# A preliminary assessment of nurses' asthma education needs and the effect of a training programme in an urban tertiary healthcare facility

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## Abstract

Nurses are important partners in the provision of quality healthcare to asthma sufferers worldwide. However adequate attention has not been given to asthma education among various health professionals, and in particular nurses, in our environment where most patients do not have access to qualified medical practitioners. The aim of the current study was to assess the knowledge of nurses, evaluate their skills and competency on asthma treatment and also to assess the impact of a training programme. Seventy-eight nurses were recruited from relevant departments that were involved in asthma care in a tertiary health institution in Lagos, Nigeria. A one-day training programme was carried out with a pre- and post-test evaluation. The training included didactic lectures on the pathogenesis, presentation , and management of asthma and hands-on training sessions on various drug delivery devices used in asthma care and the use of a peak flow meter.

The mean age of the nurses was 46.59±8.30 years and the mean duration of practice was 21.69± 9.86 years. At pre- test, nurses' knowledge and use of the peak flow meter was fair with 48 (61.5%) reporting its usefulness in asthma monitoring while only 17 (21.8%) had used a peak flow meter prior to the training. The use of spacers was very low with only 3 (3.8%) having used one previously. The training resulted in all the nurses 75 (100%) being able to effectively handle and use the peak flow meter. At the end of the training, there was a statistically significant increase in their knowledge.

The pre-test knowledge of the nurses about drug delivery devices and peak flow meters was poor and inadequate, but with the training these metrics were significantly improved. We recommend that a structured course on asthma management, to include hands-on training with various devices and the peak flow meter, should be put in place and made accessible to all nurses who attend to patients with asthma.


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## Introduction

Asthma is one of the most common chronic diseases; it is estimated to affect about 300 million people worldwide.[1] In Nigeria it is estimated to affect about 10.7% of the population.[2] Nurses are an important part of the team providing care to affected individuals. Nurses are often more widespread, and are available in all tiers of health facilities and also in the communities; as such they are the first line of contact for sufferers, particularly during acute crises at home or in healthcare facilities. It is therefore expected that nurses themselves have adequate knowledge about this condition.

Asthma is a frequent cause of hospital visits and absenteeism from school and work; poor control therefore has a negative impact on the patient's quality of life. It is known that the symptoms of asthma can be effectively managed by using appropriate medications properly delivered with adequate attention to trigger factors in the environment, including avoidance of allergens and adherence to treatment for maintenance. In a study conducted among asthma patients, poor inhaler technique was identified as a major hinderance to achieving optimal control,[3] thus adequate training of nurses on inhaler techniques and use of other devices may help improve outcomes in these patients.

The nurses' knowledge will obviously influence the quality of care and the standard of the health education provided to these patients, particularly in our environment where there is a shortage of health educators.[3] This study was therefore conducted to assess the knowledge of nurses about asthma, to evaluate their skills and competency in the treatment of asthma, and to assess the effect of a training programme in an urban tertiary healthcare facility.

## Method

This study was a cross-sectional quasi-intervention study carried out in a tertiary hospital located in Lagos, south-west, Nigeria. The centre is a 600-bed hospital located in a densely populated area of Lagos and receives substantial numbers of asthma cases both in the outpatient department and as in-patients. It has about 500 nurses distributed unevenly throughout its various departments. The participants of the study were nurses from all the departments where asthma patients were likely to be treated.

The teaching materials used in the education programme were developed from the Global Initiative

for Asthma (GINA) guidelines for the management of asthma.[2,3] Two respiratory physicians, a community physician, a pharmacist, and a nurse educator designed and conducted the training. The facilitators gave lectures on asthma aetiology, clinical features and management of chronic asthma, acute severe asthma management, drug delivery devices in asthma care, as well as nursing care plans for patients with asthma. Each session lasted about 30 minutes. There were demonstrations of the use of peak flow meters, meter dose inhalers, turbohalers, and diskus, and the use of volumatics as well as nebulisers. The participants were also split into groups for hands-on training in the use of the devices. Nurses were also given take-home instructional materials. The training lasted 5 hours, i.e. 3 hours of lectures and 2 hours of practice.

The effectiveness of the asthma education programme was evaluated by the use of a questionnaire which was administered before and after the course. The questionnaire consisted of 33 questions which were divided into four sections. Section one described the demography of the respondents while section two focused on asthma aetiology and pathophysiology; section three evaluated asthma treatment and section four evaluated confidence, training, and health education knowledge.

The data collected were analysed with SPSS software version 19. Descriptive statistics were used to describe the demographic characteristics of the nurses. Continuous variables were expressed as means±standard deviation while categorical variables were expressed in proportions. Comparison of unpaired categorical variables was carried out using the chi-square test. Paired dichotomous data were compared using Student's t-test. A p-value of <0.05 was taken as significant.

Ethical clearance was obtained from the institutional review board as well as from the nursing directorate. Verbal informed consent was obtained from the participants prior to the training.

## Results

### Demography of participants

A total of 78 nurses participated in the training and took the pre-test, while only 76 participated in the post-test. The mean age of the nurses was 46.59±8.3 years. The mean duration of practice as a nurse was 21.69±9.86. years. About one-quarter of the participating nurses were from the Department of Medicine (21(26.9%)), 13

| Statements | Pre-test frequency (%) (n=78) | Post-test frequency (%) (n=75) |
|---|---|---|
| **Asthma is a chronic inflammatory disorder of the airways** | | |
| Yes | 62 (79.5) | 75 (100) |
| No | 10 (12.8) | |
| Don't know | 06 (7.7) | |
| **Asthma is a disease characterised by airway hyper-responsiveness** | | |
| Yes | 74 (94.9) | 75 (100) |
| No | 02 (2.6) | |
| Don't know | 02 (2.6) | |
| **Asthma is a non-communicable disease** | | |
| Yes | 70 (89.7) | |
| No | 06 (7.7) | 69 (92.0) |
| Don't know | 02 (2.6) | 06 (8.0) |
| **Asthma is a disease with widespread airway narrowing** | | |
| Yes | 74 (94.9) | 75 (100) |
| No | 01 (1.3) | |
| Don't know | 03 (3.8) | |
| **Patients could have chronic cough** | | |
| Yes | 60 (76.9) | 74 (98.7) |
| No | 13 (6.7) | 01 (1.3) |
| Don't know | 05 (6.4) | |
| **Patients present with chest tightness** | | |
| Yes | 77 (98.7) | 75 (100) |
| No | 01 (1.3) | |
| Don't know | | |
| **Wheezing occurs in asthma** | | |
| Yes | 77 (98.7) | 75 (100) |
| No | 01 (1.3) | |
| Don't know | | |
| **Patients have episodic breathlessness** | | |
| Yes | 77 (98.7) | 75 (100) |
| No | 01 (1.3) | |
| Don't know | | |

*Table 1: Nurses' knowledge of asthma definition and symptoms*

(16.7%) were from Surgery, while 11 (14.1%) were from the Paediatric Department; 8 (10.3%), 7 (9.0%), and 6 (7.7%) were from the Obstetrics, Critical Care, and emergency units, respectively.

**Asthma definition and presentation**

The pre-test and post-test knowledge of the nurses about asthma definition and clinical presentation are shown in Table 1. The majority of the nurses 62 (79.5%) agreed that asthma is a chronic inflammatory disorder while a good number had adequate knowledge about the definition of asthma with 62 (79.5%) agreeing that it is a chronic inflammatory disorder of the airway. Seventy-four (94.9%) nurses knew that asthma is a disease characterised by airway hyper-responsiveness. However, following the training there was a stastistically significant improvement in the knowledge of nurses regarding the definition of asthma definition ($p<0.001$).

Regarding the symptoms of asthma, the majority of the nurses 77 (98.7%) knew that chest tightness, episodic breathlessness, and wheezing were modes of presentation; a much lower number (60 (76.9%)) knew that chronic cough could also be a symptom of asthma. This knowledge improved to almost 100% following the training.

Evaluating the knowledge of the nurses about trigger factors showed that all the nurses knew that exposure to allergens may be a trigger factor; exercise was mentioned by 74 (94.9%), while respiratory infections, cold air exposure, and certain drugs were regarded as trigger factors by 68 (87.2%), 71(91%), and 66 (84.6%) respectively. These percentages increased with training.

The majority of the nurses were aware of the association between asthma and allergic rhinitis and sinusitis, this was noted by 66 (84.6%) and 66 (84.6%) nurses respectively. About half, 41 (52.6%) and 33 42.3%), knew that asthma could be associated with allergic conjunctivitis and atopic dermatitis respectively. At the end of the training 66 (88%) knew that asthma could be associated with atopic dermatitis (Table 2).

The knowledge of the nurses about good asthma control was also evaluated (Table 3). There was a significant improvement in the knowledge of the nurses about good asthma control after the training.

**Use of peak flow meter**

Knowledge about the use of peak flow meter was noted to be very low among the nurses. The majority of the nurses 45 (57.7%) had never seen a peak flow meter before while only 16 (20.5%) had used a peak flow meter previously. Seventeen (21.8%) had seen a peak flow meter, but never used one; 48 (61.5%) nurses knew that peak flow meter was useful in monitoring asthma.

**Medications in asthma**

Table 4 shows the nurses' knowledge about medications

*Table 2: Nurses' knowledge of the trigger factors and associated conditions*

| | Pre-test frequency (%) (n=78) | Post-test frequency (%) (n=75) |
|---|---|---|
| **Trigger factors** | | |
| **Respiratory infections** | | |
| Yes | 68 (87.2) | 75 (100) |
| No | 07 (9.0) | |
| Don't know | 03 (3.8) | |
| **Exposure to allegens** | | |
| Yes | 78 (100) | 75 (100) |
| No | | |
| Don't know | | |
| **Exercise** | | |
| Yes | 49 (62.8) | 68 (90.67) |
| No | 19 (24.4) | 07 (9.33) |
| Don't know | 09 (11.5) | |
| **Exposure to cold air** | | |
| Yes | 71 (91.0) | 75 (100) |
| No | 04 (5.1) | |
| Don't know | 03 (3.8) | |
| **Drugs** | | |
| Yes | 66 (84.6) | 74 (98.7) |
| No | 03 (3.8) | 01 (1.3) |
| Don't know | 09 (11.5) | |
| **Pollutants** | | |
| Yes | 74 (94.8) | 75 (100) |
| No | 02 (2.6) | |
| Don't know | 02 (2.6) | |
| **Associated conditions** | | |
| **Allergic conjunctivitis** | | |
| Yes | 41 (52.6) | 70 (93.3) |
| No | 24 (30.8) | 03 (4.0) |
| Don't know | 13 (15.7) | 02 (2.6) |
| **Allergic rhinitis** | | |
| Yes | 66 (84.6) | 72 (96.0) |
| No | 05 (6.4) | 03 (4.0) |
| Don't know | 07 (9.0) | |
| **Atopic dermatitis** | | |
| Yes | 33 (42.3) | 66 (88.0) |
| No | 25 (32.1) | 04 (5.3) |
| Don't know | 20 (25.6) | 05 (6.7) |
| **Allergic sinusitis** | | |
| Yes | 66 (84.6) | 72 (96.0) |
| No | 08 (10.3) | 02 (2.7) |
| Don't know | 04 (5.1) | 01 (1.3) |

used in asthma patients. A large percentage (70 (89.7%)) knew that asthma medications included relievers and controller medications and this improved with training. Also, 61(78.2%) knew that inhaled corticosteroids are controller medications in asthma while 62 (79.5%) agreed that inhaled steroids are anti-inflammatory. About half (44 (56.4%)) of the nurses knew that β-agonists were short- and long- acting while about one-third (26 (34.3%)) of the nurses did not know that short-acting β-agonists were reliever medications and are useful in acute episodes (29 (37.2%)). Less than half, 33 (42.3%), knew that oral steroids could be given during acute exacerbations. The majority of the respondents (66 (84.6%)) knew that asthma medications were best given by the inhaled route. The knowledge of medications increased after the training.

| Variables | Pre-test frequency (%) (n=78) | Post-test frequency (%) (n=75) |
|---|---|---|
| **No limitation of activities** | | |
| Yes | 51 (65.4) | 66 (88) |
| No | 23 (29.5) | 07 (9.3) |
| Don't know | 04 (5.1) | 02 (2.6) |
| **No emergency visit** | | |
| Yes | 49 (62.8) | 68 (90.6) |
| No | 22 (28.2) | 07 (9.3) |
| Don't know | 07 (9.0) | |
| **No night time awakening** | | |
| Yes | 58 (74.4) | 68 (90.6) |
| No | 14 (17.9) | 07 (9.3) |
| Don't know | 06 (7.7) | |
| **No absenteeism** | | |
| Yes | 59 (75.6) | 68 (90.6) |
| No | 14 (17.9) | 07 (9.3) |
| Don't know | 05 (6.4) | 0 |
| **No need for frequent rescue medications** | | |
| Yes | 51 (65.4) | 60 (80) |
| No | 23 (29.5) | 13 (17.3) |
| Don't know | 04 (5.1) | 02 (2.6) |

*Table 3: Nurses' knowledge of good asthma control*

**Use of drug delivery devices**

Nebulisers were the most frequently used device by the nurses, 64 (82.1%). One-third, 24 (30.8%), of the respondents had used a meter dose inhaler device for their patients. Seven (9%) and 11 (14.1%) had used turbohalers and accuhalersfor their patients respectively, while only 3 (3.8%) had used a spacer previously.

**Self-rating of confidence of nurses at managing asthma**

Prior to the training, less than half of the nurses (36 (46.2%)) reported that they had enough knowledge to manage asthma effectively, with 23 (29.5%) of them confident of being able to demonstrate the use of an inhaler; this increased to 73 (97.3%) following training. Twenty-eight (35.9%) of the nurses claimed that they demonstrate the use of inhalers to their patients. The majority of the nurses (59 (75.6%)) had received no training on asthma care since leaving school. The majority of the nurses (74 (94.9 %)) also agreed to participate in future continuing medical education (CME) on asthma care.

**Provision of health education**

Many of the nurses (58 (74.4%)) provided health education to their patients about asthma. All the nurses agreed that asthma health education should include advice on avoidance of smoking. Seventy-six (97.4%) of the respondents would tell their patients to avoid known allergens, including exposure to fumes and dust; 61 (78.2%) would tell their patients to keep the house free from cockroaches.

**Emergency asthma care**

Sixty-eight (87.2%) nurses agreed that oxygen should be given in acute asthma, while 66 (84.6%) knew that intravenous hydrocortisone is indicated in emergency asthma care. Over 90% knew that salbutamol is nebulised in emergency care and a similar number agreed to the use of intravenous aminophylline. This increased to 75 (100%) after the training. However, only 36 (46.2%) knew that ipratropium bromide could be used in acute care. This increased to 59 (78.7%) at the end of the training.

## Discussion

Nurses are an important component of healthcare provision to asthma patients worldwide. In Nigeria, nurses are found in most healthcare facilities and they are the personnel most frequently consulted for medical attention outside the hospital settings in our communities. This study highlighted the significance of CME and training for nurses as an integral part of achieving optimal asthma care. This training would update their knowledge about current trends and recent advances in asthma which will ultimately lead to improved patient care. This study demonstrated that significant improvements in knowledge of asthma definitions, symptomatology, triggers, and environmental factors occurred in nurses following a 5-hour training session. This is similar to the findings among Taiwanese public health nurses.[4] It was also noted that many of the nurses did not have adequate knowledge

about other atopic conditions which may have negative implications on the treatment outcomes of asthma patients who may also suffers from such conditions. Such patients may have several years of skin, nasal, or eye troubles without adequate attention being given to them.

The finding of poor knowledge and utilisation of the peak flow meter in this study is similar to the reports of the studies conducted elsewhere.[4-6] It is therefore very important that continuing asthma education for nurses and other healthcare professionals is given priority. There is also a need to make peak flow meters available in practices where asthma patients are managed.

Regarding medications in asthma, the nurses' knowledge increased significantly after the training. In this study we did not assess nurses' inhaler techniques by direct observation; however, the self-rated confidence on the use of inhalers was low. The nurses notably did not use many of the other devices. This may be due to the relative rarity of these devices compared with the metered dose inhaler. This finding is quite surprising as in the last few years there has been a relative increase in the availability of turbohalers and accuhaler-based medications for asthma in our environment. Adequate training of the nurses would have raised awareness of their availability. This further illustrates the need for greater education among nurses about medications and devices available for administration.

While metered-dose inhalers were very frequent in our practice, there were also a considerable number of patients who were unable to use the devices appropriately,[3] thus needing spacer devices; it was however of concern that the majority of our nurses were unaware of spacer devices and their use. This study highlighted the knowledge gaps that exist among the nurses regarding asthma care. The findings will form a basis for designing a more comprehensive asthma care education programme for nurses in Lagos, with the goal of improving their knowledge and providing better treatments with improved health outcomes for the numerous asthma patients whose treatments are handled by this group of healthcare practitioners.

While this study was conducted among nurses, it important to note that other healthcare professionals, particularly the pharmacist, may play a key role in delivering qualitative care to asthma sufferers. The effect of pharmacist education on asthma treatment plans has been found to be associated with better use of medications and improvement in patient outcomes.[7] In a study by Mehuys and colleagues in Belgium, pharmacist intervention – including education about asthma management, inhaler techniques, medication adherence, and smoking cessation – was effective in improving asthma control and related quality of life.[8]

This present study is limited to immediate recall and self-report. However, it has demonsrated the importance of a training programme for healthcare providers on asthma treatment and control. Further study should elicit long-term recall.

## Conclusion

This study showed that the nurses in the tertiary hospital studied had good knowledge about asthma definition, symptoms, and precipitating factors, and these improved with health education. The study also identified gaps in the knowledge of the nurses regarding asthma medications, drug delivery devices, and use of peak flow meters. The findings will form the basis for planning an appropriate health education intervention programme to improve the skills and competence of nurses in managing asthma appropriately.

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