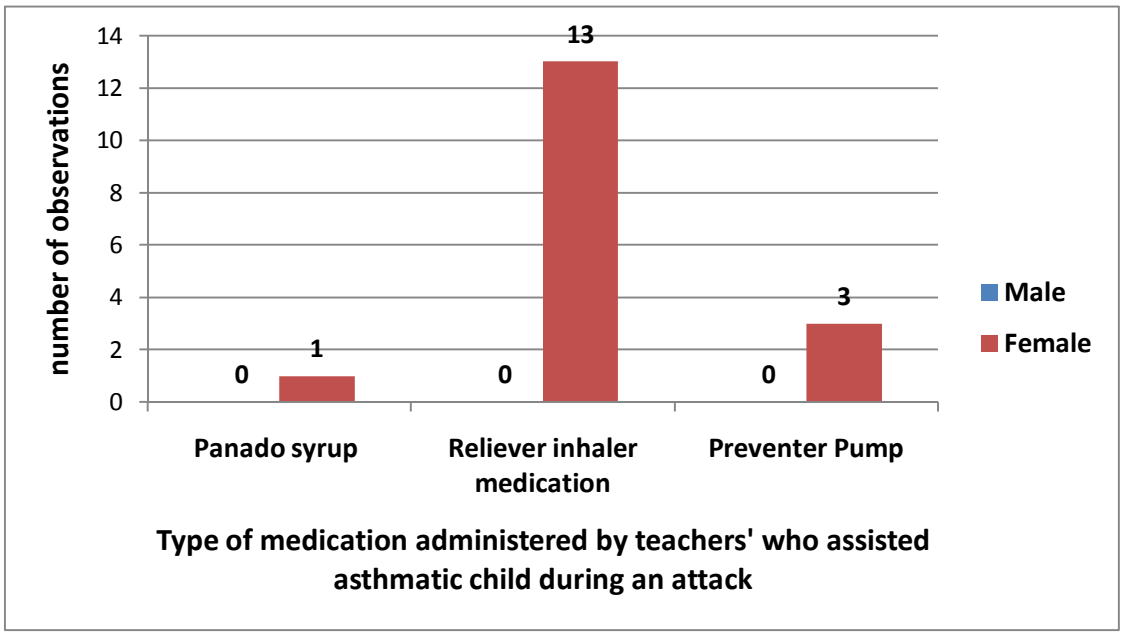


Figure 29: Type of medication administered to asthmatic child during an asthma attack by sex of respondent (n=14)

4.4.10 Personal perceptions about handling asthmatic children

The majority of the teachers (66.8%; n=151/226) indicated they felt that they did not know enough about asthma to help a child presenting with symptoms of an asthma attack in the classroom (Figure 30). Of those teachers who indicated they that felt they did not know enough about asthma to help a child presenting with symptoms of an asthma attack, 60.0% (n=15/25) were males and 67.7% (n=136/201) were females. It is important to note that a significant proportion of teachers (20.8%; n=47/226) reported that they were unsure about whether they enough about asthma to care for a child during an asthma attack. Only 12.4% (n=28/226) of teachers feel they know enough about asthma to help a child presenting with symptoms of an asthma attack in the classroom. The 12.4% of teachers who felt they knew enough about asthma to help a child presenting with symptoms of an attack included 20.0% (n=4/25) males and 11.9% (n=24/201) females (Table 59).

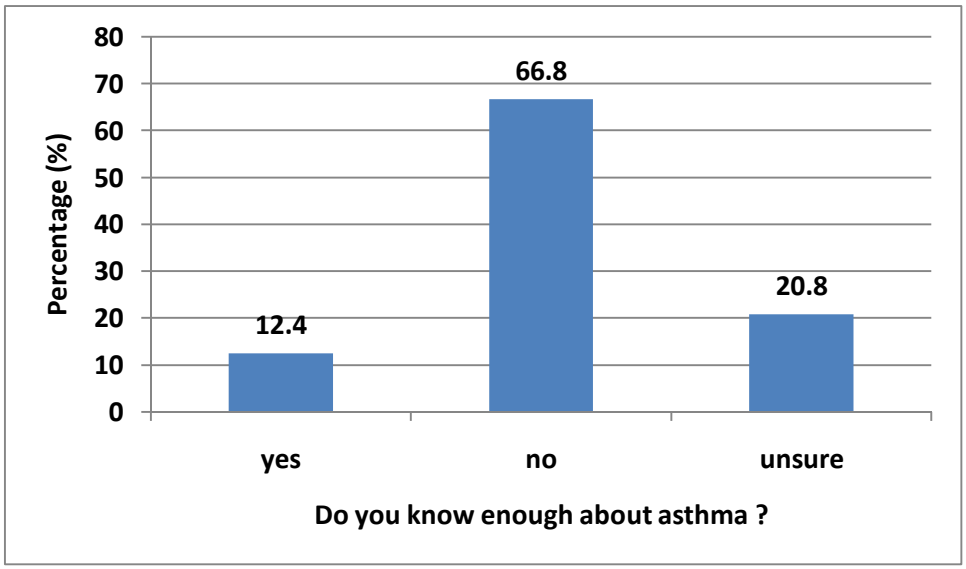


Figure 30: Teachers' perception about whether they know enough about asthma (n=226).

Table 59: Teachers' perception about whether they know enough about asthma by sex (total number of respondents =226).

	Gender	
Know enough about asthma	**Male**	**Female**
	n (%)	**n (%)**
Yes	4 (16.0)	24 (11.9)
No	15 (60.0)	136 (67.7)
Unsure	6 (24.0)	41 (20.3)
Total	25 (100)	201 (100)

The majority of the respondents (76.6%; n=173/226) were very or quite concerned about dealing with asthmatic children in the school environment (Figure 31). All male respondents were slightly concerned, quite concerned or very concerned about dealing with asthmatic children (Table 60). Seven (3.5%) of the female teachers were not concerned at all about dealing with asthmatic children.

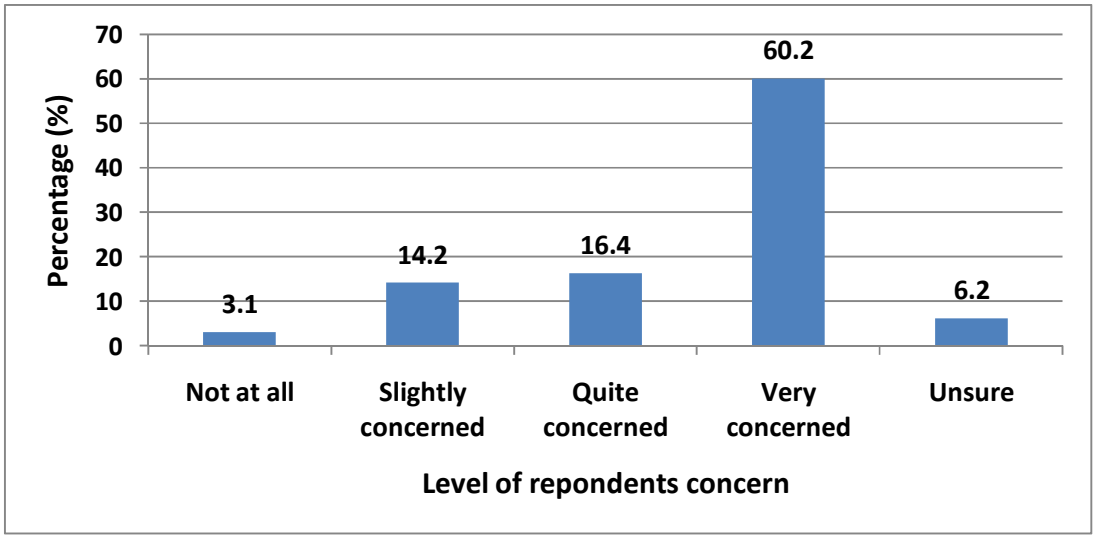


Figure 31: Level of respondents concerns about dealing with asthmatic schoolchildren (n=226).

Table 60: Level of respondents concerns about dealing with asthmatic schoolchildren by sex (total number of respondents =226).

	Gender	
Level of concern of respondents	**Male**	**Female**
	n (%)	**n (%)**
Not at all	0 (0)	7(3.5)
Slightly concerned	3 (12.0)	29 (14.4)
Quite concerned	4 (16.0)	33 (16.4)
Very concerned	17 (68.0)	119 (59.2)
Unsure	1 (4.0)	13 (6.5)
Total	25 (100)	201 (100)

The majority of teachers' (56.2%; n=127/226) were not confident in assisting an asthmatic child during an asthma attack while 11.9 % (n=27/226) were unsure about their confidence in caring for an asthmatic child during an asthma attack (Figure 31). In terms of sex, the 56.2% of teachers consisted of 64.0% (n=16/25) males and 55.2% (n=111/201) female teachers who reported a lack of confidence in assisting an

asthmatic child during an asthma attack (Table 61). Only 5 male teachers and 67 female teachers reported they were confident in assisting a child during an asthma attack.

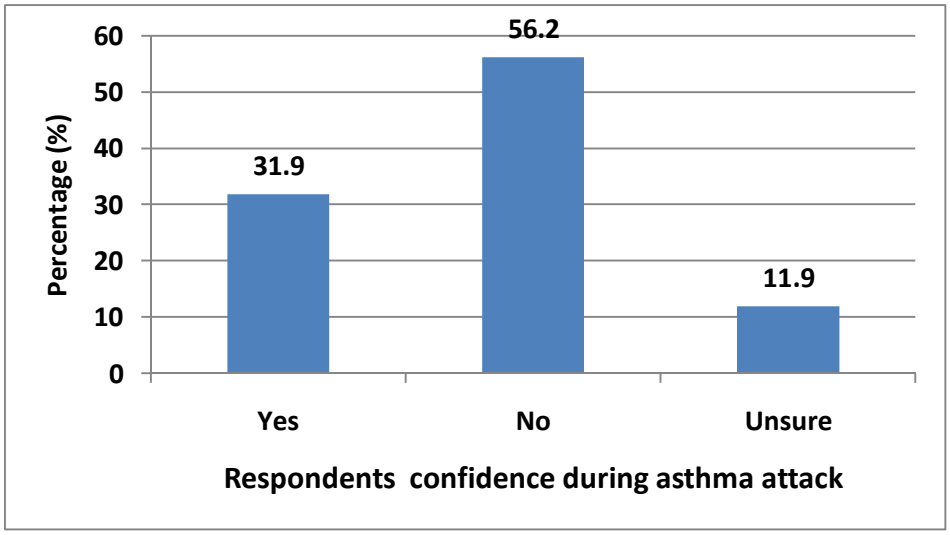


Figure 32: Respondents confidence in assisting an asthmatic child during an asthmatic attack (n=226).

Table 61: Respondents confidence in assisting an asthmatic child during an asthmatic attack by sex (total number of respondents =226).

	Gender	
Confidence with assisting an Asthmatic Child during an asthma attack	**Male**	**Female**
	n (%)	n (%)
Yes	5 (20.0)	67 (33.3)
No	16 (64.0)	111 (55.2)
Unsure	4 (16.0)	23 (11.4)
Total	25 (100)	201 (100)

Cross tabulation was used to analyse the association between teachers' level of asthma knowledge and their confidence in their ability to assist a child during an asthma attack. There was a significant association between the overall asthma knowledge score and teachers confidence in their ability to assist a child during an asthma attack ($p<0.0001$) (Table 62).

Table 62: Association between the overall asthma knowledge score and teachers confidence their ability to assist child during an asthma attack

Variable	Categories	n=226	p-value
		n (%)	
Confidence	yes	72 (31.9)	<0.0001
	no	127 (56.2)	
	unsure	27 (11.9)	

The majority of the teachers (71.2%; n=161/226) indicated that if a child's asthma is not controlled then, they would inform the parents or caregivers (Figure 32). Of these 71.2% of teachers, 68.0% (n=17/25) were males and 71.6% (n=144/201) were females that would report uncontrolled asthma to the child's parents or caregivers (Figure 33)

Only 9.7% (n=22) of teachers indicated that if a child's asthma is not controlled, they would report it to the school nurse while 18.1% (41) reported they would refer the child to a medical practitioner.

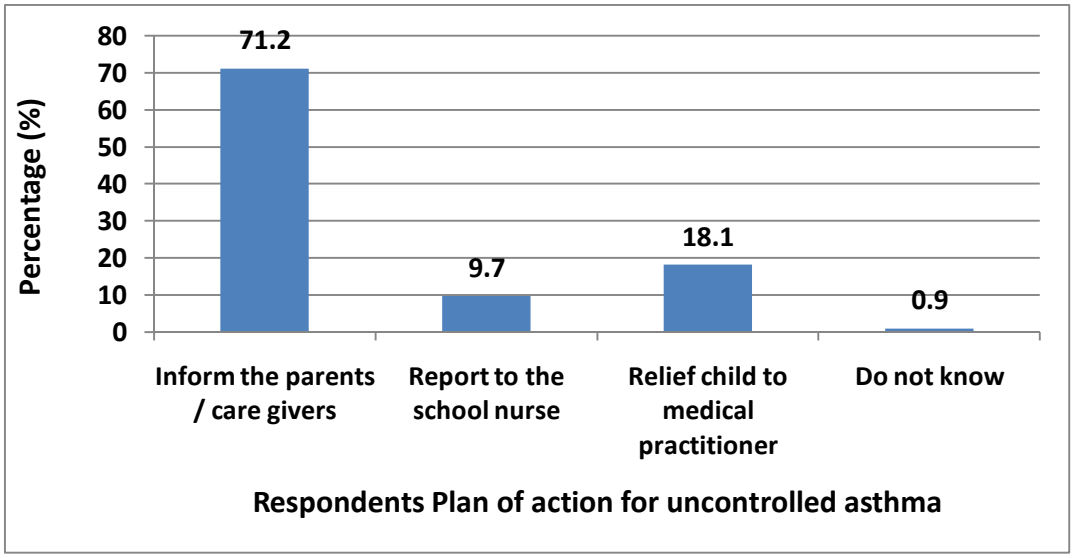


Figure 33: Teachers preferred plan of action if a child's asthma is not controlled (n=226).

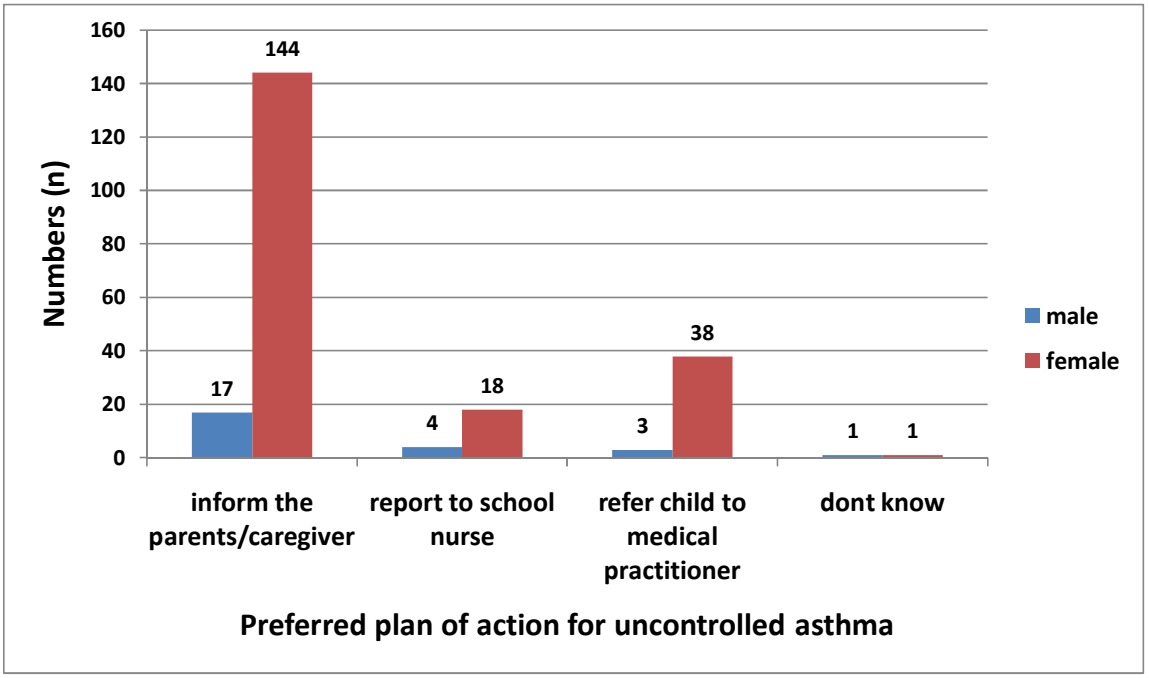


Figure 34: Teachers' preferred plan of action if a child's asthma is not controlled by sex (n=226).

Teachers' principal concerns about asthmatic children were explored. The respondents who reported they had "no concerns at all" regarding asthmatic children and the respondents who were "unsure" of their confidence in their ability to assist a child during an asthma attack were exempted from answering this question. A total of 33 schoolteachers were exempted from answering this question on principal concerns about asthmatic children. These include the 7 respondents who reported they had "no concerns at all" regarding asthmatic children. Of these 7 respondents who had "no concerns at all" regarding asthmatic children, 1 respondent also reported being "unsure" about his/her confidence in his/her ability to assist a child during an asthma attack.. This respondent was also therefore included among the 27 respondents who were "unsure" about their confidence regarding their ability in assisting a child during an asthma attack. The statistical software SPSS was able to avoid duplication of the count of the number of respondents and accurately extrapolate that 33 respondents were exempted from this question based on their responses in previous questions. Therefore 193 teachers responded to this question about principal concerns about asthmatic children in school. The majority of teachers (69.4%; n=134/193) reported that their principal concern is coping with an emergency (Table 63) while 24.9% (n=48/193) of the teachers were concerned about administering treatment. Of the 59.3% of teachers who reported that their concern is coping with an emergency, 14.3% (n=3/21) were males and 26.2% (n=45/172) were females (Figure 34). Of the eleven teachers who reported their principal concern about asthmatic children in schools is the disruption to other pupils included 2 male teachers and 9 female teachers.

Table 63 Teachers' principal concerns about having asthmatic children in their schools (n=193).

Principal Concerns	n(%)
Disruption to other pupils	11(5.7)
Administering treatment	48 (24.9)
Coping with an emergency	134 (69.4)
Total	193*(100)

* This question was only applicable to193 respondents.

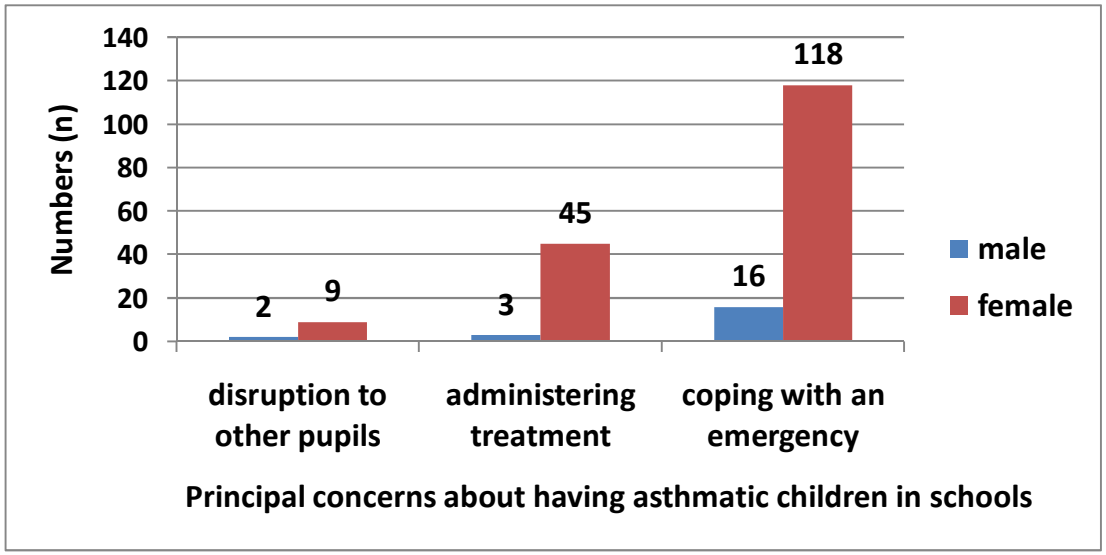


Figure 35: Teachers' responses to their concerns about having asthmatic children in school by sex (n=193)*.

* This question was only applicable to193 respondents.

Almost all the participants (95.1%; n=215) mentioned that in-service training for asthma management is absolutely necessary (table 64). All 25 male teachers reported that it is absolutely necessary to have in-service training on asthma management (Figure 35)

Table 64: Teachers' rating of the need for in-service training on asthma management.

Rating	n (%)
Absolutely necessary	215 (95.1)
Somewhat necessary	9 (4.0)
Unnecessary	2 (0.9)
Total	226 (100.0)

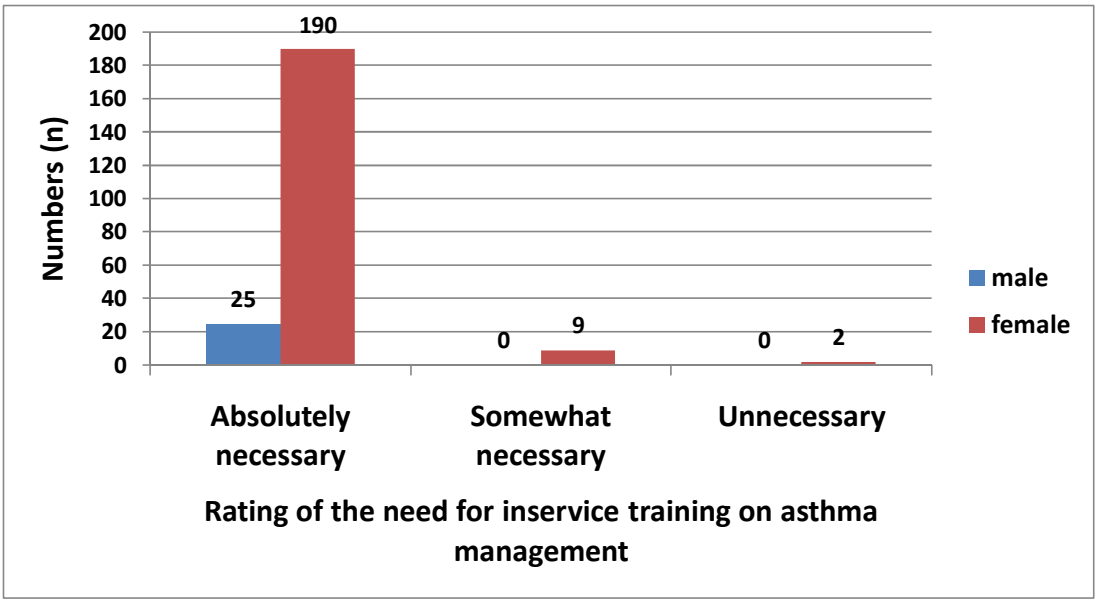


Figure 36: Teachers' rating of the need for in-service training on asthma management by sex (n=226)

4.5 Conclusion

Although 61.5% of teachers scored above 50% correct answers for the asthma knowledge test, there was a huge gap in their knowledge on the care of a child with an acute exacerbation of asthma. The results of this study also suggest that there is a lack of knowledge among teachers in certain areas of asthma which include medication use and sports. Teachers' general knowledge an asthma and trigger factors was reasonable.

The deficiency in knowledge of asthma care in an acute exacerbation may have contributed to their lack of confidence in assisting a child during an asthma attack. The information on school asthma policy, school health nurse visits and equipment was uncertain as there were conflicting results.

The lack of knowledge of asthma care in an acute attack is of great concern as an immediate repose will be required to assist the affected child. Knowledge of asthma care during an acute exacerbation is pivotal to successful asthma management. Inaccurate information about this serious disease can result in teachers making incorrect decisions and failing to assist the asthmatic child.

The results will be discussed and further explored in chapter 5.

CHAPTER 5: DISCUSSION

5.1 Introduction

The aim of this study was to elucidate asthma knowledge and management in primary schools in Umdoni subdistrict.

The schools used in this study were selected from the Umdoni school registry kept by the Department of Education, Port Shepstone. The primary schoolteachers in Umdoni subdistrict were included as the sample population for this study. There were nineteen schools that finally agreed to participate in this study, and 226 schoolteachers.

The attitudes and personal perceptions of primary schoolteachers towards assisting asthmatic schoolchildren depends largely on their knowledge of asthma and its management. Primary schoolteachers constitute an important resource in the care of asthmatic schoolchildren within the school environment. An African proverb, “it takes a village to raise a child” (van der Schyf, 2010) inspires the vision of schoolteachers as guardians of children within the school setting.

This chapter is a discussion of the findings of this study which were presented in the preceding chapter, and places them in the context of the available literature. The results of the asthma knowledge test in the True-False with “unsure option” formats were assessed as follows: correct answers denoted presence of knowledge, incorrect answers denoted misconceptions and unsure denoted absence of knowledge.

The results of this survey indicates that although most teachers had above 50% score for the asthma knowledge test, there was a substantial lack of knowledge among teachers in Umdoni primary schools in the areas identifying signs and symptoms of an asthma attack, management of a severe asthma attack, asthma medication and use. Large proportions of teachers believed asthma and aspirin may be used to treat an asthma attack. None of the respondents knew the correct steps to administering inhaled medication. Only 6 of 226 teachers indicated they received training in asthma management which indicates a huge skill gap. The significant lack of knowledge and

misconceptions on the various areas of asthma among teachers has led to their lack of confidence in dealing with this serious common childhood disease.

5.2 Demographic profile of the primary schoolteachers'

The participating teachers' ages ranged from 18 to 64 years with a mean of 43 years (SD=8.2 years). While the youngest would seem unusual, the age distribution is what would be expected from a working age population. The age distribution for teachers over the age of 35 is similar to that reported in the studies undertaken in Malaysia (Bahari and Rahman, 2003), in Hong Kong (Tse and Yu, 2003) and Turkey (Ones *et al.,* 2006). This study found no significant relationship between age and teachers' knowledge of asthma. Ones *et al.* (2006) reported a similar finding in an asthma knowledge survey conducted on primary schoolteachers in Istanbul, Turkey.

In terms of sex, the majority of participants are female teachers (88.9%). Male teachers accounted for 11.1% of the study sample. Other studies of asthma knowledge amongst schoolteachers have also identified a majority of female teachers (Bahari and Rahman, 2003; Ones *et al*., 2006 and Tse and Yu 2003) but few studies have investigated the relationship between sex and teachers' knowledge of asthma (Brook, 1990; Ones *et al*., 2006 and Tse and Yu, 2003). These non South African studies found a significant, but contradictory, relationship between sex and primary schoolteachers' knowledge of asthma. Tse and Yu (2003) found in the Hong Kong asthma knowledge study that male teachers performed better in the survey. Ones *et al.* (2006) found that female primary schoolteachers were more knowledgeable on asthma and its management (p=0.003)**.** The results of this study do not reflect similar findings. There was no significant relationship between teachers' sex and knowledge of asthma (chi-square value = 0.027, p = 0.870). This lack of an identified association is not likely due to the sample size and differences in the male to female ratio. In the study by Brook (1990), in Holon (Israel), the sample consisted of 69 teachers which included 25.8% male teachers and 74.2% female teachers. The high female teacher ratio to the male teacher ratio is similar to this study. However, Brook (1990) found a significant relationship between the level of knowledge and gender ($p< 0.01$).

Drudy (2008) reported in a paper about sex variations and bias in the teaching profession that there are more females than males in the teaching profession overall. This is indeed reflected in the teacher population in Umdoni subdistrict. Drudy (2008) cites many reasons for the feminisation that is associated with the teaching profession, including current economic trends, the changing role of women in the community and personal views of masculinity. However, other studies have shown similar findings in other settings. Juhn *et al.* (2002) investigated child care programme directors' knowledge of asthma and factors that influence the directors' knowledge of asthma via telephonic interviews. These authors found that there was no significant relationship between the child care program directors' sex and level of asthma knowledge.

It is possible that the lack of sex differences in the knowledge score in this study is related to the lack of a sex-differentiated training programme for South African teachers. Thus sex in this study was not expected to project a significant influence on the teachers' knowledge of asthma.

This study is the first to further explore gender and age differentials in relation to variables such as qualifications, teaching experience, teacher's asthmatic status and contact with an asthmatic individual in any detail. The ability to compare these findings is therefore limited due to paucity of available literature.

Almost three-quarters (71.7%) of the teachers had an undergraduate degree or education diploma. The proportion of teachers who had received tertiary education was high as in comparison with the study conducted in Hong Kong by Tse and Yu (2003) were only 32% of teachers reported having obtained such a qualification. Five percent of the respondents had a lesser qualification (completed high school). This study found that all males had a tertiary qualification while 4.9% of those with a lesser qualification were all women. This is perhaps expected as more men have access to higher education than women in South Africa.

Correlation analysis was done to explore the association between the levels of teachers' qualifications and overall asthma knowledge. Overall knowledge was not significantly associated with qualification of the participants (chi-square value = 9.762, $p = 0.082$).This finding concurs with the current literature available. The only other studies that investigated the association between teachers' knowledge of asthma and

teachers' level of education were done in Hong Kong and Turkey. Tse and Yu (2003) and Ones *et al.* (2006) also found no association between schoolteachers' knowledge of asthma and their level of education in Hong Kong and Turkey respectively. However Brook (1990) found that there was a significant relationship between the level of asthma knowledge and the level of teachers' study ($p<0.01$) in Holon, Israel.

The majority (41.6%) of the primary schoolteachers reported they had more than ten years of teaching experience. The length of the majority of the Umdoni primary schooteachers' tenure is similar to that reported in other studies by Bahari and Rahman (2003) in Malaysia, Bell *et al*. (2000) in Ireland, French and Caroll (1997) in Western Australia, Hussey *et al.* (1999) in Ireland, Latif (2004) in Bahraini and Ones *et al.* (2006) in Turkey. All the male teachers who participated in this study had more than 5 years teaching experiencing indicating that they were older than the female participants.

Cross tabulation was conducted to examine the association between Umdoni primary schoolteachers' years of teaching experience and overall asthma knowledge. In this study teachers' knowledge of asthma was not significantly associated with years of teaching experience of the participants (Chi-square value = 8.664, $p = 0.070$).

Bahari and Rahman (2003) and Ones *et al.* (2006) also found no significant relationship between teachers' length of tenure and teachers' asthma knowledge. Studies in Hong Kong and Bahraini by Tse and Yu (2003) and Latif (2004) respectively found a significant relationship between the length of teachers' tenure and teachers' asthma knowledge.

Only 14 teachers in this study reported that they were suffering from asthma. Of these 14 teachers, 13 were females and 1 was a male. Asthma is a respiratory disease more common in males than females. The proportion of teachers suffering from asthma as reported in this study is lower than the proportions reported in similar asthma knowledge surveys such as 9.6% (n=33/344) in the Irish study by Bell *et al.* (2000) and 6.5% (n=75/1162) in the Hong Kong study by Tse and Yu (2003). Due to the small number of teachers who reported to be asthmatics, no statistical analysis was done to explore the relationship between teachers' knowledge of asthma and their asthmatic status. However, it would be expected that such teachers would be more

knowledgeable about their own condition, and therefore better placed to offer advice or care to learners with asthma.

In this study, 46.5% of teachers knew someone close to them who was suffering from asthma. The majority of these respondents were female teachers and in the older age category (aged 33-52 years) and they reported knowing an asthmatic who was either in their immediate family, a friend and or colleague. Cross tabulation showed no association between the level of asthma knowledge and those that knew someone with asthma and those who did not know someone with asthma (Chi-square value =3.48, p=0.176), although such an association might be expected. Few studies have investigated the relationship between teachers' asthma knowledge and their personal contact with an asthmatic individual. Studies by Brook (1990) in Israel, Madsen, Storm and Johannsen (1992) in Denmark and Tse and Yu (2003) in Hong Kong found that teachers' who knew someone with asthma had significantly better asthma knowledge scores as would be expected. Bell *et al.* (2000) also found that teachers who had contact with an asthmatic individual scored higher in asthma knowledge (mean score =20.89) than those who had no contact with an asthmatic individual (mean score =19.33; p=0.003).

Bell *et al.* (2000) further explored the relationship between asthma knowledge and having an asthmatic family member. Teachers who had an asthmatic family member scored higher with regards to asthma knowledge (p=0.003). However, according to Bell *et al.* (2000, p553), although statistically significant relationships were established with regards to knowing someone with asthma and asthma knowledge, "the differences in mean scores were small and may have little impact in practice". There seems to be no viable alternative to direct training of teachers, if they are to be effective agents within their schools.

However, other studies have not been able to demonstrate this effect. The findings of this study in Umdoni concurs with the findings of the Australian study by Atchison and Cuskelly (1994) which found no significant relationship between teachers' knowledge of asthma and teachers' knowing someone with asthma.

The teachers who were asthmatic and knew of someone with asthma had similar knowledge and practices to those without exposure can be explained by considering

that there is a possibility that although those teachers who were non asthmatic and reported not having exposure to an asthmatic individual, may have had exposure to asthma knowledge from books, internet, television etc. This may not have been formal training but the individuals may have learnt something about asthma. Another possibility as why teachers who knew someone with asthma or were asthmatic had similar knowledge and practices to those without exposure, is that this could reflect the overall state of knowledge to health in this region.

According to the IMB model, behaviour is a result of information, motivation and behavioural skills. With regards to the predictive variables identified in this study in influencing teachers' knowledge of asthma such as age, sex, qualifications, teaching experience and contact with an asthmatic individual was not significantly associated with teachers overall asthma knowledge. Although the association between previous training in asthma management and asthma knowledge was not statistically analysed, none of the six respondents trained in asthma care was able to correctly identify the correct steps to using a metered dose inhaler. This may be an important shortcoming in the asthma education training of these teachers

5.3 Background and knowledge about asthma

Only six respondents mentioned that they had received training in asthma care. Those teachers who received training in asthma care were mostly (n=4) females over 30 years of age and class teachers. The majority of teachers (220) had no training in asthma care. Due to the small number of teachers who received training in asthma care, no statistical analysis was done to explore the relationship between teachers' knowledge of asthma and training in asthma care. Bahari and Rahman (2003) also found that only 5 (1.79%) of the 280 Malaysian teachers who participated in an asthma knowledge survey had received training in the management of children with asthma. These researchers also did not explore the association between asthma knowledge and training in asthma management. Several studies have, however explored teachers' level of asthma knowledge and training in asthma care (Bell *et al*., 2000; Maclehose *et al*., 2001; Madsen *et al*., 1992 and Tse and Yu, 2003). Maclehose *et al.* (2001) reported that 29.4% of teachers who participated in the asthma knowledge survey in

south Essex had received training in asthma care. In a Danish study, 5% of teachers who participated in the asthma knowledge survey in the county of Randy reported previous training in the management of children with asthma (Madsen *et al*., 1992). Bell *et al.* (2000) found that 19.2% of Irish teachers in a Belfast survey received training in asthma care. In a Hong Kong study, Tse and Yu (2003) found only 4% of teachers had received training in asthma care. Tse and Yu (2003) found that asthma training was a significant determinant in the level of asthma knowledge. Danish teachers who received training in asthma care had significantly higher scores than those teachers with no training in asthma care [p=0.001-0.05] (Madsen *et al*., 1992). Similar findings were reported by Bell *et al.* (2000) in the Irish study (p=0.009).

Maclehose *et al.* (2001) found that those teachers with asthma had higher levels of knowledge than those who were non asthmatic and asthma-trained. Maclehose argues that exposure to asthma showed better levels of knowledge rather than training in asthma care.

In this South African study, the low numbers of teachers trained in asthma care can be attributed to the fact that asthma is not a prioritised condition either in schools or recognised as part of the country's priority disease. The high levels of infectious diseases such as tuberculosis, HIV/AIDs and parasite infestation, which drains most of countries resources in sub-Saharan Africa, results in very little emphasis on asthma being prioritized by government and researchers (Ait-Khaled *et al.,* 2007)

The True-False with "unsure option" formats which was used in the asthma knowledge test was assessed as follows: correct answers denoted presence of knowledge, incorrect answers denoted misconceptions and unsure denoted absence of knowledge. It is important to note from the literature review that the questionnaire design of most of the previous studies also include a "don't know" or an "unsure" option to measure absence of knowledge. These studies include Bahari and Rahman (2003), Bevis and Taylor (1990), Bell *et al.* (2000), Brook (1990), French and Caroll (1997), Latif (2004), Madsen *et al.* (1992), Ones *et al.* (2006) and Seto *et al.* (1992).

An unsure option which is usually absence of knowledge is important because when participants don't have this choice, they may engage "guesswork". Guesswork can

represent false knowledge (Jennings and Bush, 2006). According to Perold, Louw and Kleyhans (2010) acknowledging the absence of knowledge is more significant as there is a possibility that individuals are more careful in their decisions and may have an interest to gain the knowledge needed whereas individuals with incorrect knowledge or misconceptions may hold on the false or distorted information and this may result in them not trying to find information and hence providing incorrect recommendations.

In the evaluation of clinical or medical knowledge, “misinformation is worse than an absence of information” (Jennings and Bush, 2006, p5).

In terms of what teachers understood about asthma, most knew that the following factors were associated with asthma (cough, breathlessness, wheezing, tight chest and production of chest secretions). Bahari and Rahman (2003) also found that Malaysian primary schoolteachers also had a fairly good understanding of the factors associated with asthma. Latif (2004) also found that 82% of Bahraini teachers correctly identified that coughing, shortness of breath and wheezing are associated with asthma. In this study, 72% of teachers correctly identified coughing as being associated with asthma while 86% and 83% of teachers correctly identified breathlessness and wheezing respectively as being associated with asthma. Bell *et al.* (2000) found that only 45.3% of Irish primary schoolteachers could identify three factors associated with asthma. A proportion of 9.3% of Umdoni primary schoolteachers were “unsure” about the association between cough and asthma in comparison to 9.5%, 4.5% and 12% in the surveys by Latif (2004), Ones *et al.* (2006) and Seto *et al.* (1992) respectively Overall, in this current study, 80.5% of the Umdoni primary schoolteachers had answered four or more questions correctly out of seven questions on terms associated with asthma**.**

Some teachers (12.4%) displayed absence of knowledge of the association of wheeze and asthma. Previous studies by Latif (2004) found that 20% of the Bahraini teachers did not know there was an association between asthma and wheeze while Seto *et al.* (1992) found that only 1% of teachers in south Auckland did not know this was an association. The difference could be attributed to the fact that teachers in South Auckland, New Zealand, which has one of the highest prevalence of asthma in world, may be more knowledge about symptoms associated with asthma.

Almost all (91.6%) of the Umdoni teachers knew that a tight chest was associated with asthma, in comparison to the 21.8% of teachers in the survey by Bell *et al.* (2000). However a tenth (10%) of teachers also identified an ear discharge as being associated with asthma while 45.6% incorrectly thought fever is associated with asthma. Latif (2004) also found that Bahraini teachers incorrectly identified signs, symptoms and complications of asthma. Almost half (45.1%) of Bahraini teachers thought diarrhoea was associated with asthma.

Asthma is associated with predisposing risk factors, including a history of allergies, previous infections and environmental exposures. Ear infections or otitis media, which are common in childhood, are associated with atopy, male gender, parental smoking and respiratory infections. Studies have shown a positive relationship between asthma and otitis media (Eldeirawi and Persky, 2004).

According to Virtual Paediatrician.com (2008) ear infections in asthmatic children are common. There is an association between allergy symptoms of the respiratory system and otitis media. “The same cell type lines the Eustachian tube (from the middle ear to the throat) as lines the tubes in the lungs, and is subject to the same inflammatory processes” (Virtual Paediatrician.com, 2008, p2) Sinusitis, otitis media, asthma and allergic rhinitis are all co-morbidities (Munjra, 2010).

An ear discharge may be present in an asthmatic child and may be used as an identifying symptom for asthma but in this study, the paediatric asthma specialist had reviewed the questionnaire and advised on the common signs and symptoms to probe teachers understanding of asthma.

Teachers’ general knowledge regarding asthma was explored in the questionnaire. In terms of the global problem of childhood asthma, 73.5% of Umdoni teachers were aware that asthma is a common respiratory disease in children. Teachers’ knowledge on the prevalence of the disease in their country was good, as 74.8 % of teachers were able to identify that there is an increase in the number of people suffering from asthma in South Africa. Umdoni teachers’ knowledge of the extent of the problem of asthma in their own country is higher than that that reported in Denmark and Hong Kong. In Denmark, only 60.1% of teachers knew that the prevalence of asthma was high in the

country (Madsen *et al*., 1992) and only 26.5% of teachers in Hong Kong knew that there was a high prevalence of the disease in their country (Tse and Yu, 2003).

More than a third (35.4%) of Umdoni teachers were able to correctly identify that asthma mortality was high in their country in comparison with 19.4 % of teachers in the English study (Bevis and Taylor, 1990) and 14.6% in the western Australian study (French and Carroll, 1997). This was similar to the proportion reported (32.9%) in the Danish study (Madsen *et al*., 1992).

It is important for teachers to know the association between asthma and allergies. If they know that allergies and asthma are associated, they would then be able identify asthma trigger factors. In this study, just over half (51.3%) of teachers knew that allergies are associated with asthma compared with 30.6% and 45.7% of teachers in the surveys by Bevis and Taylor (1990) and French and Carroll (1997) respectively. However a higher number (77.6%) of Danish teachers (Madsen *et al*., 1992) were able to identify the association between allergies and asthma. There is therefore room for improvement. It is also alarming to note that 30.5% of teachers in Umdoni were "unsure" of the association between allergies and asthma in comparison to 9.5% of Turkish teachers in the study by Ones *et al*. (2006)

Umdoni schoolteachers performed better in knowledge about the association between asthma and slow growth in comparison to the findings of the surveys conducted in other countries. In this study 40.3% of teachers knew asthma could lead to poor or slow growth in comparison to 28.6%, 26.8% and 21.2% in the surveys by Bevis and Taylor (1990), French and Carroll (1997) and Madsen *et al.* (1992) respectively. However the findings of this study are similar to those of the survey by Bahari and Rahman (2003), which reported that 42.9% of teachers knew that asthma was associated with slow or poor growth. The absence of knowledge about the association between asthma and slow growth in this study is significant with 33.6% reporting they were "unsure" of this association. Similar to this survey, other surveys by Bahari and Rahman (2003), Bevis and Taylor (1990), Fench and Caroll (1997) and Madsen *et al.* (1992) have shown that 41.07%, 22%, 51.8% and 12% of teachers do not know about the association between asthma and slow growth. However, the extent to which slow

growth is associated with steroid use rather than asthma *per se* was not explored in this or other studies.

The majority of teachers in this study (73.9%) knew that asthma could be genetic or familial, which is similar to the findings of the Malaysian study (76.43%) by Bahari and Rahman (2003), the English study (65%) by Bevis and Taylor (1990), western Australian study (65.2%) by French and Carroll (1997) and the Danish study (82.2%) by Madsen *et al.* (1992). Only 16.4% of Umdoni teachers were "unsure" about the link between asthma and genetics. The absence of schoolteachers' knowledge on the association between asthma and genetics is also noted in the Malaysian study by Bahari and Rahman (2003), the English study by Bevis and Taylor (1990), the Australian study by French and Caroll (1997), the Turkish study by Ones *et al.* (2006) and the Danish study by Madsen *et al.* (1992), 13.39%, 22%, 21.3% and 14.3% respectively.

An important study by Levin (2008) yields information that can be use to debate genetics in atopic asthma, atopic eczema and allergic rhinitis. The study was conducted on urban Black African high school children to determine total Immunoglobulin E. (IgE). There is association between genetic factors and IgE levels. Total Ige is not only raised in atopic asthma, atopic eczema and allergic rhinitis but also in helminth infections. The findings of the study revealed that 34% of the high school children had elevated IgE ascaris (worm infestation) and total IgE correlated with ascaris IgE. According to Levin (2008, p449), "parasite infections rather genetic differences, may be a contributing factor of IgE level in certain populations". However this is one of few studies conducted on total IgE levels in the investigation of atopy in Black Africans. In an earlier study by Steinman (2003), ascaris infection was not a factor in atopic sensitization and bronchial hyper-responsiveness in rural or urban Xhosa and White children.

Teachers often have misconceptions about asthmatic children and their academic abilities. Tse and Yu (2003) reported that more than one third of teachers in the Hong Kong survey felt that asthmatic children were slow learners. This study reports that 23% of Umdoni teachers think that children with asthma have low IQ levels, in comparison to 0.6 % of teachers in the survey by Madsen *et al.* (1992) in Denmark. Asthma is a chronic non communicable disease, so it is worrying that 60.2% of Umdoni

teachers in this study think asthma is a curable disease. It is important to note that 19.9% of teachers were “unsure” if asthma is a curable disease in comparison to 10.6% of Turkish teachers in the study by Ones *et al*. (2006) Out of ten questions on general knowledge, 69.5% of Umdoni teachers answered five or more questions correctly.

Teachers’ knowledge regarding signs and symptoms of a severe acute asthma attack are critical to their ability to handle this type of emergency in the school environment. In this study, teachers’ knowledge of this aspect was low as 63.3% could only indicate three or less symptoms out of six. Only 36.3% of Umdoni teachers were able to identify blue discolouration as a sign of a severe acute asthma attack. This is low when compared to the 53.6% and 88% of teachers who correctly identifying blue discoloration of the lips as sign of a severe acute asthma attack as documented in the studies by Tse and Yu (2003) in Hong Kong and Seto *et al.* (1992) in New Zealand respectively. Only 52.7% of Umdoni teachers knew that difficulty in speech is sign of a severe acute asthma attack, in comparison to 77% of teachers in a survey by Seto *et al.* (1992).

It is imperative that teachers are able to identify trigger factors of asthma. These trigger factors may be abundant in the school environment. This study explored if teachers were able to correctly identify fourteen common trigger factors of asthma which were included in other surveys in the literature. In this study, 88.9% of teachers identified smoke as trigger factor, in comparison to 6.7% and 7.1% in the surveys by Bahari and Rahman (2003) and Tse and Yu (2003) respectively. However a study by Seto *et al.* (1992) similarly showed that 90% of teachers in New Zealand were able to identify smoke as a trigger factor of asthma.

Exercise can induce asthma symptoms. The known symptoms of exercise-induced asthma are coughing, wheezing, chest tightness and shortness of breath (Asthma and Allergy Foundation of America, 2005). The cause of exercise induced asthma is cold or dry air that leads to bronchospasm of the airways (Nagel, 2010). Sports and other activities that involving cold air like hockey may promote exercise induced asthma. Sport activities such as basketball, soccer and track which leads to one having to breathe faster due to high oxygen demands results in cold or dry air that promotes bronchospasm. According to the Asthma and Allergy Foundation of America (2005),

swimming is an ideal sport for asthmatics because the air is humid. The symptoms of exercised induced asthma may begin 6 to 10 minutes of exercise and result in great discomfort for the asthmatic when participating in sports if appropriate treatment is not administered. Nagel (2010) advises caregivers of asthmatic children not to restrict their children from sports including activities like running but rather prevent exercise induced asthma through the appropriate use of asthma medication. These medications include bronchodilators and preventer mast cell stabilisers. Exercised induced asthma may also be an indication of poorly controlled asthma and require proper medical management (Nagel, 2010). The Asthma and Allergy Foundaton of America (2005) encourages asthmatic children to lead normal lives and enjoy and play competitive sport of their choice.

Forty three percent of teachers identified exercise as a factor that could precipitate an asthma attack. This is low when compared with the 63.6%, 66.5%, 56.8%, 86% and 65.3% reported in the surveys by French and Carroll (1997), Latif (2004), Ones *et al.* (2004), Seto *et al.* (1992) and Tse and Yu (2003) respectively. In the English surveys by Bevis and Taylor (1990) and Maclehose *et al.* (2001), only 34% and 17.8% of teachers respectively were able to identify exercise as a precipitating factor of an asthma attack. This is despite the clear identification of exercise-induced asthma as a clinical category, and the common exposure of learners to exercise during school hours. In this study only 31.4% of teachers knew that preventative medication can be taken by the asthmatic child before exercise/sports. This finding is similar to the 32.6% and 35 % of teachers documented in the surveys by Bevis and Taylor (1990) and Bahari and Rahman (2003) respectively. Surveys by French and Carroll (1997), Madsen et al (1992) and Tse and Yu (2003) reported that 53.4%, 57.1% and 46.7% of teachers respectively were conscious of the use of preventative medication by the asthmatic child prior to exercise or sports. Khan (2006) reported that between 59% and 70% of teachers in an Ethekwini survey in KwaZulu-Natal, South Africa, reported that most asthmatic learners do not have access to their medication prior to exercise and sports. A significant proportion of teachers (17.7%) of teachers displayed an absence of knowledge about exercise triggering asthma symptoms in comparison with 29.3% and 10% of teachers in the study by Ones *et al*. (2006) and Seto *et al*. (1992) respectively. Umdoni teachers' knowledge regarding asthma and sports was poor, as only 12.4% could answer all three questions on this subject correctly.

Most teachers (68.1%) knew that cold weather is a trigger factor for an asthma attack in comparison to 7.5%, 27%, 36.3%, 37%, 33.2% and 8.5% in the surveys by Bahari and Rahman (2003), Bevis and Taylor (1990), French and Carroll (1997), Hussey *et al.* (1999), Madsen *et al.* (1992) and Maclehose *et al.* (2001), respectively. Similar to this survey, other surveys by Ones *et al.* (2006), Seto *et al.* (1992) and Tse *et al.* (2003) showed 76%, 80% and 98.4%, respectively, were able to correctly identify cold weather as a trigger factor for an asthma attack. Fewer Umdoni teachers (13.3%) were "unsure" about cold weather triggering asthma in comparison with the higher proportion of 51% of teachers in the English study by Bevis and Taylor (1990), 37.2% of teachers in the Australian study by French and Caroll (1997) and 38.9% teachers in Danish study by Madsen *et al.* (1992).. The knowledge regarding the effect of weather as an asthma trigger seems to transcend climatic zones, as reported in previous studies.

Few studies investigated if teachers could identify the common cold as a trigger factor for an asthma attack. This study found that 68.1% of teachers were able to correctly identify the common cold as a trigger factor for an asthma attack. Bahari and Rahman (2003) and Tse and Yu (2003) found 76.1% and 60.1% of teachers respectively were able to identify the common cold as a precipitating factor for an asthma attack. Twenty four percent of Umdoni teachers knew that laughing is a trigger factor for an asthma attack in comparison to 3.7% of teachers in the survey by Ones *et al.* (2006). A significant proportion of teachers in Umdoni (22.1%) of teachers were "unsure" that laughing can trigger an asthma attack which is similar to the study by Ones *et al.* (2006). Seventy nine percent of teachers knew that animal dander is a trigger factor for an asthma attack. This is similar to the findings of the study of Tse and Yu (2003), where 86.5% of Hong Kong teachers correctly identified animal dander as a trigger factor for asthma. In the study by Maclehose *et al.* (2001), only 1.2 % of teachers knew that animal dander can precipitate an asthma attack. Only 12.4% of teachers in Umdoni were "unsure" of animal dander precipitating an asthma attack in comparison to 19.1% by Ones *et al.* (2006)

While 52.2%, 52.7% and 71.7% of Umdoni teachers correctly identified diet, stress and pollen as precipitants of an asthma attack, respectively, Maclehose *et al.* (2001) reported that only 0.2%, 17% and 25.3% of teachers identified these same factors correctly. This was the only study that explored if teachers knew that menstruation

could trigger an asthma attack. Only 8.4% of Umdoni teachers knew that menstruation could trigger an asthma attack. In a South African study, the most common triggers identified by teachers in the classroom that can precipitate an asthma attack included cockroaches and dust from the chalkboard and mould (Khan, 2006). In this study, 71.2 % of teachers identified chalk dust as trigger factor for an asthma attack.

Bell *et al.* (2000) found that Irish teachers' knowledge of trigger factors associated with asthma was poor, as only 50% of teachers could identify two trigger factors. Overall, the Umdoni teachers' knowledge on factors that can exacerbate asthma in children was reasonable, as 75.7% correctly identified seven or more factors from a total of fourteen factors.

In this study, 56.2% of teachers incorrectly identified antibiotics as medications used to relieve an asthma attack. This finding is similar to that reported from the Hong Kong study, where 72.2% of teachers thought that antibiotics were used to treat an asthma attack (Tse and Yu, 2003). In the Malaysian study, Bahari and Rahman (2003) reported that 19.64 % of teachers incorrectly identified antibiotics as a medication used to treat symptoms of an asthma attack. However in Denmark, only 5.3% of teachers incorrectly identified antibiotics as an asthma reliever medication (Madsen *et al.*,1992). This is perhaps reflective of the general layperson's attitudes to the use of antibiotics in many settings.

Most teachers (67.7%) knew that Ventolin® (a common brand name for salbutamol) is a medication used to relieve an asthma attack. This finding concurred with the literature. In the Malaysian study (Bahari and Rahman 2003), the Danish study (Madsen *et al*., 1992) and the Hong Kong study (Tse and Yu, 2003), 62.5%, 56.3% and 85.4% of teachers, respectively, identified this medication as being used to relieve an asthma attack.

Aspirin is known to be dangerous for asthmatics as it can precipitate or worsen an asthma attack. It has been stated that "aspirin intolerance has emerged as a prominent risk factor of severe asthma" (Side-Effects-Site.com, 2010, p2). This study investigated if teachers thought that aspirin was used in the treatment of an asthma attack. It is alarming to note that 31% of Umdoni teachers incorrectly identified that aspirin can be given to an asthmatic to relieve an asthma attack. The adverse events of using aspirin

in children have been recorded in the literature. The relationship between aspirin and asthma has been described as a "deadly combination" (Side-Effects-Site.com, 2010, p1). Jenkins, Costello and Hodge (2004) conducted a systematic review of the prevalence of aspirin-induced asthma and its implications for clinical practice. Aspirin-induced asthma is a sensitivity that is experienced in some asthmatic individuals after an intake of aspirin. The reaction occurs when aspirin inhibits cyclo-oxygenase (COX) enzymes. Jenkins *et al.* (2004) found that the prevalence of aspirin-induced asthma is 21% for adults and 5% for children according to the systematic review conducted. The cause for concern from the current study in Umdoni is that, if 31% of teachers are under the impression that aspirin relieves an asthma attack, these teachers may practise administering aspirin to asthmatic children and adults. Aspirin-induced asthma is life-threatening (Jenkins *et al.,* 2004).

Beutler *et al.* (2009) have summarised available literature on the use of aspirin in children for fever or viral syndromes. This information is highly important for this study and should be communicated to teachers as they are likely to administer aspirin to ill children. According to Beutler *et al.* (2009, p1472), "Aspirin should not be used to treat febrile illness in children as data from case-control and historic cohort studies demonstrate an association between aspirin use and Reye's syndrome". Reye's syndrome is characterised by cerebral disturbance (hepatic encephalopathy) and clinical signs include poor concentration, slurred speech, confusion, gross disorientation and coma as the condition of the affected individual worsens. Organisations such as the National Reye's Syndrome Foundation, the US Surgeon General, the US Food and Drug Agency (FDA), Centres for Disease Control and Prevention, and the American Academy of Paediatrics advocate against the use of aspirin in persons younger than 19 years (Beutler *et al.,* 2009).

In 2001, recommendations on the use of analgesics in patients with asthma were proposed by Levy and Volans. According to Levy and Volans (2001): 1)analgesics must be used under strict and close medical supervision; 2) prior to the use of non-steroidal anti-inflammatory (NSAIDs), patients should have evidence of aspirin provocation testing; 3) asthmatic patients who have been using NSAIDs with no side-effects, may continue to do so but these patients must be well educated on potential side-effects.

Very few studies explored schoolteachers' knowledge on the side effects of asthma-related medication. Twenty seven percent of teachers in this study were able to identify that Ventolin® can cause a rapid pulse rate, palpitations and tremors which are its known side effects. The studies by Bevis and Taylor (1990), French and Caroll (1997), Madsen *et al.* (1992) and Seto et al. (1992) are the only known studies that also investigated the knowledge of the side effects of Ventolin®. Madsen *et al.* (1992) found that 21.6% and 17.1% of teachers knew that Ventolin®, can cause palpitations and tremors respectively. The "unsure" responses regarding the side-effects of Ventolin® were 57.1% in Umdoni. The significance of the absence of knowledge regarding the side effects of Ventolin® in Umdoni is similar in comparison to 78% in the English survey by Bevis and Taylor (1990) and 54% in the western Australian study by French and Caroll (1997).

The majority of the teachers (71.2%) knew that preventative medication is needed for asthmatic sufferers. A similar finding is noted in the Irish study by Bell *et al.* (2000) in which 91.2% of teachers were also able to correctly state that preventative medication is needed by asthmatic sufferers. However Ones *et al.* (2006) found that very few Turkish teachers knew that preventative medication is needed for asthmatics. Overall Ones *et al.* (2006) concluded that Turkish teachers' knowledge on asthma medication and management was poor.

It is important for teachers to know that oxygen therapy is required in very asthma attacks. This knowledge will also help to reflect if teachers perceive asthma to be a serious condition. In this study, 89.4% of teachers correctly stated that oxygen therapy is required in very severe asthma attacks.

The literature also reports misconceptions about asthma medication (Seto *et al.*, 1992). In the New Zealand survey, "52 % of teachers held the misconception that the overuse of asthma medications will result in diminished effect and this may mean that teachers may be reluctant to repeat a dose of bronchodilator therapy" (Seto *et al.*, 1992, p265).

In this study, 48.7% of teachers believed that asthma medications are addictive and weaken the heart. This misconception will have serious implications for those teachers that are assisting and supervising asthmatic schoolchildren when they are using their

medication. Teachers who have this misconception may develop negativity towards children having to use their medication as needed.

This study attempted to further explore the limitations of other studies in terms of asthma management. Schoolteachers' knowledge of asthma delivery devices was also investigated. Most teachers were able to identify the nebuliser (82.3%) and pressurised aerosol inhaler (91.6%) as devices that deliver asthma medication to the lungs. Very few teachers (22.1%) were able to identify the spacer as a device that is used in delivering asthma medication to the lungs. Spacers are used mainly in the paediatric population.

Regarding the use of a metered dose inhaler, about a quarter (24.8%) of the teachers' mentioned that they knew how to use a metered dose inhaler. This was the first study that requested teachers to identify the correct steps to using an inhaler. None of the teachers who mentioned that they knew how to use a metered dose inhaler correctly identified the steps. This is alarming because it raises issues about teachers' ability to assist an asthmatic child during an asthma attack and teachers' ability to correctly supervise asthmatic children with regards to their medication. Amongst the six teachers who received training in asthma care, only three stated they knew how to use a metered dose inhaler and none of them correctly identified the steps on using the metered dose inhaler. At least based on this very small sample, it would appear that previous training in asthma management is not predictive of teachers' ability to use to use a metered dose inhaler. It should be acknowledged, however, that many asthmatics experience difficulty with using metered dose inhalers anyway.

Teachers are in an ideal position to also monitor if a children's asthma is controlled. Poorly controlled asthma can be determined by observing a child's behaviour, school attendance and general condition. It is important for teachers to able to identify if the health of a child is being compromised. This study is one of few studies that examined if teachers had knowledge of asthma control. Three questions were asked about asthma control. More than half (55.8%) of the teachers knew that if a child's asthma is not controlled, s/he would be coughing a lot. In this study, 85.4% of teachers correctly responded if a child's asthma is not controlled, s/he would be absent frequently, in comparison to 30.5% and 27.5% of teachers in the surveys by French and Carroll (1997) and Madsen *et al.* (1992), respectively. In a South African study, teachers were

asked about asthmatic children's school attendance in the Ethekwini municipality and 65% to 70% of teachers in that study stated that absenteeism was high among asthmatic schoolchildren and that asthma was the main reason on the sick certificate (Khan, 2006). Asthma can affect the well being and functioning of an individual. Sixty seven percent of Umdoni teachers correctly indicated if a child's asthma is not controlled, s/he would be very sedentary.

Teachers' knowledge of asthma and sports/exercise was also explored. According to Hussey *et al.* (1999, p178) "physical activity provides the same beneficial rewards for the asthmatic child as for all children, both physically and psychosocially". It is important to know teachers' knowledge of asthma and sports as well as their perceptions, as this will influence how teachers' supervise asthmatic children during these activities.

Almost a third (30.1%) of teachers knew that swimming is the best sport for asthmatics. This is low when compared to the 51.1% and 57.8% of teachers documented in the surveys by Madsen *et al.* (1992) and Tse and Yu (2003), respectively. .A significant proportion of teachers in Umdoni was "unsure" of swimming being the most suitable sport for asthmatics. Only 46.5% of teachers disagreed correctly that asthmatic children should avoid exercise and sports, which meant that they felt asthmatic children should engage in sports and exercise. This is similar in comparison to 32% of Danish teachers who were also "unsure" of swimming being the most suitable sport for asthmatics. This is disappointingly low when compared to the 78.2%, 97 %, 80.4% and 68.8% of teachers documented in the surveys by Bahari and Rahman (2003), French and Carroll(1997), Madsen *et al.* (1992) and Tse and Yu (2003), respectively. However, Ones *et al.* (2006) reported that only 21.6% of Turkish teachers correctly stated that asthmatic children should engage in exercise and sports. The absence of knowledge regarding the need for preventative medication by asthmatic children prior to participation in sports and exercise was a significant 31.4% in Umdoni. This is similar in comparison to 46% in the study by Bevis and Taylor (1990), 50% in the study by Bahari and Rahman (2003) and 29.3% in the study by French and Caroll (1997).

Overall the average score for knowledge on asthma was 30.3 (SD=9.3). Actual range for the score was between 2 and 51. Almost two-third (61.5%) of the participants scored more than 27 points reflecting above 50% correct answers for asthma

knowledge survey. However 38.5% of participants scored less than 27 points, which denoted poor or limited knowledge of asthma and its management.

Although studies by Barthwal and Marwah (2009) and Rodenhorst (2003) defined satisfactory knowledge of asthma as having a score of 50% correct answers and above, in this study the significant defiencies of knowledge in critical areas of asthma is of great clinical relevance. Hamm (2004) proposed the following recommendations for teachers to effectively assist and manage asthmatic schoolchildren: 1) Teachers should develop an understanding of what is asthma; 2) Teachers should have knowledge on common triggers of asthmatic episodes; 3) Teachers should have knowledge of the signs and symptoms of an asthma attack; 4) teachers should have knowledge on relaxation techniques; 5) Teachers should have an asthma action plan which includes knowledge of medication, use of medication, side-effects of medication, how to assist child in an emergency and 6) Teachers should have access to asthma education resources.

Umdoni primary schoolteachers had limited knowledge in terms of identifying an asthma attack, limited knowledge of asthma medication and management. None of teachers knew the correct steps to using an MDI. Most teachers reported referring a child experiencing an asthmatic episode to someone else rather than providing the urgent first aid. In light of this, in terms of clinical relevance, asthma knowledge amongst primary school teachers in Umdoni subdistrict cannot be deemed satisfactory.

The timelines of previous studies must also be considered carefully when comparing the results. Teachers in the present study may have more access to information as compared to their counterparts in other studies. The majority of teachers in this study were mature (mean age of 43 years) and the majority had over 6 years of teaching experience, which may have influenced their responses to this asthma knowledge survey. However, by the same token, they would have been expected to have had exposure to asthmatic learners and have built up knowledge through these experiences.

5.4 Asthma related practices in the schools

This study found that, 73.9% of the Umdoni primary schoolteachers indicated that there is no written policy for managing asthmatic schoolchildren in their schools. However, all nineteen primary schools had no written school asthma policy. A possible explanation as to why some teachers' reported that their schools had a written policy for asthma could be that teachers' were worried about the possible implications for the school of admitting to not having a school asthma policy. Another explanation could be that teachers were not sure if there was a written school asthma policy and reported having such a policy even though an "unsure" option was allowed for the question.

Few studies actually inquired about the management of asthma in schools (Bevis and Taylor, 1990; Hussey *et al*., 1999; Maclehose *et al*., 2001; Seto *et al*., 1992 and Tse and Yu, 2003). Most studies traditionally focused only on schoolteachers' knowledge of asthma and not on management trends in schools.

In terms of school asthma polices, most studies that have examined this issue have found that schools were deficient with regards to school asthma policies or that there was a great need for improvement in sound asthma policies. Maclehose *et al.* (2001) found that only 18.6% of schools surveyed in south Essex, UK, had school asthma policies. In an Irish study, 84% of schoolteachers reported that there was no school asthma policy to guide them in emergency situations (Hussey *et al*., 1999). Bevis and Taylor (1990) found that in most of the primary schools that they surveyed the school policies had many loopholes and were not sound in terms of managing asthmatic children. Seto *et al.* (1992) found 60% of the schools surveyed in South Auckland, New Zealand had a school asthma policy in place.

New Zealand is noted to have the one of the highest asthma prevalence in the world (15.1%) (Braman, 2006). Holt (2001) reported that 15% to 20% of children in New Zealand are affected by asthma and it is the one of the leading cause of hospital admission in children. New Zealand is a first world country and asthma is a priority, unlike on the African continent. This could be a reason for a high percentage of schools having asthma policies.

According to Seto *et al*. (1992), the Department of Education in New Zealand prioritised asthma as a common chronic childhood disease by providing educational materials to guide asthma management in the school setting.

On the African continent, chronic non-communicable diseases including asthma are sidelined and priority is given to infectious diseases and malnutrition. The South African National School Health Policy does not even mention asthma as serious chronic condition affecting children. Thus it would be expected that none of schools surveyed would have a policy for managing children with asthma.

This study showed that 53.1% of teachers reported that the school nurse has never visited their school. Few studies have looked at the involvement of the school nurse in the school environment. Tse and Yu (2003) reported that none of the 82 schools surveyed had a permanent school nurse which was also noted in this study. Tse and Yu (2003) did not research the frequency of the visits to schools by the Hong Kong Department of Health's school nurses. In the Danish study, 87% of teachers reported that there was a school nurse who was either permanent or partially attached to their schools (Madsen *et al*., 1992). Neuharth-Pritchett and Getch (2001) emphasise the importance of school nurses in the care of children with chronic diseases like asthma. School nurses are also needed to assist in training teachers on how to deal with asthmatic children in the school environment.

In this study, 50.4% of primary schoolteachers reported that there were self-declared asthmatic children in their schools while 25.7% were unsure if there were any self-declared asthma children in their schools. While this study focused on teachers' knowledge of self-declared asthmatic children in their schools, other studies investigated if teachers knew of self-declared children in their classes in a more specific manner (Bevis and Taylor, 1990; French and Carroll, 1999; Hussey *et al*., 1999; Madsen *et al*, 1992 and Tse and Yu, 2003). It was found that 60% of Malaysian teachers and 59% of Irish teachers reported having self-declared asthmatic children in their classes. In the south Auckland, New Zealand study, the average percentage of asthmatic schoolchildren known to the school principals was 9.9% while the average percentage of asthmatic schoolchildren known to teachers was 12.6 % (Seto *et al*., 1992).

Various studies (Bevis and Taylor, 1990; French and Caroll, 1999 and Hussey *et al*., 1999) have shown that most schoolteachers reported that in a class of 27 children, there is average of 2 to 3 known asthmatics. These findings are important because it has shown that teachers are in contact with asthmatic schoolchildren on a regular basis. In a South African study, many teachers (60% to 67%) were unable to identify if children in their schools had asthma (Khan, 2006), which may be an indication of the priority afforded this condition, or learners' health status in general.

The schools surveyed in this study had no formal asthma registry. Teachers were asked how they were notified of the self declared asthmatic children amongst other children in their schools. Almost two-thirds (62.5%) of teachers reported that parents informed them about children's asthmatic status while half (50.9%) reported that asthmatic children themselves notified their teachers about their asthmatic status. Various studies (Hussey *et al*., 1999; Maclehose *et al*., 2001 and Seto *et al*., 1992) have shown that teachers were informed by parents about children's asthmatic status. Seventy five percent of teachers in south Auckland reported that parents were the known source to inform them of the child's asthmatic status, as was the case in the Umdoni schools.

Schoolteachers indicated that persons who looked after asthmatic children's medication were found to be the children themselves (29.6%), school office staff (20.8%) and class teacher (16.4%). Almost a third (30%) did not know who looked after the asthmatic children's medication. Bevis and Taylor (1990) found that some schools would not allow any asthmatic medication to be brought to school by children. In such circumstances, the asthmatic child would be sent home if he or she became ill and needed the asthmatic medication. In other schools, a teacher would be assigned the responsibility of looking after the medication and in some instances the school office staff was responsible for safe keeping and storage of the asthma medication.

According to Seto et. al (1992) 51% of schools in south Auckland, New Zealand reported that class teachers are primarily responsible for looking after children's asthmatic medication while 6% and 13% of schools reported that the school office staff and a designated teacher, respectively, were responsible for looking after children's asthma medication. Khan (2006) investigated in the Ethekwini survey if schoolteachers knew if children carried their own asthmatic medication to schools. Most teachers

reported that most children did not carry their asthmatic medication to school. Teachers provided the reasons for children not carrying asthmatic medication to school, which included the "fear of the medications being lost and parents or caregivers reprimanding children" (Khan, 2006, p35).

Almost seventy one percent of teachers in South Essex reported that school office staff looks after children's asthma medication while 19.8% of teachers reported that asthmatic children look after their own medication (Maclehose *et al*.,2001). The finding of this current study concurs with that of the South Essex study.

The high "unsure" response (29.6%) with regards to who is responsible for looking after children's asthma medication in this study could be due to the fact that there is no policy to guide the schools and asthma is not a priority condition in these schools.

This study also investigated whether schools had nebulisers and peak flow meters. This aimed at investigating if the school resources were available to assist in the management of asthmatic children. The only other study that investigated if schools had nebulisers was conducted by Seto *et al* (1992). According to Seto *et al* (1992), 13% of schools from 42 schools reported having a nebuliser.

In this study, only five (2.2%) of the teachers reported to have a nebuliser in their schools. The majority of teachers (85.1%) indicated they had no nebulisers in their schools. Despite the fact that 5 teachers reported they had nebulisers in their schools, their claims were contradicted by reports from the school principals where all principals indicated they had no nebulisers in their schools. The majority of teachers (73%) mentioned that there is no peak flow meter in their schools. In actual fact, none of the schools had peak flow meters. Teachers who admitted to having nebulisers and peak flow meters in their schools may have been confused about the device and therefore guessed in their responses.

This study attempted to find out if teachers had witnessed a child experiencing an asthma attack in the school environment and how they coped with it. No studies shown in the literature has explored if teachers experienced situations where they may have needed to assist asthmatic children in school. This study, therefore, provides useful information for further studies in this area. Over a third (35.4%) of teachers reported to

have witnessed a child having an asthma attack in class or during school hours. A study by Hussey *et al.* (1999) in Dublin, Ireland reported that 23% of teachers had witnessed an asthma attack. Hussey *et al.* (1999) did not further investigate if teachers assisted the asthmatic child during the attack and the manner in which they assisted the children during the attack. Among those teachers who witnessed an asthma attack, the majority (87.5%) indicated they assisted the asthmatic children. In terms of assisting the asthmatic children during the asthma attack, 41.1% called the parent/caregiver, 32.9% called for medical assistance, 19% took the child to clinic/hospital/GP and 20.1% administered treatment. Of the 19% of teachers who reported administering medication to the asthmatic child, all were females. This may also correspond with the fact that the majority of respondents who reported training in asthma care were females. This study also further explored if appropriate medication was administered to the child during an asthma attack by those teachers who mentioned they assisted the child by administering medication. Thirteen teachers mentioned they used reliever inhaler medication.

.The information on school asthma policy, school health nurse visits and equipment was uncertain as there were conflicting results. There were a significant proportion of "unsure" responses regarding the management of asthma in the schools surveyed.

5.5 Personal perceptions about handling asthmatic children

Asthma can often present as a medical emergency even in the school setting and thus teachers may have concerns about coping in such situations. In this study, teachers' personal perceptions about dealing with asthmatic children were also explored, as this appeared to be a limitation in most asthma knowledge surveys amongst schoolteachers. Information on teachers' personal perceptions about managing asthmatic children is needed to determine training needs. Motivation is an important concept in the Information Motivation Behaviour Model, which is the theoretical framework for this study. Teachers' personal perceptions about managing asthmatic children will relate directly to their motivation and hence behaviour towards asthmatic schoolchildren. The IMB theory postulates that an individual must be adequately motivated to use information on hand. Motivation can be personal and social. Personal motivation would apply to how important teachers perceive asthma as a medical

condition and their positivity to manage asthmatic children. Social motivation refers to teachers' perception on how important society views assisting asthmatic children. Misovich *et al.* (2003) describes motivation as a crucial requirement for health behaviour. The same authors believe that a negative perception about a condition, and social support observed as poor, may lead to low intentions to manage the health condition. In terms of personal motivation, teachers attitudes towards asthmatic children was observed by their concerns about managing asthmatic children and their response to in-service training. Social support focused on the social environment rather than norms of individuals in society. The focus was on the availability of school health nurse visits, asthma policies and resources.

The majority of teachers (66.8%) indicated that they did not feel that they knew enough about asthma to help a child presenting with symptoms of an asthma attack in the classroom. However this is lower in comparison to the 93%, 88% and 89% of teachers reported as sharing this view in the surveys by Bevis and Taylor (1990), Hussey *et al.* (1999) and Madsen *et al.* (1992), respectively.

In this study, 76.6% of respondents were very or quite concerned about dealing with asthmatic children, in comparison to 47% of teachers in the South Essex survey by Maclehose *et al.* (2001). The proportions regarding the different level of concerns for asthmatic children in the Umdoni study included: 3.1% not concern at all, 14.2% slightly concerned, 16.4% quite concerned, 60.2% very concerned and 6.2% unsure of their concern for asthmatic children. All male respondents in this Umdoni study were slightly concerned, quite concerned or very concerned about dealing with asthmatic children while 7 female teachers were not concerned at all about dealing with asthmatic children. This perception amongst the male teachers concurs with the fact that most male teachers had no training in asthma care and only 4 out of 25 male teachers felt they knew enough about asthma.

Teachers were asked if they were confident in assisting an asthmatic child during an asthma attack. Only 31.9% of teachers' were confident in assisting an asthmatic child during an asthma attack. This was substantially higher than the 16.1% of teachers in the survey by Maclehose *et al.* (2001). However in this current study, it was alarming that 11.2% of teachers' were unsure about their confidence in assisting an asthmatic child during an asthma attack. Neuharth-Pritchett and Getch (2001) investigated

teachers' preparation to teach children with asthma in the Georgia public school teachers' asthma knowledge survey. Seventy seven percent of teachers reported they "did not feel prepared to teach children with asthma" (Neuharth-Pritchett and Getch , 2001, p326). This study found a significant association between asthma knowledge and teachers confidence in their ability to assist an asthmatic child during an asthma attack ($p<0.0001$).Teachers with higher asthma knowledge scores are more confident in their ability to assist a child during an asthma attack than those with lower asthma knowledge scores. A South African study by Perold, Louw and Kleyhans (2010) on primary schoolteachers' knowledge and misperceptions of Attention Deficit Hyperactivity Disorder (ADHD) also found that teachers with higher knowledge on ADHD were more confident in their ability to teach children with the ADHD ($p<0.05$)

Most teachers (71%) reported that if a child's asthma is not controlled, they would inform the parents, while 10% and 18% of teachers reported they would inform the school nurse and medical practitioner, respectively. This information was gathered in order to ascertain what teachers felt should be the plan of action if a child was presenting with poorly controlled asthma.

This study not only focused on teachers' general concerns about dealing with asthmatic children but it also explored the reasons for teachers' concerns about having asthmatic children in their schools, which many other similar studies have overlooked. The majority of the teachers (69.4%) were concerned about coping in an emergency while 24.9% and 5.7% were concerned about administering treatment and disruption to other pupils, respectively. The findings in this study match those in the literature. These findings are essential to directing asthma education in areas of the primary schoolteachers' principle concerns.

Umdoni primary schoolteachers' response to the need for in-service training on asthma management was very positive. The majority of teachers (95.1%) thought it was absolutely necessary for in-service training on asthma management for schoolteachers. The findings of this study concur with the literature. Eiser and Town (1987) conducted a questionnaire study on 147 teachers about their concerns about chronically ill children and its implications for paediatricians. Most teachers reported great concern that they did not know how to deal with medical emergencies in the classroom and the impact on other children.

All male teachers responded positively for the need on in-service training for asthma management. Their response corresponds with their level of concern about dealing with asthmatic children, as all male teachers are quite or very concerned about asthmatic children.

In a South African asthma knowledge study by Khan (2006), all teachers who participated in the survey agreed on the need for asthma education for teachers. International studies by Bahari and Rahman (2003), Brook (1991) and Tse and Yu reported that 92.14%, 88% and 87% of teachers, respectively, were supportive of in-service training on asthma management.

5.6. The application of the findings within the context of the theoretical framework.

In this study, it was assumed that the levels of information, motivation and behavioural skills are essential determinants of schoolteachers' asthma related practices (behaviour) towards asthmatic schoolchildren (Figure 37). Asthma knowledge is an important component in the management of asthmatic children within the school environment. Overall the average score for knowledge on asthma was 30.3 (SD=9.3). Almost two-third (61.5%; n=140) of the participants scored more than 27 points reflecting satisfactory knowledge on asthma. This finding implies that most teachers were equipped with asthma-related information, although the average score was 55%. There were deficiencies in teachers' knowledge in areas of sports and asthma, signs and symptoms of an asthma attack and asthma control.

In terms of teachers' motivation, more than two-thirds (66.8%) perceived they did not know enough about asthma to help a child presenting with symptoms of an asthma attack in the classroom. Despite the findings of the study reflecting satisfactory knowledge of asthma amongst teachers, it is evident that teachers perceived their level of asthma knowledge negatively. Other dimensions of teachers' personal motivation included their perception or level of concern of asthmatic children and their preferred plan of action for uncontrolled asthma as well. Most importantly, in terms of motivation, is teachers' perception of their importance in caring for and managing asthmatic

children in the school environment. While most respondents were concerned about dealing with asthmatic children, only 60.2% of them were very concerned about dealing with asthmatic children in the school environment. This may imply that only two-third of teachers' perceived asthma to be a serious respiratory condition in children. Most of the teachers' preferred plan of action for uncontrolled asthma was to inform the parents or caregivers, which may give an indication that teachers perceived parents of asthmatic children as important referents. In light of this, parents of asthmatic schoolchildren can provide the social support for schoolteachers' asthma related practices (behaviour) towards asthmatic schoolchildren. According to Hamm (2004), teamwork between parents of asthmatic children and schoolteachers is critical to good asthma management and development asthma action plans. Almost all the teachers perceived asthma management in-service training for teachers to be absolutely necessary. None of the schools had environments conducive to asthma management when considering the absence of written asthma policies, nebulisers, peakflow meters and the reports of poor support from the school health nurse in terms of visits to the school.

Teachers behavioural skills were explored in terms of confidence (self-efficacy), perceived principal concerns and previous training in asthma management. The majority (56.2%) of teachers did not feel confident to assist a child during an asthma attack. This is not surprising when deficits were identified in teachers' knowledge of asthma and teachers perception of their overall asthma knowledge. A positive association, however, was found between asthma knowledge and teachers confidence in their ability to assist a child during an asthma attack ($p<0.0001$). This finding reflected that those with higher asthma knowledge scores were more confident in their ability to assist the child during an asthma attack than those with low asthma knowledge scores. This study sheds further light that a well informed individual is more likely to be confident in their ability to assist in the management of a health condition. Hence the cliché "knowledge is power" holds true in daily circumstances. Information and Motivation are independent constructs that activate behavioral skills and also promote a sense of self-efficacy. Behavioural skills also extend to the skills required for performing a behavior as shown in this study that although six teachers reported previous asthma training, none could correctly identify the correct steps in using a metered dose inhaler.

These findings indicate that loopholes exist in both teachers' asthma information and their motivation which extends to their perceived lack of behavioral skills.

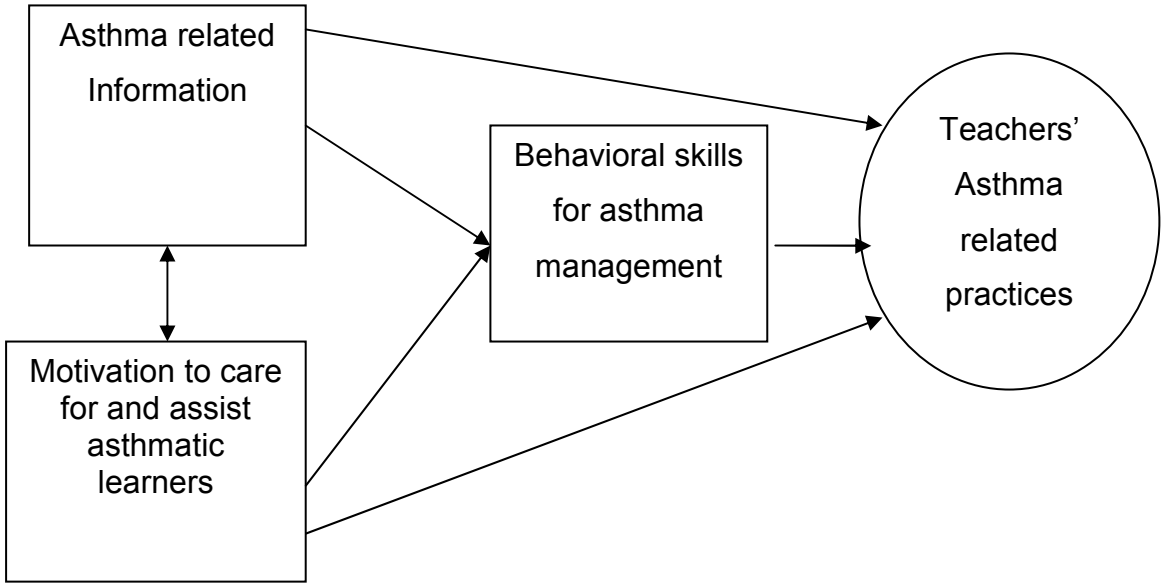


Figure 37: Adaptation of the Information Motivation Behavioural Skills Model

5.7. Limitations of the study

No study is without limitations. Thus it is important to acknowledge the limitations of the study. This study used a sample of convenience, in that the study area was chosen purposively. This limits generalisability to areas of similar socioeconomic and spatial characteristics. However 19 clusters (primary schools) were included this study, and this meant that the sample included teachers with different backgrounds and experiences.

The information of policy, school health nurse visits and equipment was uncertain as there were inconsistent and conflicting results. The scope of this study did not include analysing the situation of school health services in the Umdoni subdistrict and therefore

did not explore the nature of the school health nurse visits and poor knowledge of emergency asthma management.

The policy of handling asthma medication was uncertain as well as many teachers provided different responses. The limitation of this study would be inconsistent data and highlights the need for a study that will further explore school health service management not only with regards to asthma but other neglected chronic childhood diseases.

The IMB model constitutes the following: health related information, motivation and behavioural skills (Fisher, Fisher and Harman 2003). According to Fisher and Fisher (1992), information is a very important component of this theory. Information relates to knowledge which is important for behaviour change. Motivation relates to the individuals insight about the condition, management, behaviour and social support (Fisher, Fisher and Harman, 2003). Behavioural skills encompasses the skills required to improve self efficacy and ultimately lead to behaviour change (Fisher and Fisher 1992). The questionnaire used in this study was not designed adequately to probe into the social support which is essential to the motivation component of the IMB theoretical framework. Further studies are required to describe the support teachers receive from parents of children with chronic diseases like asthma. Qualitative research methods would have been ideal for this study. “Qualitative research can help us find out why these behaviours occur and why people hold these views” (Katzellenbogen, Joubert and Abdool-Karim, 1997, p176) whereas the quantitative approach used only shows how prevalent such views are. Qualitative research would have assisted the researchers in probing deeper into teachers’ perceptions about managing asthmatic children in school.

A separate questionnaire might have been designed for school principals, as it would have been interesting to compare teachers’ information about asthma management in schools with that of the school principal. This could have provided the researchers with information about communication within the schools about managing children with chronic health conditions such as asthma. Such analyses can contribute to designing effective intervention programmes and assist with plans for health promoting schools

5.8 Summary

In summary, this study found that although the majority of primary schoolteachers (61.5%) had above 50% for the asthma knowledge test, the vast majority (95.1%) felt asthma education was absolutely necessary for schoolteachers. The positive response to asthma education in-service training may have been a reflection that most teachers were aware that deficiencies in their knowledge existed and this is noted by the overall average asthma knowledge score of 55% (30/55). This study showed that teachers' knowledge of asthma and sports was deficient and that teachers do have misconceptions about asthmatic children's abilities as compared to non-asthmatic children. Misconceptions about asthma medication were also revealed. The lack of medical or nursing personnel at these schools means that the initial management of the child during an asthma attack will be in the hands of school personnel. In light of this, it is important to note that 38.5% of participants scored less than 27 points which denoted poor knowledge of asthma and its management. The results of this study illustrates in a form of a 'word picture' that Umdoni schoolteachers' current knowledge about asthma may not be adequate enough to assist asthmatic learners at school especially in emergency situations. There is a serious deficiency in knowledge of asthma care in an acute exacerbation among schoolteachers. Due to most teachers lack of confidence in caring for an asthmatic child during an asthma attack, teachers indicated assisting the child by referral to someone else instead of providing the critical first aid. Teachers also demonstrated inadequate knowledge on administering emergency medication and have significant misconceptions about asthma.

None of the schools had written material to guide the management and care of asthmatic children. This research used the IMB theoretical framework to aid in understanding teachers' asthma related practices within the school environment. The results of this study provide a useful baseline for developing asthma education intervention programmes and asthma policy for schools for South Africa.

CHAPTER 6: RECOMMENDATIONS AND CONCLUSIONS

6.1 Introduction

The CDC (2006, p1) has stated that “a healthy student is a student ready to learn”. This can be achieved by promoting healthy and accommodating school environments for learners with chronic medical conditions such as asthma. The SABC News (2006) and Ministry of Health, Western Cape (2006) reported that one in eight children in South Africa has asthma. Schoolteachers will make important decisions in the school environment regarding asthmatic children. These decisions may include the participation of asthmatic children in sports and the plan of action in a severe acute asthma attack. This study identified asthma knowledge gaps, negative perceptions amongst most teachers about their asthma knowledge, a lack of confidence by most teachers in dealing with asthmatic children. The majority of teachers reported their greatest concerns as coping with an asthma emergency and administering treatment. The greatest barrier to effective asthma management identified in the schools surveyed was the absence of guidelines or written asthma polices and asthma assessment and medication delivery devices. Thus there is definitely a need to promote safe management of asthmatic children in schools. It is therefore important that teachers are equipped with safe and adequate knowledge on asthma and its management.

6.2 Recommendations

6.2.1 Asthma is a chronic respiratory disease in childhood globally. Unfortunately in the South African National School Health Policy, a chronic childhood condition such as asthma is not recognised. It is a disease that is associated with death and disability. Collaboration is required between the health and education authorities in acknowledging that the burden of non-communicable diseases also deserves recognition. The National School Health Policy in South Africa has a narrow approach, focusing more on nutrition and infectious diseases. Advocating support for chronic non-communicable childhood diseases is essential to the well-being of the future generation.

6.2.2 Education programmes on asthma may benefit schoolteachers in their approach to caring for asthmatic schoolchildren. This study showed that 95.1% of the teachers agreed that an asthma education programme for school personnel was absolutely or quite necessary. This is an encouraging response from the teachers. The Information Motivation Behavioural Skills Theory (IMB) has been used for health promotion purposes. This study provides a baseline of the information, motivation and behavioural skills of primary schoolteachers in Umdoni Subdistrict. An asthma education intervention for school personnel requires collaboration between the Department of Health and the Department of Education with a common goal of accomplishing safe and supportive environments for asthmatic schoolchildren. Asthma education interventions should also target affected children as well. The CDC (2006) recommends the following strategies to assist schools with managing asthma: 1) establish management and support systems for asthma friendly schools, 2) provide appropriate school health and mental health services for students with asthma, 3) provide asthma education and awareness programs for students and school staff, 4) provide a safe and healthy school environment to reduce asthma triggers, 5) provide safe, enjoyable physical education and activity opportunities for students with asthma and 6) co-ordinate school, family, and community efforts to better manage asthma symptoms and reduce school absences among students with asthma. We suggest that the findings of this study can guide an asthma education intervention for schoolteachers in this district.

6.2.3 The role of the school nurse in the management of children with chronic illnesses in the school environment deserves serious recognition. School nurses can assist with asthma education interventions for school personnel. School health services in South Africa are integrated into Primary Health Care. Each district in South Africa should have its own school health team. The school health team would be in an ideal position to provide training and support for school personnel, children and parents. We recommend that research should also be conducted on school nurses regarding their knowledge and perceptions on asthma management within schools. The outcomes of such a research should determine if school nurses are equipped to take on this unique position of agents of change for a safer environment for asthmatic children.

6.2.4 We recommend that the Departments of Education and Health take seriously into consideration the South African Thoracic Society and National Asthma Education Programme guidelines to schools on the approach to managing and caring for asthmatic schoolchildren. The National Asthma Education Programme provides guidelines through the school asthma documents and resources (www.asthma.co.za). There is a need for a sound school asthma policy. In practice, schools may have a first aid policy but the policy may not provide procedures in place when there is an asthma emergency. Thus schools require a policy in place that can inform their responsibilities on issues surrounding asthma. We recommend that findings of this research can inform the drafting of an asthma school policy.

6.2.5 Organisations such as the National Asthma Education Programme and Centre for Health and Environmental Education Awareness should advocate for the inclusion of asthma guidelines for schools that it recommends in the national school health policy. These organisations should also advocate for asthma education to be included in teacher training curricula.

6.2.6 Schools should have standard tool kit for monitoring recognising an asthma exacerbation. First Aid kits in schools should include monitoring equipment, reliever medication and oral prednisone.

6.2.7 We strongly recommend research into teachers' knowledge of other childhood diseases as well. The data that will be provided by such research will assist in educational interventions. All educational interventions should also be evaluated and monitored. This will assist South African schools in achieving a health promoting school status. In this way, we can promote a healthier South African nation.

6.3 Conclusion

The theoretical framework used, the IMB model, holds that information and motivation are prerequisites for sound behavioural skills. A teacher with specific asthma related information and a sense of high motivation may initiate the relevant behavioural skills to ensure sound asthma related practices in children (behaviour). The IMB model also emphasises the need for ongoing support for schoolteachers in terms of social motivation (parents, the community, school health nurse, institutional guidelines and resources).

Ubuntu, the African notion is most applicable to this study. In Africa it is not “I” but “we”. The notion of Ubuntu encompasses human relationships and is based on deep-seated humanism that everyone in the community is responsible for the well-being of its members. “Ubuntu” means people are people through other people – the full version being “Umuntu ngumuntu ngabantu”. It is also acknowledged that every citizen enjoys both the rights and responsibilities in promoting individual and social well-being (South African Government, 1996, Government Welfare Paper, No.16943). A school is a community and teachers can play their part in Ubuntu by caring for the well-being of its children holistically.

REFERENCES:

Ait-Khaled N, Odhiambo J, Pearce N, Adjoh KS, Maesano IA, Benhabyles B, et al. (2007). Prevalence of symptoms of asthma, rhinitis and eczema in 13-to-14 year old children in Africa: the International Study of Asthma and Allergies in Childhood Phase lll. *Allergy, 62*, 247-258.

Akinbami, L., & Schoendorf, M. (2002). Trends in Childhood Asthma: Prevalence, Health Care Utilization, and Mortality. *Pediatrics,* 110(2), 315-321.

American Lung Association. (2005). *Trends in Asthma Mortality and Morbidity*. Epidemiology and Statistics Unit. Research and Program Services Division.

Amico, K., Toro-Alfonso, J., & Fisher, J. (2005). An empirical test of information, motivation and behavioural skills model of antiretroviral therapy adherence *AIDS Care*, 17, 661-673.

Anderton, J., & Broady, J. (1999). Improving schools' asthma policies and procedures. *Nursing Standard,* 14(6), 34-38.

Atchison, J., & Cuskelly, M. (1994). Educating Teachers about asthma. *Journal of Asthma,* 31, 269-276.

Bahari, M., & Rahman, A. (2003). A Knowledge of Asthma in School Children:A survey among Primary School Teachers *Singaporean Medical Journal,* 44(3), 131-135.

Becker, J. (2003). Asthma deaths during sports *Journal of Allergy and Clinical Immunology,* 113(2), 264-267.

Beutler AI, Chestnut GT, Mattingly JC, & Jamieson B. (2009). Aspirin Use in Children for fever or viral syndromes. *American Family Physician,* 80(12), 1472-1474.

Bell, H., McElnay, J., Hughes, C., & Gleadhill, I. (2000). Primary Schoolteachers' Knowledge of Asthma: The Impact of a Pharmacist Intervention. *Journal of Asthma,* 37(7), 545-555.

Bevis, M., & Taylor, B. (1990). What do school teachers know about asthma. *Archives of Disease in Childhood,* 65, 622-625.

Bousquet, J., Bousquet, P., Godard, P., & Daures, P. (2005). The public health implications of asthma. *Bulletin of the World Health Organisation,* 83(7), 481-560.

Braman, S. (2006). Global Burden of Asthma. *Chest,* 130, 4-12.

Brook, U. (1990). An Assessment of Asthmatic Knowledge of School Teachers. *Journal of Asthma,* 27(3), 159-164.

Caruthers P, Ebbutt A F, & Barnes, G. (1995). Teachers knowledge of asthma and asthma management in primary schools. *Health Education Journal, 54*, 28-36.

Clark, N., Brown, R., Parker, E., Robins, T., Rernick, D., Martin, A., et al. (1999). Childhood Asthma. *Environmental Health Perspectives,* 107, 421-427.

Clyral. (2009). Clyral -web application development and mobile software solutions. Retrieved 6th March, 2009, from www.clyral.com

Connor, G. (1997). Teachers and asthma. *Journal of Continuing Education of General Practitioners,* XII(1), 104-108.

Doko L. (2008). Illness link to refineries*. Daily News*. March 24th.

Drudy, S. (2008). Gender balance/gender bias: the teaching profession and the impact of feminisation. *Gender and Education,* 20(4), 309-323.

Eildeirwari K, & Persky V. (2004). History of Ear Infections and Prevalence of Asthma in a National Sample of Children Aged 2 to 11 Years. *Chest, 125*(5), 1-6.

Eiser C & Town C. (2008). Teachers' Concerns about Chronically Sick Children: Implications for Peadiatricians (Abstract). *Developmental Medicine and Child Neurology, 29*(1), 56-63.

Feldman, C. (2010). The Year of the Lung. *South African Journal of Epidemiology and Infection,* 25(1), 3-4.

Fisher, J., & Fisher, W. (1992). Changing AIDS risk behaviour [abstract] [Electronic Version]. *Psychology Bulletin*, 11, 455-474.

Fisher, J., Fisher, W., Amico, K., & Harman, J. (2006). An Information Motivation Behavioural Skills model of adherence to therapy [abstact] [Electronic Version]. *Health Psychology*, 25, 462-473.

Fisher, J., Fisher, W., & Harman, J. (2003). IMB Model. Retrieved 2 February, 2010, from www.apla.org/accionmutual/pdf/IMB-model.pdf

French, D., & Caroll, A. (1997). Western Australian primary school teachers' knowledge about childhood asthma and its management. *Journal of Asthma,* 34(6), 469-475.

Glanz K, Rimer BK, & Su SM. (2005). *Theory at a Glance: A Guide for Health Promotion*: United States National Cancer Institute.

Green, R., Zar, H., & Bateman, E. (2007). Asthma - is survival good enough. *South African Medical Journal,* 97(3), 172.

Green RJ, Davis G, & Price D. (2008). Perceptions', impact and management of asthma in South Africa: a patient questionnaire study. *Primary Care Respiratory Journal, 17*(4), 212-216.

Green RJ, Greenblat MM, Jones S, & Adam B. (2001). Asthma management and perceptions in rural South Africa. *Annals Allergy Asthma Immunology*, 86(3), 343-347.

Grieling, A., Boss , P., & Wheeler, L. (2005). A preliminary investigation of asthma mortality in schools. *Journal of School Health,* 75(8), 286-290.

Hamm, E. (2004). Managing Asthma in the Classroom. *Childhood Education,* 81(1), 16-18.

Harris, L. (2002). Asthma Education for Middle School Students and Staff. *Journal of School Nursing,* 18(2), 117-121.

Hawa, R., Munro, B., & Doherty-Poirier, M. (1998). Information, motivation and behaviour as predictors of AIDS risk reduction among Canadian first year university students *Canadian Journal of Human Sexuality*, 7(1), 9-10.

Hazir, T., Das, C., Piracha, F., Waheed, B., & Azam, M. (2002). Carer's perception of childhood asthma and its management in a selected Pakistani community. *Archives of Disease in Childhood,* 87, 287-290.

Henry, R., Lough, S., & Mellis, C. (2006). National policy on asthma management for schools. *Journal of Paediatrics and Child Health,* 42, 491-495.

Hillemeier, M., Gusie, M., & Yu Bai, M. (2006). Rural and Urban Children with Asthma: Are School Health Services Meeting Their Needs? *Pediatrics,* 118(3), 1097 - 1103.

Houston, P. (2003). *Asthma Wellness - Keeping Children with Asthma in School and Learning*: Spring Publications - A School Board Publication of the American Association of School Administrators.

Hussey, J., Cahill, A., Henry, D., King, A., & Gormley, J. (1999). National school teachers' knowledge of asthma and its management. *Irish Journal of Medical Sciences,* 168(3), 174 -179.

Jeena, P., Luyt, D., Morris, A., & Green, R. (2004). *What is asthma ?* Retrieved 2 February 2009. from http://www.capegateway.gov.za/eng/pubs/public_info/W67819.

Jenkins C, J, C., & L, H. (2004). Systematic review of prevalence of aspirin induced asthma and its implictions for clinical practice. *BMJ,* 328, 434-437.

Jennnings S, & Bush Martin. (2006). A comparison of conventional and liberal Multiple-Choice Tests [Electronic Version]. *Practical Assessment, Research and Evaluation*, 11. Retrieved 17th February from http://pareonline.net/getvn.asp?v=11&n=8.

Juhn, Y., Sauver, J., Shapiro, E., & McCarthy, P. (2002). Child Care program directors' level of knowledge about asthma and factors associated with knowledge. *Clinical Paediatrics,* 41, 111-116.

Katzenellenbogen, J., Joubert, G., & Abdool Karim, S. (1997). *Epidemiology A Manual For South Africa*: Oxford University Press Africa, Cape Town.

Keysser, J., Splett, P., Ross, S., & Fishman, E. (2006). Statewide Training for Minnesota School Personnel. *Journal of School Health,* 76(6), 264268.

Khan, F. (2006). Preparation and undertaking of an education programme to promote the understanding and importance of environment and health linkages with a particular focus on respiratory health (pp. 1-47): CHEEA.

Lalloo, U., Ainslie, G., Wong, M., Abdool-Gaffar, S., Irusen, E., Mash, R., et al. (2007). Guidelines for the management of chronic asthma in adolescents and adults. *South African Family Practitioner* 49(5), 19-31.

Latif, A. (2004). Bahraini school teachers' knowledge of asthma. *Middle East Journal of Family Medicine, 2*(2), 1-11.

Levin ME. (2006a). Overcoming language barriers. *SAMJ, 96*(7), 1058-1060.

Levin ME. (2006b). Different use of medical terminology and culture specific models of disease affecting communication between Xhosa-speaking patients and English-speaking doctors at a South African paediatric teaching hospital. *SAMJ, 96*(10), 1076-1079.

Levin ME. (2007). Use of Asthma Terminology by Xhosa-Speaking Patients in South Africa- How it affects Asthma-Control Questionnaires and Questionnaire -Based Epidemiological Studies *Current Allergy and Clinical Immunology, 20*(2), 74--78.

Levin ME. (2008). Total IgE in Urban Black South African teenagers: the influence of atopy and helminth infection. *Paediatric Allergy Immunology, 19*(5), 449-454.

Litonjua, A., Carey, V., Weiss, S., & Gold, D. (1999). Race, socioeconomic Factors, and Area of Residence Are Associated With Asthma Prevalence. *Pediatric Pulmonology,* 28, 394 - 401.

MacIntyre EA, Chen C, Herbarth O, Borte M, Schaaf B, Kramer U, et al. (2010). Early - Life Otitis Media and Incident Atopic Disease at School Age in Birth Cohort. *The Paediatric Infectious Disease Journal, 29*(12), 96-99.

MacIntyre UE, de Villiers FP, & Owange-Iraka JW. (2001). Increase in childhood asthma admissions in an urbanising population. *South African Medical Journal,* 91(8), 667-672.

MacLehose, R., Rao, M., Dyson, J., & Milnes, P. (2001). Asthma Knowledge and management in primary schools in South Essex, UK. *Health Education,* 101(6), 255-263.

Madsen, P., Storm, K., & Johansen, A. (1992). Danish primary schoolteachers' knowledge about asthma: results of a questionnaire. *Acta Paediatrica,* 81(4), 413 -416.

Masoli M, Fabian D, Holt S, & Beasely, R. (2004). The global burden of asthma: executive summary of the GINA Dissemination Committee report. *Allergy,* 59, 469-478.

Ministry of Health (Provincial Government of the Western Cape). (2006). *World Asthma Awareness Day*. Retrieved. from http://www.capegateway.gov.za/eng/pubs/public_info.

Misovich, S., Fisher, J., Martinez, T., & Bryan, A. (2003). Predicting Breast self-examination: A test of the Information-Motivation-Behavioural Skills Model. *Journal of Applied Social Psychology,* 33(4), 775-790.

Munjra AI. (2010). Allergic rhinitis in children; allergic rhinitis is the most common disorder affecting children. *CME, 28*(9), 418-424.

Munro, S., Lewin, S., Swart, T., & Volmink, J. (2007). A review of health behaviour theories: how useful are these for developing interventions to promote long term medication adherence for TB and HIV/AIDS *BMC Public Health*, 104(7), 1-25.

National Department of Health. (2003). *School Health Policy and Implementation Guidelines*. Pretoria South Africa

Neuhart- Pritchett, S., & Getch, Y. Q. (2001). Asthma and the school teacher: the status of teacher preparedness and training. *Journal of School Nursing,* 17(6), 323-328.

Neuhart-Pritchett, S., & Getch, Y. (2006). Teacher Capability and School Resource Scale for Asthma Management. *Journal of Asthma,* 43, 735 -738.

Ninan, T. K., & Rusell, G. (2000). The changing picture of childhood asthma. *Paediatric Respiratory Review,* 1, 71-78.

Nriagu, J., Robins, T., Gary, L., Liggans, G., Davila, R., Supuwood, K., et al. (1999). Prevalence of asthma and respiratory symptoms in south cental Durban, South Africa. *European Journal of Epidemiology,* 15, 747-755.

Ones, U., Akcay, A., Zamay, T., Guler, N., & Dogru, M. (2006). Asthma knowledge level of Primary Schoolteachers in Istanbul, Turkey. *Asian Pacific Journal of Allergy and Immunology,* 24, 9-15.

Osborne, C., & Egede, L. (2009). Validation of an Information Motivation Behavioural Skills Model of Diabetes self care[abstract]. *Journal of the Association of Nurses in Aids Care,* 79(2), 49-54.

Partridge, M. (1995). Delivering optimal care to the person with asthma: what are the key components and what do we mean by patient education. *European Respiratory Journal,* 8, 298 -305.

Pauwels, R., & Major, S. (1999). WHO plans to halve child asthma deaths. *British Medical Journal,* 318(8), 8.

Perold M., Louws, C. & Kleyhans, S. (2010). Primary schoolteachers' knowledge and misperceptions of attention deficit hyperactivity disorder (ADHD). *South African Journal of School Health,* 30, 457-473.

Prelip, M., Erausquin, J., Slusser, W., Vecchiarelli, S., Weightman, H., Lange, L., et al. (2006). The role of classroom teachers in nutrition and physical education. *Californian Journal of Health Promotion,* 4(3), 116-127.

Republic of South Africa, Department of Welfare. (1996). *White Paper for Social Welfare: Principles, guidelines and recommendations. Proposed policies and programs for the development of social welfare in South Africa*.

Rodehorst, T. (2003). Rural elementary schoolteachers' intent to manage children with asthma symptoms. *Pediatric Nursing,* 29(3), 184 -192.

Rural Doctors Association of South Africa (RUDASA). (2006). Rural Health Strategy for South Africa. Retrieved 10 February, 2009, from www.rudasa.org/download/RuralHealthStrat_draft020306

SABC. (2006). Asthma deaths continously souring in SA. Retrieved 15 February 2008, from http://www.sabcnews.com/south_africa/health,html

Sapien, R., Fullerton-Gleason, L., & Allen, N. (2004). Teaching School Teachers to Recognize Respiratory Distress in Asthmatic Children. *Journal of Asthma,* 41(7), 733-737.

Schlemmer A, & Mash B. (2006). The effects of a language barrier in a South African district hospital. . *SAMJ, 96*(10), 1048-1087.

Seto, W., Wong, M., & Mitchell, E. (1992). Asthma Knowlege and Management in Primary Schools In South Auckland. *New Zealand Medical Journal,* 105(937), 264-265.

Shohat, T., Graif, Y., Garty, B., Livne, I., & Green, M. (2004). The child with asthma at school: Results from a national asthma survey among schoolchildren in Isreal. *Journal of Adolescent Health,* 37(4), 275 - 280.

Side-Effects-Site.com. (2010). Ibuprofen or Aspirin and Asthma Can Be A Deadly Combination. Retrieved 6th October, 2010, from http://www.side-effects-site.com/aspirin-and asthma html

Singh, M. (2005). The Burden of Asthma: an Asian Perspective. *Paediatric Respiratory Review,* 6(1), 14-19.

Steinman H, Donson H, Kawalski M, Toerien A, & Potter PC. (2003). Bronchial hyper-responsiveness and atopy in urban, peri-urban and rural South African children *Paediatric Allergy Immunology, 14*(5), 383-393.

Tse, K., & Yu, T. (2002). Knowledge of asthma and its management: A study in primary schoolteachers in Hong Konk. *Hong Konk Practitioner,* 24, 4-14.

United Nations Development Programme (UNDP). (2005). About the MDG's: Basics. Retrieved 12 March, 2009, from www.undp.org/mdg/basics/shtml

United Nations Children's Fund. (2008). On the rights of the child. Retrieved 19 January, 2010, from www.unicef.org/crc

van de Schyf, L. (2010, July-August). Turning Scars into Stars. *Inspirations Magazine,* 50 -51.

Virtual Pediatrician. (2008). Asthma. Retrieved 15th February 2011, from http://www.thevirtualpediatrician.com/Asthma.html

Weinberg, E. (1994). Problems of childhood asthma in a developing society. *Continuing Medical Education,* 12(1), 17-26.

World Health Organisation. (2006). *What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting schools approach*: WHO Regional Office for Europe's Health Evidence Network(HEN).

World Health Organisation. (2008). Asthma. *Factsheets* Retrieved 18th February, 2008, from http://www.who.int/mediacentre/factsheets/fs307/en/index.html

World Health Organisation. (2004). Bronchial Asthma. *WHO Fact sheets* Retrieved 18th February 2008, from http://www.who.int/mediacentre/factsheets/fs206/en/index.html

World Health Organisation. (2006). Asthma. *WHO Fact Sheets* Retrieved 18th February, 2008, from http://www.who.int/mediacentre/factsheets/fs307/en/index.html

World, Health, & Organisation. (2009). Definition of Asthma. Retrieved 19th May, 2009, from www.who.int/respiratory

Zar, H., Stickells, D., Torien, A., Wilson, D., Klein, M., & Bateman, E. (2001). Changes in fatal and near -fatal asthma in an urban area of South Africa from 1980 - 1997. *European Respiratory Journal,* 18, 33-37.

Zar HJ, Erhrlich RI, Workman L, & Weinberg, E. (2007). The changing prevalence of asthma, allergic rhinitis and atopic eczema in African adolescents from 1995 to 2002. *Paedtric Allergy Immunology, 18*(7), 560-565.

APPENDIX A

Postgraduate Education Committee Approval

UNIVERSITY OF
KWAZULU-NATAL

11 August 2009

Mr A Gray
Dept of Therapeutics and Medicine Management

Dear Mr Gray

PROTOCOL: Primary school teachers' knowledge of asthma in Ugu North, KwaZulu Natal, MPH, *Govender D*, Student number 200003419 (REF. MPH017/08)

The Postgraduate Education Committee ratified the approval of the abovementioned study on 04 August 2009.

Please note:

- The Postgraduate Education Committee must review any changes made to this study.
- The study may not begin without the approval of the Biomedical Research Ethics Committee.

May I take this opportunity to wish the student every success with the study.

Yours sincerely

Dr A Voce
Dean's Assistant: Coursework Programmes
Postgraduate Education Committee

CC. D Govender

Nelson R Mandela School of Medicine, College of Health Sciences,
Medical Research Administration

Postal Address: Private Bag 7, Congella 4013, South Africa

Phone: +27 (0)31 260 4495 **Facsimile:** +27 (0)31 260 4529 **Email:** lupkek@ukzn.ac.za **Website:** www.ukzn.ac.za

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

UNIVERSITY OF
KWAZULU-NATAL

06 October 2009

Mr A Gray
Dept of Therapeutics and Medicine Management

Dear Mr Gray

PROTOCOL: Primary school teachers' knowledge of asthma in Ugu North, KwaZulu Natal

At a meeting of the Postgraduate Education Committee held 06 October 2009, your request for approval of protocol amendment dated 28 September 2009 has been noted and approved.

New title: 'Primary school teachers' knowledge of asthma in Umdoni subdistrict, KwaZulu-Natal'.

Yours sincerely

Dr A Voce
Dean's Assistant: Coursework Programmes
Postgraduate Education Committee

CC. D Govender

Postgraduate Education Administration
Medical School Campus

Postal Address: *Private Bag 7, Congella, 4013, South Africa*

Telephone: *+27 (0)31 260 4327* ***Facsimile:*** *+27 (0)31 4401* ***Email:*** *hesliopi@ukzn.ac.za* ***Website:*** *www.ukzn.ac.za*

UNIVERSITY OF
KWAZULU-NATAL

20 August 2010

Student no: 200003419

Ms D Govender
P O Box 10429
Umkomaas
4170

Email: 200003419@ukzn.ac.za

Dear Ms Govender

Master of Public Health
Title: "Primary School Teachers' Knowledge of Asthma in Umdoni Subdistrict, KwaZulu Natal" 64 Credits

Supervisor: Mr Andy Gray
Department of Therapeutics and Medicines Management

I acknowledge receipt of your intent to submit the above dissertation on 15 November 2010. You are required to submit 5 soft bound copies of your dissertation to the Postgraduate Office. In addition you are required to submit one electronic copy in pdf format on a computer disk (CD).

Each copy of the dissertation must be signed and dated by the student and supervisor.

The attached declaration MUST be included in the dissertation.

Please ensure that the dissertation submitted bears the above approved title.

Denise Heslop
Postgraduate Administration

CC: Mr A Gray
Dept of Therapeutics and Medicines Management

APPENDIX B

Biomedical Ethics Approval

UNIVERSITY OF
KWAZULU-NATAL

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609
Email: BREC@ukzn.ac.za
Website: http://research.ukzn.ac.za/ResearchEthics11415.aspx

29 September 2009

Ms. Desiree Govender
Department of Public Health
Nelson R. Mandela School of Medicine
University of KwaZulu- Natal

Dear Ms Govender

PROTOCOL: Primary school teacher's knowledge of Asthma in Ugu North, KwaZulu- Natal. Ms Govender, Dept of Public Health UKZN. REF: BE089/09.

EXPEDITED APPLICATION

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received on 17 April 2009.

The study was approved pending appropriate responses to queries raised. Your responses received on 01 September 2009 to queries raised on 11 June 2009 have been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given **full ethics approval** and may begin as from **today; 29 September 2009.**

This approval is valid for one year from **29 September 2009.** To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2004), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at http://research.ukzn.ac.za/ResearchEthics11415.aspx.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be **RATIFIED** at a full sitting of the Biomedical Research Ethics Committee meeting to be held on **13 October 2009.**

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

Professor D.R Wassenaar
Chair: Biomedical Research Ethics Committee

APPENDIX C

KwaZulu Natal Department of Education permission to conduct the study

PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATALI

DEPARTMENT OF EDUCATION
UMNYANGO WEMFUNDO

Tel: 033 341 8610
Fax: 033 341 8612
Private Bag X9137
Pietermaritzburg
3200

228 Pietermaritz Street
PIETERMARITZBURG

INHLOKOHOVISI | PIETERMARITZBURG | HEAD OFFICE

Imibuzo: Enquiries: Sibusiso Alwar
Reference: Inkomba: 0023/2009
Date: Usuku: 24 April 2009

MS D GOVENDER
P.O BOX 10429
UMKOMAAS
4170

PERMISSION TO INTERVIEW LEARNERS AND EDUCATORS

The above matter refers.

Permission is hereby granted to interview Departmental Officials, learners and educators in selected schools of the Province of KwaZulu-Natal subject to the following conditions:

1. **You make all the arrangements concerning your interviews.**
2. **Educators' programmes are not interrupted.**
3. **Interviews are not conducted during the time of writing examinations in schools.**
4. **Learners, educators and schools are not identifiable in any way from the results of the interviews.**
5. **Your interviews are limited only to targeted schools.**
6. **A brief summary of the interview content, findings and recommendations is provided to my office.**
7. **A copy of this letter is submitted to District Managers and principals of schools where the intended interviews are to be conducted.**

The KZN Department of education fully supports your commitment to research: **Primary school teachers' knowledge of Asthma In Ugu North of KwaZulu Natal**

It is hoped that you will find the above in order.

Best Wishes

R Cassius Lubisi, (PhD)
Superintendent-General

PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATALI

DEPARTMENT OF EDUCATION
UMNYANGO WEMFUNDO

Tel: 033 341 8610
Fax: 033 341 8612
Private Bag X9137
Pietermaritzburg
3200

228 Pietermaritz Street
PIETERMARITZBURG

INHLOKOHOVISI | PIETERMARITZBURG | HEAD OFFICE

Imibuzo: Enquiries: Sibusiso Alwar
Reference: Inkomba: 0023/2009
Date: Usuku: 15 June 2009

TO WHOM IT MAT CONCERN

This serve to confirm that Ms D Govender had been granted permission to conduct her research on the following schools.

1. Vusisizwe Secondary School
2. Umzintovale Primary School
3. Umzinto Primary (Old Main Rd)
4. Khuphuka Primary School
5. Tholimfundo Primary School
6. Mmoyeni Junior Primary School
7. Olwasini Junior Primary School
8. Celokuhle Secondary Primary School
9. Amandawe Junior Primary School
10. Amahlongwa Junior Primary School
11. St Francis Primary School
12. Bongumbhele Primary School
13. Sezela Primary School
14. Macebo Junior Primary School
15. Ifafa Junior Primary School
16. Kwamaquza Junior Primary School
17. Scottburgh Primary School
18. Mahlashana Secondary Primary School
19. Pennington Primary School
20. Shayamoya Public Primary School
21. Shonkweni Junior Primary School
22. Injabulo Secondary Primary School
23. St Annes Primary School
24. Mtwalume Primary School
25. Mhlangamkhulu Junior Primary

Kind regards

Ms M Mbuli
Manager Resource Planning

APPENDIX D

Principals permission to conduct study at randomly selected schools

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: SHONKWENI PRIMARY

Principal: (Acting) J. N. HLOPHE

Signature of School Principal

Date: 25/08/09

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO
DEPARTMENT OF EDUCATION
25 AUG 2009
P.O. BOX 623 SCOTTBURGH 4180
SHONKWENI C.P. EMIS 262...

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School:

MMOYENI J.P SCHOOL
UMKOMAAS 4170

Principal: MRS T. G. MTHEMBU

Signature of School Principal

Date: 19/08/2009

Please put school stamp on this document

KZN DEPT. EDUCATION & CULTURE
MMOYENI J.P. SCHOOL
P.O. BOX 30199 UMKOMAAS, 4170
19 AUG 2009
PRINCIPALS SIGNATURE:
PHONE: 039 979 1019

With thanks

Regards

Desiree Govender

Principal Investigator

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: THOLIMFUNDO PRIMARY SCHOOL UMZINTO **Principal:** (ACTING) MTHULI R.Z.

Signature of School Principal _____ **Date:** 2009/08/20

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

DEPARTMENT OF EDUCATION
THOLIMFUNDO PRIMARY SCHOOL
20 AUG 2009
P O BOX 499 UMZINTO 4200
EMIS NO. 282589
PHONE: 039 974 1608

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: BONGUMBHELE Principal: B. P. NTOMBELA

Signature of School Principal Date: 19/08/09

Please put school stamp on this document

With thanks

Regards

Desiree Govender

Principal Investigator

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO
DEPARTMENT OF EDUCATION
2009 -08- 21
P.O. BOX 11248, UMZINTO 4200
TEL: 039-974 0095
BONGUMBHELE S PRIMARY EMIS 111370

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School:
UMZINTO PRIMARY MAIN ROAD UMZINTO, OPPOSITE ADAMS HARDWARE

Principal: Operation MR G. MORGAH

Signature of School Principal
Operation

Date: 20-08-07

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYS
2009 -08- 20
P.O. BOX 61 UMZINTO 4200
UMZINTO P (Old Main Rd)

PERMISSION GRANTED

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: MACEBO Junior Primary Principal: D.V. MBANJWA

Signature of School Principal DVM Date: 19/08/2009.

Please put school stamp on this document

With thanks

Regards

Desiree Govender

Principal Investigator

Govender

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMPUNDO KAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYS
2009 -08- 19
P/BAG X 0553 UMZINTO 4200
MACEBO J.P. EMIS 190513

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School:

IFAFA J.P.

Principal: K.V. KHESWA

Signature of School Principal

Date: 2009/05/19

Please put school stamp on this document

With thanks

Regards

Desiree Govender

Principal Investigator

Govender

DEPT. OF EDUCATION
IFAFA J.P. SCHOOL
P.O. BOX 480
UMZINTO 4200
PRINCIPAL
PHONE 039 - 9748113

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School:

ST. FRANCIS PRIMARY SCHOOL
PARK RYNIE

Principal: [signature]

Signature of School Principal
MR. K. D. PILLAY

Date: 2009/05/27

Please put school stamp on this document

With thanks

Regards

Desiree Govender

Principal Investigator

Govender

DEPARTMENT OF EDUCATION
ST FRANCIS PRIMARY SCHOOL
P/BAG X[illegible]
PK RYNIE
4[illegible]
TELEFAX: 039-9781544

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: ST ANNE'S PRIMARY

CONVENT ROAD, UMZINTO

Principal: R. MAHARAJ

Signature of School Principal R. Maharaj **Date:** 19-08-09

Please put school stamp on this document

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYS
2009 -08- 13
P.O. BOX 468 UMZINTO 4200
ST ANNE'S P EMIS 274164

With thanks

Regards

Desiree Govender

Principal Investigator

Govender

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School: SCOTTBURGH PRIMARY

Principal:

T.A. Robertson
Principal
Scottburgh Primary School

Signature of School Principal

Date: 20/08/2009

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School:
CELOKUHLE S.P.
P.O. Box 1448, SCOTTBURGH

Principal:

Signature of School Principal

Date: 18/05/09

Please put school stamp on this document

DEPT. OF EDUC. & C
CELOKUHLE H.P. SC
P.O. BOX 1448
SCOTTBURGH
4180

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School:
Olwasini J.P. School Principal: P.J. Mbambo
P.O. Box 1290 Scottburgh
4180

Signature of School Principal
[signature] Date: 19/08/2009

Please put school stamp on this document

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
19 AUG 2009
P.O. BOX 1290 SCOTTBURGH 4180
OLWASINI

With thanks
Regards
Desiree Govender
Principal Investigator
[signature]

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School:
MTWALUME PRIMART

Principal: MRS R. R. RAMBALI

Signature of School Principal
R Rambali

Date: 2009: 05: 04

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

MTWALUME PRIMARY SCHOOL
P.O. BOX 67
MTWALUME
4186
DEPARTMENT OF EDUCATION AND CULTURE

MTWALUME PRIMARY SCHOOL
P.O. BOX 67
MTWALUME
DEPARTMENT OF EDUCATION AND CULTURE

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School: AMAHLONGWA J.P

Principal: MRS T.M SHAZI

Signature of School Principal

Date: 04.08.2009.

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF EDUCATION & CULTURE
2009 -08- 04
P.O. BOX 3013

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: MHLANGAMKHULU J.P SCHOOL **Principal:** J.S LANGA

Signature of School Principal J Skanga **Date:** 20/08/09

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator
D Govender

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYSER
20 AUG 2009
P/BAG X 570 UMZINTO 4200
MHLANGAMKHULU J.P. EMIS 210345

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:
Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School:
MAHLASHANA SP.
BOX 560, SCOTTBURGH

Principal: MR. S. BUTHELEZI

Signature of School Principal

Date: 19/08/2009

Please put school stamp on this document

DEPARTMENT OF KWAZULU-NATAL
PROVINCIAL GOVERNMENT
DEPARTMENT OF EDUCATION & CULTURE
SOUTH COAST REGION
19 AUG 2009
P.O. BOX 560 SCOTTBURGH 4180
MAHLASHANA SP

With thanks
Regards
Desiree Govender
Principal Investigator

Govender

039 975 1297

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School: SEZELA PRIMARY **Principal:** R. BRIJRAJ

Signature of School Principal **Date:** 23/07/09

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYS
2009 -07- 23
P.O. SEZELA
SEZELA P 6W8 251035

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School:
Amandawe J. P. Principal: N. Y. Nyuswa

Signature of School Principal
Date: 19/08/2009

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

PROVINCE OF KWAZULU NATAL
UMYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
2009 -08- 19
P.O. BOX 10 SCOTTBURGH 4180
AMANDAWE J.P. EMIS 101750

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:
Name of School: Vusisizwe Primary Principal: Cwiza T.S.

Signature of School Principal
Date: 2009-08-19

Please put school stamp on this document

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYS
2009 -08- 19
PRIVAAT SAK X502 UMZINTO 4200
VUSISIZWE SP EMIS 294130

With thanks
Regards
Desiree Govender
Principal Investigator
Govender

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal

PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: PENNINGTON PRIMARY

2 SCHOOL ROAD, SEZELA

Principal: MR. P.V. GOVENDER

Signature of School Principal

Date: 11-08-2009

Please put school stamp on this document

With thanks

Regards

Desiree Govender

Principal Investigator

Govender

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
DEPARTEMENT VAN ONDERWYS
2009 -08- 11
P/BAG X01 SEZELA 4215
PENNINGTON P EMIS 250008

PERMISSION TO CONDUCT A RESEARCH STUDY/TRIAL

School Principal
PROTOCOL

Permission is requested to conduct the above research study at the School/s indicated below:

Primary Schoolteachers knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

Site 1 address:

Name of School: KWAMAQUZA J. PRIMARY **Principal:** P.N.K. KHUMALO

Signature of School Principal **Date:** 19/08/09

Please put school stamp on this document

With thanks
Regards
Desiree Govender
Principal Investigator

PROVINCE OF KWAZULU-NATAL
UMNYANGO WEZEMFUNDO NAMASIKO
DEPARTMENT OF EDUCATION & CULTURE
2009 -07- 19
P.O. BOX 614 SCOTTBURGH, 4180
KWAMAQUZA J.P. SCHOOL EMIS 180671

APPENDIX E

Participant information Sheet and Consent Form

Information Document

Study title: Primary school teachers' knowledge of asthma in Umdoni subdistrict, KwaZulu Natal.

I, Desiree Govender, an asthma educator and a qualified physiotherapist am very enthusiastic about investigating what primary schoolteachers in Umdoni know about asthma and its management. Research is just the process to learn the answer to a question.

What is the purpose of this survey?

The purpose of this survey is to determine what primary schoolteachers know about asthma and its management.

Why is the study being done

Asthma is a common chronic disease amongst young children and it is imperative that primary schoolteachers' have some knowledge of asthma and its management to ensure that asthmatic school children can be assisted.

Invitation to participate in the research

You are invited to participate in this research.

Description of the study

The study is based on a questionnaire survey that will be conducted by means of a technology called mobile researcher. The setting for the study is the district of Umdoni subdistrict. The targeted participants are primary schoolteachers' from Umdoni. Fieldworkers and the researcher will visit your school. Once you have agreed to participate in the study, you will be asked answer questionnaires which will be downloaded onto a mobile phone. Your answers to the questions will be stored on the mobile phone and uploaded to a research centre.

Is there any discomfort or risks?

No risks are involved.

Potential Benefits of the research

- This study will provide us with information to determine if there is a need for an asthma education intervention.
- The study may also serve as a foundation to guide the implementation of an asthma education program for school personnel if a need is identified.

Participation is voluntary

Refusal to participate in this study will involve no penalty or loss of benefits to which the participant is otherwise entitled to, and the participant may discontinue participation at any time.

Will compensation be made for any injury resulting from this study?

No injury is anticipated; therefore no arrangement has been made for compensation.

Confidentiality

Every effort will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed. Personal information may be disclosed if required by law.

Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as Research Ethics Committee. If results are published, no individuals or cohorts will be identified.

Contact Details of researcher

Tel: 039 -9787047
Cell: 0846021724
Email: 200003419@ukzn.ac.za
Or physio.gjcrookeshospital@kznhealth.gov.za
Postal Address:
P.O. Box 10429
Umkomaas
4170

Contact Details of BREC Administrator or Chair – for reporting of complaints/problems

Telephone: 031-2604769

Fax: 031-2602384

Administrator: Ms P Ngwenya

Email: ngwenyap@ukzn.ac.za

Chair Prof D R Wassenaar

CONSENT FORM

Greeting:
I, Desiree Govender, an asthma educator and a qualified physiotherapist am very enthusiastic about investigating what primary schoolteachers in Umdoni know about asthma and its management. Research is just the process to learn the answer to a question. I am a part-time master's student in Public Health at the University of KwaZulu Natal who is responsible for the study.

You have been asked to participate in this questionnaire survey study. Fieldworkers and the researcher will visit your school. Once you have agreed to participate in the study, you will be asked to answer questions which will be downloaded from a mobile phone. Your answers to the questions will be stored on the mobile phone and uploaded to a research centre.

You may contact Desiree Govender any time if you have questions about the research or if you are injured as a result of study.
Tel: 039 -9787047
Cell: 0846021724
Email: 200003419@ukzn.ac.za
Or physio.gjcrookeshospital@kznhealth.gov.za
Postal Address:
P.O. Box 10429
Umkomaas
4170

You may contact the Biomedical Research Ethics Office on 031-2604769 or 260 1074 if you have questions about your rights as a research participant.

If you agree to participate, you will be given a signed copy of this document and the participant information sheet which is a written summary of the research.

The research study, including the above information, has been described to me orally. I understand what my involvement in the study means and I voluntarily agree

to participate. I have been given an opportunity to ask questions that I might have about participation in the study.

---------- **Date:……**

Subject's signature

---------- **Date:……**

Signature of Witness

APPENDIX F

Survey designed to investigate the primary schoolteachers' knowledge of asthma and asthma management.

Asthma Survey Questions

All information will be treated as strictly confidential

Section A: Personal Information

1. **Age:_____**

2. **Gender:**

Male	**Female**

3. **What is your job within the school?**

Headteacher	**Deputy Headteacher**	**Class Teacher**	**Non-Class Teacher**

4. **Do you have asthma?**

Yes	**No**	**Unsure**

5. **Is there existence of asthma in your near family/friends/co-workers?**

Yes	**No**	**Unsure**

6. **If you have answered YES for question 5, please indicate which of following known to you have asthma?**

Spouse	**children**	**parents**	**siblings**
Friend/friends	**Co-worker/co-workers**		

Section B: Understanding of Asthma

The following question is to ascertain your understanding of asthma: State whether each of the following is associated with asthma?

7. cough

True	False	Unsure

8. breathlessness

True	False	Unsure

9. wheezing

True	False	Unsure

10. tight chest

True	False	Unsure

11. production of chest secretions

True	False	Unsure

12. ear discharge

True	False	Unsure

13. fever

True	False	Unsure

Section C: Education Background and Training in Asthma Care

14. Indicate your qualifications:

University postgraduate degree	University undergraduate degree plus Education Diploma	University undergraduate degree
4 years Education Diploma	3 years Education Diploma	Lesser qualification

15. Indicate your teaching experience:

Less than 5 years	6 – 10 years	11-20 years
21-30 years	Over 30 years	

16. Have you ever received training in asthma management?

Yes	No

17. if you have answered YES for question 16 -Where did you receive this training

College of education/university	Fellow member of staff	School nurse/Doctor	paediatrician
Parent(s) with children with asthma	First Aid Training	GP	National asthma campaign
Internet	Other Please specify		

Section D: Asthma management in your school

18. Does your school have a written policy for managing children with asthma?

Yes	No	Unsure

19. How often has your school been visited by the school health nurse in the last three months?

once	>once	Never	Unsure

20. Do you have any self declared asthmatic children in your school?

Yes	No	Unsure

21. If YES, how many asthmatic children are there in your school?

<5 children	6 -10 children	11-20 children
21-30 children	more than 30	unsure

22. Ignore this question if you have answered No or Unsure for question 20 Where do you generally get information about children who have asthma at this school? (choose the appropriate response/responses)

Not informed	child	Parent /caregiver	Child's previous teacher

Member of support staff	head teacher	GP	Schoolnurse	paediatrician	Local clinic

23. Who looks after the asthmatic child's medicines? (choose the appropriate response/responses)

you	**children**	**School office staff**	**Head teacher**
Qualified first aider	**School nurse**	**Other Please specify**	**Don't know**

24. Does your school have a nebuliser?

Yes	**No**	**Unsure**

25. Does your school have a peak flow meter?

Yes	**No**	**Unsure**

Section E: Coping with children who have asthma

26. Have you witnessed a child having an asthma attack in class or during school hours?

Yes	No	Unsure

27. If you have answered YES for question 26, did you have to assist the asthmatic child?

Yes	No	Unsure

28. If you have answered YES for question 27, how you did assist the asthmatic child? (choose the appropriate response/responses)

Administered medication	Called for medical assistance	Took child to clinic/hospital/GP
Called the parents/caregivers	Other Please specify	

29. If you answered question 28 and indicated that you administered medication: What medication did you administer? (choose the appropriate response/responses)

Panado syrup	Reliever inhaler medication	aspirin
Preventer Pump	Do not know	Other Please specify

Section F: General knowledge of asthma

30. Asthma is a common respiratory disease in children worldwide.

True	False	Unsure

31. There is an increase in the number of people suffering from asthma in South Africa.

True	False	Unsure

32. The number of asthma deaths is high in South Africa.

True	False	Unsure

33. Asthma is usually genetic or familial.

True	False	Unsure

34. Allergies are associated with asthma.

True	False	Unsure

35. Asthma can cause slow or poor growth.

True	False	Unsure

36. Asthmatic children have low IQs.

True	False	Unsure

37. Asthma is not curable.

True	False	Unsure

38. Asthma is controlled by appropriate medication.

True	False	Unsure

39. Asthma is an emotional disorder that needs psychological counseling.

True	False	Unsure

Section G: Recognition of signs and symptoms of a severe acute asthma attack

Which of the following are serious clinical features of an asthma attack?

40. Difficulty in speech

True	False	Unsure

41. Agitation

True	False	Unsure

42. Drowsiness

True	False	Unsure

43. Chest and Neck Skin pulled in.

True	False	Unsure

44. Confusion

True	False	Unsure

45. Blue discoloration of the lips.

True	False	Unsure

Section H: Identifying Factors that exacerbate asthma in children

Which of the following are common triggers of asthma?

46. Smoke.

True	False	Unsure

47. Perfumes.

True	False	Unsure

48. Chalk Dust

True	False	Unsure

49. paint fumes

True	False	Unsure

50. Exercise.

True	False	Unsure

51. Cold weather.

True	False	Unsure

52. Common Cold.

True	False	Unsure

53. Laughing.

True	False	Unsure

54. Animal dander/Pets.

True	False	Unsure

55. Foods.

True	False	Unsure

56. Pollen.

True	False	Unsure

57. Menstruation.

True	False	Unsure

58. Stress

True	False	Unsure

59. House dust mites.

True	False	Unsure

Section I: Knowledge on asthma medication and management

Which of the following medication is used to relieve an asthma attack?

60. Antibiotics

True	False	Unsure

61. Aspirin

True	False	Unsure

62. Ventolin/asthavent

True	False	Unsure

63. Do you think preventative medication is needed for most asthmatic children?

True	False	Unsure

64. Oxygen therapy is required in very severe asthma attacks.

True	False	Unsure

65. Ventolin can cause a rapid pulse rate, palpitations and tremors.

True	False	Unsure

66. Asthma medications are addictive and weaken the heart.

True	False	Unsure

The following can deliver asthma medication to the lungs:

67. Nebulisers

True	False	Unsure

68. Pressurized aerosol inhaler

True	False	Unsure

69. Spacer

True	False	Unsure

70. Asthma medication delivered through a pressurized aerosol inhaler and spacer is as good as using asthma medication through a nebuliser.

True	False	Unsure

Section J: Knowledge on how to use a metered dose inhaler (PUMP)

71. Do you know how to use a metered dose inhaler (PUMP)

Yes	No	Unsure

72. If you have answered YES for question 71, Rank the following statements in the correct order 1-5?

Breathe out gently ----------

Put mouth piece in mouth and at start of inspiration, which should be slow and deep, press canister down and continue to inhale deeply ----------

Remove the cap and shake inhaler ----------

Hold Breath for 10 seconds, or as long as possible then breathe out slowly------

Wait for a few seconds before repeating ----------

Section K: Knowledge on asthma control

73. If a child's asthma is not controlled, he would be coughing a lot?

True	False	Unsure

74. If a child's asthma is not controlled, he would be very sedentary?

True	False	Unsure

75. If a child's asthma is not controlled, he would be absent frequently?

True	False	Unsure

76. If a child's asthma is not controlled, what should be the plan of action? (Choose the appropriate response/responses)

Inform the parents/caregiver	Report to the school nurse	Refer child to medical practitioner	Don't know

Section L: Asthma and Sports

77. Asthmatic children should avoid exercise and sports.

True	False	Unsure

78. Preventative medication can be taken by the asthmatic child before exercise/sports.

True	False	Unsure

79. Swimming is the best sport for asthmatics.

True	False	Unsure

Section L: Personal perceptions about handling asthmatic children

80. Do you feel that you know enough about asthma to help a child presenting with symptoms of an asthma attack in the classroom?

Yes	No	Unsure

81. Do you have concerns about dealing with asthmatic children?

Not at all	Slightly concerned	Quite concerned
Very concerned	Unsure	

82. Would you feel confident in dealing with a child who is suffering an asthma attack?

Yes	No	Unsure

83. Ignore this question if you answered "Not at all" and "Unsure" for question 81 and 82 respectively

What are your concerns about having asthmatic children in this school?

Disruption to other pupils	Administering treatment	Coping with an emergency
Other (please specify)		

84. How would you rate the need for in-service training on asthma management for schoolteachers?

Absolutely necessary	Somewhat necessary	unnecessary