Effectiveness of A Nurse-Led Educational Program On Knowledge of Asthma Based On Global Initiative for Asthma Strategy

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ABSTRACT: *Asthma is a significant issue in Niger Delta region in Nigeria, especially Rivers State due to side effect of oil exploration. Asthma is generally under- treated resulting in significant burden of disease due to lack of understanding and use of established guidelines and this impacts negatively on the individual, their family, and society as a whole. The study objective is to enhance asthma knowledge among nurses in Rivers State Teaching Hospitals through educational program using adopted GINA guidelinesQuasi-experimental one group pre-post research design was utilized in this study. Self- structure questionnaire developed by researcher was used to collect data before and after the educational program. 52 nurses were purposively selected for this study in collaboration with nurse-leaders in each study setting. 52 questionnaires were administered pre and post educational program and all 52-questionnaire returned yielding 100%. The instrument was validated by supervisor, reliability test using Cronbach's Alpha coefficient yielded 80. Data were analysed using descriptive(percentage) and inferential statistics (paired simple T-test) with use of SPSS version 25. All ethical consideration were strictly adhered to.The findings in this study shows statistically significant improvement in the knowledge of asthma among the participants post educational program with 86.5% (45) of the participants having high level of asthma knowledge against 26.9% (14) of the participants pre -educational program. The summary of paired-sample t-test analysis on the difference in knowledge of asthma before and after nurse led educational program using GINA guideline indicated tcal = 21.00, df = 51, and t_{tab} = 1.96. Since $t_{cal} > t_{tab}$ and P<0.05 indicate significant, hence the null hypothesis which stated that there is no significant difference in knowledge of asthma before and after nurse led educational program using GINA guidelines in Rivers State Teaching Hospitals was rejected. The study concluded that nurse-led educational program using adopted GINA guidelines enhanced nurses' knowledge of asthma. This implies that with the use of evidence-based guideline, nurses can develop their knowledge, hence enhance their practice of asthma management which will in turn close asthma management gap.*

KEYWORDS: nurse-led, educational program, global initiative for asthma, knowledge, evidence based, guideline.

INTRODUCTION

Asthma is a lung disorder characterized by airway hypersensitivity to different stimuli that result in airway inflammation, constriction of airway muscles (tighten), air way obstruction and bronchospasm. Lack of appropriate knowledge of asthma has led to poor management of asthma and this is of great concern to healthcare industries. Studies has linked this to lack of assimilation of evidence based clinical guidelines. Clinical guidelines are tools designed to ensure evidence-based research are assimilated in clinical practice. Clinical tools have been developed over the years to ensure evidence-based knowledge of asthma in different countries. Due to diverse methods in management of asthma in different countries which has not yielded positive outcome especially in low-income countries, World Health organization (WHO) recommended Global initiative for asthma (GINA) guidelines as global guideline for asthma management. GINA is a World Health Organization collaborative organization founded in 1993. GINA guidelines were developed in collaboration with the National Heart, Lung and Blood Institute (NHLBI) in 1993 to improve asthma knowledge, prevention, and management practices worldwide. GINA provides clinicians with an annually updated evidence-based strategy for asthma management and prevention, which can be adapted for local context. It is evidence-based, clinically oriented, and relevant to both low and high resources countries.

Population of persons living with asthma in world is on the increase as Asthma affects more than a quarter of a billion people worldwide, it is responsible for over 1000 deaths a day of which the majority are preventable (Levy et al., 2022). in Canada it affects 10% of the population (Public Health Agency of Canada, 2020). It is estimated that 25 million people are living with asthma in the United States, which equates to one in every thirteen persons. Asthma data in Nigeria is inconsistent as there is no national representative data on asthma (Federal Ministry of Health, {FMH} 2022). However, it is estimated that approximately 13million (10.7%) Nigerians are living with asthma (Ozoh et al., 2019). Centre for Disease control, {CDC} (2022) states that adult asthma has immense economic impact, as approximately $50.3 billion is lost in medical care, estimated $3 billion productivity lost and $29 billion spent on asthma related mortality. Global burden of asthma, estimates that 21.6 million persons has adjusted life style yearly due to asthma, and asthma is ranked 34th among the leading causes of burden of disease and 24th in the leading causes of Year lived with disability (The Global Asthma Report, 2022). Asthma occurs more among the black, asthma related death occurs among adult more than any other age group.

Although data available through literature search reviewed that most nurses have basic knowledge of asthma, however, most nurses do not have knowledge of asthma based on current evidenced-based guideline as stipulated by WHO. Hence the need for all nurses to be at same pace with their knowledge of asthma based on evidence-base guideline. If asthma guidelines are not well

understood and utilized by health workers, it leads to poor knowledge and this in turn will lead to poor asthma management practices.

NHLBI (2018) strongly recommend the Provider Asthma Care Program (PACE), which is an interactive educational program to improve providers knowledge of existing asthma management guideline. It is very important that nurses have adequate evidence-based knowledge of asthma to be able to administer evidence- based care and also educate patient appropriately on selfcare management. For nurses to have adequate knowledge there is need for continuous asthma education as education is vital tool for asthma management. A study by Moscatelli (2020) on improving care of asthma patient through staff education concluded that the program increased knowledge and management practices of nurses that participated in the educational program. Axelson et al. (2020) in their study also concluded that comparisons between pre intervention and post intervention shows that the educational program strengthened the healthcare professionals 'knowledge of asthma.

Guilbert et al. (2014) emphasized the importance of using evidence-based guideline in nursing educational programs. Though there are no published studies on nurses using GINA guidelines to guide educational programs to improve knowledge, nurses in the past have used guideline guided educational programs to improve care for other health conditions such as diabetes, wound care, hypertension etc and same improved knowledge and management practice (Fuentes, 2019). Other healthcare practitioners have also improved asthma care through educational program using GINA guidelines in Nigeria (Ozoh, 2022; Ayuk, 2017; Anyatonwu, 2020). The use of evidence-based guidelines to guide educational programs is still not well practiced among nurses especially in asthma management, there is need for nurses to embrace this concept for proper patient care (C. Chukwu, personal communication, February 4, 2023).

This is in-line with Mezirow's transformative learning theory. The theory explains that an individual is expected to have transformative process of their beliefs, assumptions and experiences through new information, as learners are supported to look beyond their own frame of reference to accommodate an alternative. The valuables in transformational learning are not all about acquiring knowledge or getting new information but the critical reflection made upon such knowledge gained and consequent change of action as a result of the new information (Mezirow, 1978).

There is need for up-to-date evidence- based asthma knowledge through educational programs as nurses plays pivotal and nodal role in the healthcare industry. It is the duty of the nurse to properly educate patients on asthma symptom recognition, environmental control, techniques used in administering asthma medication, self-care management and also administer evidence- base care. It is of essence to educate nurses in Rivers State on the most recent evidence-based asthma management strategy using adopted GINA Guideline in other to close asthma management gap.

Statement of the problem

Despite commendable efforts to improve asthma care over the last two decades, many patients have not benefited from advancements in asthma management and frequently lack even the most basic of care such as proper inhaler technique as GINA (2022) stated that 80% of asthma exacerbation is as a result of poor inhaler technique. Uncontrolled asthma and ineffective management remain a public health challenge in the developing countries. Asthma is generally under-diagnosed and under- treated and this has resulted in significant burden of disease, as nurses and other healthcare practitioners continues to manage asthma poorly despite implementation of adopted asthma guidelines by various institutions.

Although the revolutionary changes are noticed in the medical and technological advancements, still there is poor asthma management among nurses, this could be attributed to lack of current evidence base knowledge and non-adherence to evidence- base treatment guidelines. This implies that most nurses do not have the requisite knowledge and skills that will enhance their asthma management practice. Nurses are important partners in the provision of quality healthcare to persons living with asthma worldwide. However adequate attention has not been given to asthma education among nurses. This has resulted in poor management of asthma.

Studies shows that continuous education and training program on asthma care can increase nurses' asthma knowledge (McCabe et al., 2019). The AAAAI suggested that educational programs be developed to ensure the continuous education of nurses and other healthcare workers on knowledge and asthma management practices using current recommended evidence-based guidelines. Ghaleb (2021) opined that an interactive educational program using evidence-based guidelines will increase nurses and other healthcare worker knowledge of asthma. Tahira (2022), concluded that there was statistically improvement on asthma knowledge and management practice post educational program. The lack of published literature on the in-depth study of how GINA guideline has been applied by nurses' shows where the true gaps are. This demonstrates a practice gap that should be filled in nursing field.

There is need for educational program for nurses using evidence- based guidelines as nurses are frontline health workers and they play pivotal and nodal role to ensure asthma patients receives optimal care, their understanding of asthma guideline will enhance asthma their knowledge of asthma. Provider Asthma Care program recommended by NHLBI, which is an interactive educational program for providers to improve awareness of existing asthma management guidelines should be encouraged. Hence the need for this study tilted a nurse-led educational program on knowledge and practice of asthma management using Global initiative for asthma in Rivers State Teaching Hospitals.

Objectives of the study

The main objective of this study is to enhance practice gap through educational program for nurses on knowledge of asthma using GINA guidelines.

Specific Objectives are to:
1. Determine nurses baseline asthma knowledge pre- nurse led educational program using GINA guideline in Rivers State Teaching Hospitals
2. Evaluate nurses' knowledge of asthma post nurse led -educational program using GINA guideline in Rivers State University Hospitals.
3. Find out the differences in nurses' knowledge pre and post nurse led educational program using GINA guideline in Rivers State Teaching Hospitals

Research questions

1. What is the nurses baseline asthma knowledge pre- nurse led educational program using GINA guideline in Rivers State Teaching Hospitals
2. What is the nurse's asthma knowledge post- nurse led educational program using GINA guideline in Rivers State Teaching Hospitals
3. What is the difference in nurses' asthma knowledge among the nurses pre and post nurse led educational program using GINA guideline in Rivers State Teaching Hospitals

Research Hypotheses

Ho: There is no significant difference in knowledge of asthma before and after nurse led educational program using GINA guideline in Rivers State Teaching Hospitals

Scope of the study

The participants for this study were drawn from nurses of different ranks and years of experience from female medical ward, male medical ward and Accident and Emergency units of the two government teaching hospitals in Rivers State: University of Port Harcourt Teaching Hospital and Rivers State University Teaching Hospital. The study covered every area of adult asthma care by exploring the concept of knowledge and asthma management practices. It reviewed asthma diagnosis, severity classification, pharmacological and non -pharmacological asthma management, step wise approach in asthma management, personalized action plan, comorbidity in asthma, asthma control, techniques in asthma management etc. The study was guided by transformative learning theory. The scope of this study is limited to nurses taking care of adults living with asthma in the two Government teaching Hospitals in Rivers State

LITERATURE REVIEW

Asthma is a complex chronic inflammatory syndrome characterized by obstruction of airflow in the airway, airway hyper reactivity to nonspecific stimuli and exacerbation episodes of airway

obstruction causing respiratory symptoms (Gupta, 2018). Individuals with asthma typically react to concentrations of agents too low to cause symptoms in people without asthma.

The exact cause of asthma is not known but it is often link to genetic factors, childhood illness, and exposure to allergy. Asthma is believed to occur when there is a complex interaction between genetic factors, environmental conditions, and nutrition. Asthma is also link to prenatal conditions eg poor nutrition, issues during delivering e.g. low birth rate, premature delivering and infant related conditions such as not been breast fed, diet low in vitamin C and E and childhood obesity (Zhang et al., 2018). Asthma is triggered by allergen such as pollen, house dust mites, molds, or a particular food. Thompson (2016), asserted that other common triggers of asthma attacks are emotional upset, aspirin, sulfiting agents (used in wine and beer and to keep greens fresh in salad bars), exercise, and breathing cold air or cigarette smoke.

Global Initiative for Asthma (GINA, 2022), defined asthma as a heterogenous diseases, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough which varies over time in intensity with variable expiratory airflow limitation. Centres for Disease Control and Prevention (CDC, 2022), defined asthma as a lung disease that causes frequent episodes of wheezing, shortness of breath, chest tightness, and night time or early morning coughing. Gupta et al. (2018), defined asthma as a lung disorder characterized by airway hypersensitivity to different stimuli that result in airway inflammation, and airway obstruction which results in constriction of airway muscles(tighten), bronchospasm, and airway obstruction. In asthma, the airway linings become swollen and produce excessive mucus hence narrowing the airway and limiting airflow (Cleverland clinic, 2021).

Two decades ago, it was assumed that asthma was an allergic/atopic disease caused by allergen exposure only, recently, research has proved that this model does not represent global asthma patterns and time trends (Pembrey, 2018). Asthma at present is considered an umbrella diagnosis for several heterogeneous diseases that has distinct mechanistic pathways (endotypes) and variable clinical presentations (phenotypes) (Kuruvilla et al., 2019). In the past, asthma was classified based on causes and predisposing factors, but presently, asthma is classified based on its phenotype and endotype. This is done to ensure asthma molecular mechanisms is considered as this will enhance asthma management and increase positive patient outcome. Thomson (2016) inferred that the strategies are now evolving to associate molecular mechanisms to phenotype as against previous thought that all asthma was the same and treated with same treatment regimen. These differences in asthma are called phenotypes. To explain asthma phenotype Kahan (2021), in his study expressed that extrinsic or allergic asthma occurs when the immune system overreacts to a harmless substance, such as plant pollens or house dust. Kahan (2021), further stated that intrinsic asthma or non -allergic asthma occurs when other causes than allergens trigger an immune system response. He, however, concluded that it is hard to identify the potential trigger that results in intrinsic asthma in most cases.

Asthma phenotypes include allergic asthma, neutrophil asthma, and aspirin sensitive- asthma, exercised- induced asthma etc. Kuruvilla et al. (2019) stated that phenotype is any observable characteristic or trait of a disease, such as development, biochemical or physiological properties while endotype is disease mechanical process. Carr et al. (2018) stated that "phenotype" refers to the observable characteristics of the disease in an individual. Endotypes is the specific biological mechanism that causes those observed properties of any given phenotype. Endotype is a subtype of a health condition, which is defined by a distinct functional or pathobiological mechanism.

Kuruvilla et al, (2019) in their study concluded that the theoretical basis of endotyping corresponds with the current interest in personalized medicine. This is the bases for GINA action plan in asthma management which aimed at personalizing asthma care. Agache et al. (2019) aligned with the above statement as they state that individuals with asthma may have similar clinical symptoms, however, they may respond differently to same asthma treatment regimen. Endotypes describe distinct pathophysiologic mechanisms at a cellular and molecular level that will enhance treatment pattern. Examples of asthma endotypes are Th2-high (eosinophilic) asthma and Th2- low (eosinophilic) asthma. Sharma et al. (2022) expressed that the recent classification of asthma based on phenotype and endotype presents a more concrete approach to the study of asthma and this has enhanced asthma management. The present asthma classification has also enhanced asthma diagnosis/assessment which positively impacts asthma management.

GINA guidelines
The GINA global strategy for asthma management and prevention is a scientific document for the management of asthma. Though it is referred to as management guideline, it contains all about asthma and its management strategies which includes definition, types, onset etc. It provides clinicians with an annually updated evidence-based strategy for asthma management and prevention, which can be adapted for local circumstances (Reddel et al., 2021). GINA strategy has a strong focus on preventing asthma-related deaths and severe exacerbations, as well as on efficacy and effectiveness for symptom control and lung function, and it promotes personalized treatment decisions across the spectrum of asthma severity" (GINA, 2022). GINA strategy has a strong focus on preventing asthma-related deaths and severe exacerbations, as well as on efficacy and effectiveness for symptom control and lung function, and it promotes personalized treatment decisions across the spectrum of asthma severity. The GINA strategy recommends a departure from severity-based management and encourages control-based management which supports proper diagnosis and evaluation of asthma patients to enhance positive outcome.

The Global Initiative for Asthma (GINA) was established in 1993 in collaboration with the National Heart, Lung and Blood Institute and the World Health Organization with the aim of disseminating information about asthma management. GINA landmark report was first published in 1995 and updated annually based on evidenced based knowledge and this has formed bases for many countries asthma practice guidelines including Nigeria. In this study GINA guidelines

review will follow step by step outline of adult asthma management based on the current 2022 guidelines. GINA guideline is all encompassing of all aspect of asthma knowledge, management and management practices that is globally accepted by all health workers. It spills out all significant roles of the healthcare workers to enhance asthma care. Asthma management practices varies among nurses in different countries. In view of this study, only the aspect of GINA guideline that is applicable to nursing practice in Nigeria will be discussed. As GINA directed that its content can be adapted for local content.

MATERIAL AND METHOD

Research design
Quasi-experimental one group pre-post research design was utilized in this study. Purpose of using quasi- experimental one group pre-post research design in this study is to establish course- and-effect relationship among the variables as the   participants in this study were selected in a non-random way and the effect of the intervention measured by comparing the pre and post intervention measurements (Schweizer et al., 2016).

Population
The study population comprised of all 103 nurses' who treats adults living with asthma in Accident and Emergency unit, female medical ward and male medical ward in University of Port Harcourt Teaching Hospital (UPTH) and Rivers State Teaching Hospital (RSUTH).

Sampling size and sampling technique
 The sample size for this study is fifty-two (52) participants who were purposively selected from population of one hundred and three (103) nurses. The nursing leaders selected 50% of the population for this study, as nurses are busy and all of them cannot participants in this.
Purposive sampling was used in this study because the researcher understands that nurses are busy, hence the need to work with the nurse leaders to ensure nurses who can effect change are selected for this study.

Instrumentation
Instrument for data collection in this study was questionnaire.

Validity of the Instrument
Questionnaire was validated by face and content validity.

Reliability of Instrument
The reliability of instrument was determined by Test - retest method. 15 nurses were selected from other health care setting outside of study area but have similar characteristics. The Instrument was administered and same instrument re-administered to same nurses after two (2) weeks. Reliability

of the instruments testing was done using Cronbach Alpha coefficient same yielded .80 using SPSS version 25.

Method of data collection
Data was collected pre and post educational program using questionnaire

Method of data analysis
This project analysis was descriptive and inferential in nature, Statistic package for social sciences (SPSS) window version 25 was used to analyze the data. This includes percentage (%) analysis of the Scio-demographic data of participants, percentage analysis of the questionnaire and checklist before and after educational program. T-test was used to test the hypothesis (compare mean of two groups, pre- and post- test). T-tests are a type of hypothesis testing used in statistical analysis and data analysis to determine if there is a significant difference between the means of two groups.

Ethical consideration
In order to protect participants, the researcher strictly observed the following central pivotal dimension (a) informed consent, (b) privacy and confidentiality, (c) protecting vulnerable subjects, and (d) avoiding harm to participants as stated by (Barker, 2016). This research strictly adhered to all established research protocols by maintaining the highest ethical standards.

RESULTS

The data analysis was guided by the research questions for this study. A total of 52 copies of the questionnaires were administered. All 52 completely filled and returned pre and post field, yielding response rate of 100%.

Research Question 1: What is the nurses' baseline asthma knowledge pre-nurse led educational program using GINA guideline in Rivers State Teaching Hospitals?

Table 1.1: Nurses baseline asthma knowledge pre-nurse led educational program using GINA guideline in Rivers State Teaching Hospitals

Level of Asthma Knowledge	Score Range	N	%
Very Low	1-15	8	15.4
Low	16-30	8	15.4
Average	31-45	10	19.2
High	46-60	12	23.1
Very High	61-75	14	26.9
	Total	**52**	**100**

Data on table 1.1 shows that 15.4% (8) participants have very low asthma knowledge,19.2 (10) participants have average asthma knowledge, 26.9% (14) participants have high asthma knowledge and 26.9% (14) participants have very high asthma knowledge. Analysis of this data shows that ½ of the participants have very low to average knowledge of asthma pre -educational program.

Research Question 2: What is the nurse's asthma knowledge post-nurse led educational program using GINA guideline in Rivers State Teaching Hospitals?

Table 1.2: Nurse's asthma knowledge post- nurse led educational program using GINA guideline in Rivers State Teaching Hospitals

Level of Asthma Knowledge	Score Range	N	%
Very Low	1-15	0	0
Low	16-30	0	0
Average	31-45	1	1.9
High	46-60	6	11.6
Very High	61-75	45	86.5
	Total	**52**	**100**

Analysis on table 1.2 above shows that 0% none of the participants has very low/low knowledge of asthma based on GINA guidelines post educational program. Only1.9% (1) of the participants had average knowledge of asthma post educational program. More than ¾ 86.5% (45) participants have very high level of asthma knowledge post educational program.

Research Question 3: What is the difference in nurses' asthma knowledge among the nurses pre and post nurse led educational program using GINA guideline in Rivers State Teaching Hospitals?

Table 1.3: Difference in nurses' asthma knowledge among the nurses pre and post nurse led educational program using GINA guideline in Rivers State Teaching Hospitals

Level of Asthma Knowledge	Score Range	Pre-test (n)	%	Post-test (n)	%
Very Low	1-15	8	15.4	0	0
Low	16-30	8	15.4	0	0
Average	31-45	10	19.2	1	1.9
High	46-60	12	23.1	6	11.6
Very High	61-75	14	26.9	45	86.5
	Total	**52**	**100**	**52**	**100**

Analysis on table 1.3 shows that pre -educational program, 15.4% (8) participants had very low level of asthma knowledge and post educational program, 0% none of the participants had very low level of asthma knowledge. Also, pre- educational program, 26.9% (14) participants had very high level of asthma knowledge, while post educational program 86.5% (45) of the participants have high level of asthma knowledge. This indicates positive effect of educational program on knowledge of asthma among the participants.

Hypothesis

There is no significant difference in knowledge of asthma before and after nurse led educational program using GINA guidelines in Rivers State Teaching Hospitals.

Table 1.4: Summary of paired-sample t-test analysis on the difference in knowledge of asthma before and after nurse led educational program using GINA guidelines in Rivers State Teaching Hospitals

Knowledge in Asthma	N	$\bar{x}$	SD	df	t_{cal}	t_{tab}	Sig.	Decision
Pre-test	52	48.67	10.80	51	21.00	1.96	0.00	Reject: H_{01}
Post-test	52	72.69	3.15					

Table 1.4 indicates that t_{cal} = 21.00, df = 51, and t_{tab} = 1.96. Therefore, since $t_{cal} > t_{tab}$ and $P < 0.05$, then there is significant difference in knowledge of asthma before and after nurse led educational program using GINA guideline in Rivers State Teaching Hospitals. Hence, the null hypothesis one is rejected at 0.05 level of significance.

DISCUSSION OF FINDINGS

Pre educational program
The findings reviewed that only insignificant number of the participants have high level of asthma knowledge and majority of the participants had average level of asthma knowledge pre-educational program. The nurses who participated in this study had asthma knowledge based on popular knowledge which is generally accepted but lack indebt knowledge of asthma based on recent evidenced-based guideline. This finding reviewed the gap in asthma management practice among nurses in Rivers State Teaching Hospitals as there is no way nurses will administer evidenced based care when there is limited evidence-based knowledge of the disease condition in question. This indicates lack of the use of evidenced based guidelines in the study setting. The finding in this study is in line with the findings of Elkamil et al, (2016) which concluded that majority of the participants 53.3% do not have good level of knowledge of asthma.

Post educational program, data collected shows that none of the participants had very low/low knowledge of asthma based on GINA guidelines. Only 1.9% (1) of the participants had average knowledge of asthma post educational program. More than ¾ of the participants 86.5% (45) had very high level of asthma knowledge post educational program. Collaboration with the nurse leaders and purposively selecting participants contributed to the result of this findings. As the participants cooperated with the researcher knowing fully well that they were representing their unit and will also need to impact knowledge on others. The mode of delivering of the educational program which is a blend of teachers/student interactive approach also contributed to the success of the program. Also, ward based educational program, in which the nurses are educated in the comfort of their ward, in a familiar environment was also a contributing factor. The outcome of this findings indicates that continuous asthma educational program/ trainings using evidenced based guideline will increase nurses' knowledge of asthma. Similarly, Albarraq, (2019) stated that, health care givers for persons living asthma needs continuous training and education which will increase their asthma knowledge. This finding supports the report of the findings of Adeyeye et al (2019) which stated that following the training there was a statistically significant improvement in the knowledge of nurses regarding asthma with (p<0.001). A similar success of an intervention in improving nurses' knowledge of asthma was demonstrated in a study in Egypt by Asher (2017). Findings of this study also shows significant difference in level of asthma knowledge among the participants, pre and post educational program. No participants were on score range of very low and low asthma post educational program. ¾, 86.5% of the participants were on the score range of very high asthma knowledge post educational program as against less than ¼ ,26.9% of the participants pre-educational program. This indicates positive effect of educational program on knowledge of asthma among the participants. These findings review the interplay between new information and its effect on change of action. This is in-line with the findings of Adeyeye et al (2019) which stated that following the training there was a statistically significant improvement in the knowledge of nurses regarding asthma with (p<0.001). McCabe et al. (2019), in their study concluded that continuing educational and training on asthma care can increase nurses' asthma knowledge and management practice.

Significant difference was found in knowledge of asthma pre and post nurse led educational program using GINA guideline. Since the calculated t-value (21.00), is greater than the critical t-value (1.96) at df of 51 at 0.05 level of significance. This finding is unlikely to occur if there is no difference between pre and post educational knowledge of asthma using GINA guidelines. Thus, it is concluded that there appears to be difference between nurses' asthma knowledge pre and post educational program, the hypothesis is therefore rejected. In light of the above the educational program was impactful on the knowledge of the participants and this will in-turn led to good asthma management practice which has a positive implication on nursing practice.

CONCLUSION

The findings of this study highlight average asthma knowledge among the participants pre- test and very high asthma knowledge post -educational program, this is as a result of the impact of the educational program. Based on the findings, the study concluded that nurse-led educational program using GINA guidelines increases nurses' knowledge of asthma which will in turn improve asthma management practice and close asthma management gap.
Recommendation

The study suggests the following

1. Educational programs for nurses should be nurse-led as it will help nurses used standardized nursing language to pass information to other nurses.
2. Future researchers who want to carry out such studies should liaise with nurse leadership in each setting to ensure nurses who can effect change are selected for such study.
3. Continuous asthma educational program on existing guideline should be encouraged among nurses.
4. Nurse should be encouraged to specialized in asthma care, diploma programs and advanced nursing programs should be designed to meet this need

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