

Hospital pharmacists' roles in promoting asthma self-management: a cross-sectional study in a Nigerian tertiary Hospital

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ABSTRACT

Background: According to the Nigerian Thoracic Society, there are about 15 million asthmatics in Nigeria. Poor inhaler techniques may lead to inadequate symptom control or death. Pharmacists can promote asthma self-management through proper demonstration of the use of asthma devices.

Objectives: The objective of this study was to assess hospital pharmacists' roles in promoting asthma self-management.

Methods: A cross-sectional study was conducted among hospital pharmacists in the University of Nigeria Teaching Hospital (UNTH) between May to July, 2017. As of the time of the study, there were 198 hospital pharmacists practicing in UNTH. A 29-item structured self-administered questionnaire assessing information on stock, action plan for pharmacists, opinions on current asthma management, interventions with asthma patients and factors influencing pharmacists' interventions with asthma patients was utilized. Validated checklists were used to assess inhaler techniques and peak flow meter use, respectively, from participants' demonstrations using dummy inhalers and peak flow meters. Poor techniques were corrected after each demonstration.

Results: Eighty three questionnaires were completed and returned (41.9% participation rate). More than 90% of the hospital pharmacists claimed to educate patients about their asthma medications. Only about a quarter (25.3%) claimed to help asthma patients use peak flow meters appropriately. Less than half (39.8%) of the hospital pharmacists were willing to intervene with asthma patients. Summarily, the demonstrated good techniques for the asthma devices were: pMDI (26.5%), accuhaler (24.1%), turbuhaler (14.5%), pMDI plus spacer (1.2%), peak flow meter (1.2%).

Conclusion: Although the hospital pharmacists believed that they had competence to educate on inhaler techniques, they demonstrated poor inhaler techniques and were deficient in the knowledge of peak flow meter use.

Keywords: Asthma, Inhalers, Peak Flow Meter, Pharmacists, Nigeria

Rôle des pharmaciens d'hôpitaux dans la promotion de l'autogestion de l'asthme : étude transversale réalisée dans un hôpital tertiaire nigérian

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RESUME

Contexte : Selon la Société Nigérienne Thoracique (Nigerian Thoracic Society), il y a environ 15 millions d'asthmatiques au Nigeria. De mauvaises techniques d'inhalation peuvent entraîner un contrôle inadéquat des symptômes ou la mort. Les pharmaciens peuvent promouvoir l'autogestion de l'asthme par une démonstration adéquate de l'utilisation de dispositifs pour l'asthme.

Objectifs : L'objectif de cette étude était d'évaluer le rôle des pharmaciens d'hôpitaux dans la promotion de l'autogestion de l'asthme.

Méthodes : Une étude transversale a été menée entre mai et juillet 2017 parmi les pharmaciens de l'Hôpital universitaire de Nigéria (UNTH). Au moment de l'étude, 198 pharmaciens hospitaliers exerçaient à l'UNTH. Un questionnaire auto-administré structuré de 29 articles évaluant les informations sur le stock, un plan d'action pour les pharmaciens, des avis sur la gestion actuelle de l'asthme, les interventions auprès de patients asthmatiques et les facteurs influençant les interventions des pharmaciens auprès des patients asthmatiques a été utilisé. Des listes de vérification validées ont été utilisées pour évaluer les techniques d'inhalation et l'utilisation des débitmètres de pointe, respectivement, à partir des démonstrations des participants utilisant des inhalateurs factices et des débitmètres de pointe. Les mauvaises techniques ont été corrigées après chaque démonstration.

Résultats : Quatre-vingt-trois questionnaires ont été remplis et retournés (taux de participation de 41,9%). Plus de 90% des pharmaciens d'hôpitaux ont déclaré informer les patients de leurs médicaments contre l'asthme. Environ un quart seulement (25,3%) ont déclaré aider les patients asthmatiques à utiliser les débitmètres de pointe de manière appropriée. Moins de la moitié (39,8%) des pharmaciens d'hôpital étaient disposés à intervenir auprès des patients asthmatiques. En résumé, les bonnes techniques démontrées pour les dispositifs asthmatiques étaient les suivantes : pDMD (26,5%), accuhaler (24,1%), turbuhaler (14,5%), pDMD plus spacer (1,2%), débitmètre de pointe (1,2%).

Conclusion : Bien que les pharmaciens des hôpitaux aient estimé qu'ils étaient compétents pour enseigner les techniques d'inhalateur, ils ont démontré de mauvaises techniques d'inhalation et une connaissance insuffisante de l'utilisation du débitmètre de pointe.

Mots-clés : Asthme, inhalateurs, compteur de débit de pointe, pharmaciens, Nigéria

INTRODUCTION

Asthma is one of the major non-communicable diseases worldwide. About 15 million Nigerians suffer from asthma.¹ It is estimated that more than 300 million people currently manage asthma worldwide, and 250,000 deaths are attributed to the disease each year.² The prevalence of the disease is continually rising, particularly in low and middle-income countries, and has been estimated to increase by 100 million by 2025.² The disparity in the prevalence of asthma in high-income countries and middle-income countries is closing.³ The finding that airway inflammation is the key underlying process in asthma has led to recommendations that inhaled corticosteroids should be introduced early in the management of the disease.⁴ Despite these guidelines and increasing knowledge, asthma morbidity is still considerably high.⁸ Poor adherence to prescribed inhaled treatment is an important cause of uncontrolled disease.⁹⁻¹³ In addition to the natural history and biology of the disease, the demographic characteristics of the population at risk play an important role in determining the pattern of spread and intensity of public health intervention measures required for disease control.¹⁴ In Nigeria, the major clinical challenge facing asthma diagnoses is that there is no single satisfactory diagnostic test for all asthmatic patients as physicians often use different criteria in making a bronchial asthma diagnosis.¹⁵ High cost and unavailability of essential asthma medications are other treatment challenges.¹⁶ Non-affordability of inhaled corticosteroids could be a potential barrier to the treatment of asthma, especially in developing countries. The lack of essential devices like nebulizers and spacer devices that are used for effective medication administration constitute a strong challenge affecting correct management of asthma.¹⁷ Even when these devices are provided, poor techniques in their use contribute to poor delivery of medications to the required site of action, poor asthma control, and the resultant increase in the health resource utilization.¹⁸ Communication gap between the healthcare providers and the patients, lack of patients' self-monitoring equipment (such as the peak flow meter), and the lack of educational materials have also been linked to poor asthma control.¹⁷ Incorrect inhaler use can lead to treatment failure by reducing drug concentration in the airways and contributes to treatment non-adherence, making clinical asthma control difficult.^{18,19}

Self-management, defined as the tasks that individuals

must undertake to live with chronic conditions, should be part of the treatment plan for any chronic disease because it empowers patients, decreases dependency, and minimizes the response time so that the morbidity and pain due to episodic exacerbations can be reduced.^{20, 21} Self-management of asthma encompasses a range of strategies including education, self monitoring of the condition, regular review by a healthcare provider and the use of a written action plan.²² Adherence and self-management are the joint responsibility of the patient and members of the asthma care team.²³

Pharmacists play a major role in the management of asthma by giving appropriate therapy and promoting patient adherence which prevent most emergency department visits and hospitalization.²⁴ Pharmacists can educate patients about the role of each medication used to prevent the frequency of symptoms and medications taken to relieve asthma symptoms; instruct patients about the proper techniques for inhaling medications and also monitor medication use and refill intervals to help identify patients with poorly controlled asthma.²⁵ Research has shown that some hospital pharmacists exempt themselves in the management of asthma because they feel the role of asthma management is solely the duty of medical doctors or they lack the knowledge on the use of inhalation devices and the peak flow meter.²⁶ Most of these studies were not conducted in Nigeria. Considering the growing prevalence of asthma in low and middle-income countries, the general objective of this study was to assess hospital pharmacists' roles in promoting asthma self-management.

METHODS

Study design and sample population

This was a cross-sectional study conducted among hospital pharmacists in the University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu State, Southeast, Nigeria, over a period of three months (May to July 2017). The hospital is a tertiary institution which serves as a major referral center to the surrounding health facilities in South-Eastern Nigeria and beyond. The eligibility criteria included hospital pharmacists who worked in UNTH and were willing to participate. As of the time of this study, there were 198 hospital pharmacists practicing in UNTH.

Data collection

The study instrument was a 29-item structured self-administered questionnaire divided into sections on demographic information, information on stock, action

plan for pharmacists, opinions on current asthma management, interventions with asthma patients and factors influencing pharmacists' interventions with asthma patients. The questionnaire was adopted and modified from a previous report by the National Institutes of Health (NIH) and questionnaire on asthma management for community pharmacists developed by Buckley and Ryder.²⁷ The checklist by Bryant and colleagues was used to assess the inhaler techniques demonstrated by the pharmacists.²⁸ The checklist by Sleath *et al.* was used to assess the demonstration of peak flow meter use.²⁹ The objectives of the survey were explained to the participants and oral consent for participation was sought before the questionnaires were administered. The hospital pharmacists filled the questionnaires in their pharmacy units, without the consultation of any reference material. Confidentiality was maintained as the names of the hospital pharmacists were not requested for. The filled questionnaires were retrieved. Then the hospital pharmacists were handed dummy inhalers and a peak flow meter for demonstration of their use. The checklist was ticked as appropriate, immediately after. The hospital pharmacists were educated on the correct inhaler techniques and peak flow meter use by demonstrations. The hospital pharmacists were asked to re-demonstrate. It was ensured that the hospital pharmacists got all the steps correctly before departure.

Data analysis

Data were collated and analyzed using the IBM Statistical Product and Services Solution (SPSS) for Windows, Version 21.0 (IBM Corp, Version 21.0, and Armonk, NY, USA). Descriptive statistics were used to summarize data.

Ethical consideration

This study was conducted after obtaining ethical approval from the Health Research and Ethics Board of the University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu State (NHREC/05/01/2008B – FWA00002458 – IRB00002323). The study was

conducted based on the approved protocol.

RESULTS

A total of eighty three questionnaires were completed and returned, representing a 41.9% participation rate (83/198). Most of the participants (83.1%) had practiced as pharmacists for less than 10 years with only 9.6 % having more than 10 years hospital pharmacy experience, Table 1.

Peak flow meters were not stocked in any of the hospital pharmacy units, Figure 1.

More than 90% of the hospital pharmacists claimed to educate patients about their asthma medications. However, only about a quarter of them helped asthma patients use peak flow meters appropriately, Figure 2.

Most of the hospital pharmacists either did not check or could not estimate the proportion of their asthma patients who used their asthma inhalers properly; used peak flow meters regularly; had an individualized asthma action plan or had well-controlled asthma, Figure 3.

Less than 5% of the hospital pharmacists claimed to always demonstrate peak flow meter usage to asthma patients, Figure 4.

Less than 40% of the hospital pharmacists correctly demonstrated that the pressurized metered dose inhaler should be shaken before use. Only about 4% correctly demonstrated that asthma patients should exhale away from the mouthpiece of the accuhaler. The hospital pharmacists poorly demonstrated all the steps for correct turbuhaler and pMDI use. They demonstrated very poor knowledge of peak flow meter use, Table 2.

Overall, the hospital pharmacists demonstrated poor device techniques for all the inhaler devices and the peak flow meter, Table 3.

In Table 4, the code responses for items 1, 4, 5, 6 and 7 were reversed in a positive direction such that higher mean scores indicated positive preferences (highly willing to intervene with asthma patients). More than half of the hospital pharmacists claimed to be competent to educate on inhalation techniques.

Table 1: Demographic details of the hospital pharmacists (N = 83)

Variables	n (%)
Age (in years)	
20 – 29	34 (41.0)
30 – 39	33 (39.8)
40 – 49	11 (13.3)
50 – 59	5 (6.0)
> 60	0 (0.0)
Gender	
Male	40 (48.2)
Female	43 (51.8)
Post-qualification experience (in years)	
< 5	39 (47.0)
5 – 10	30 (36.1)
11 – 20	8 (9.6)
> 20	6 (7.2)
Hospital pharmacy experience (in years)	
< 5	50 (60.2)
5 – 10	25 (30.1)
11 – 20	4 (4.8)
> 20	4 (4.8)

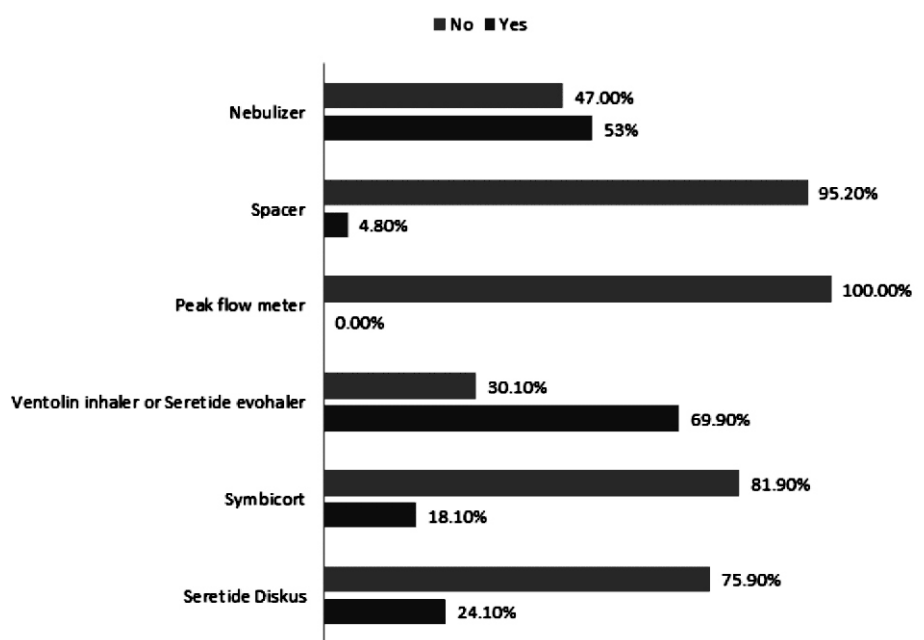


Figure 1: Information on stock

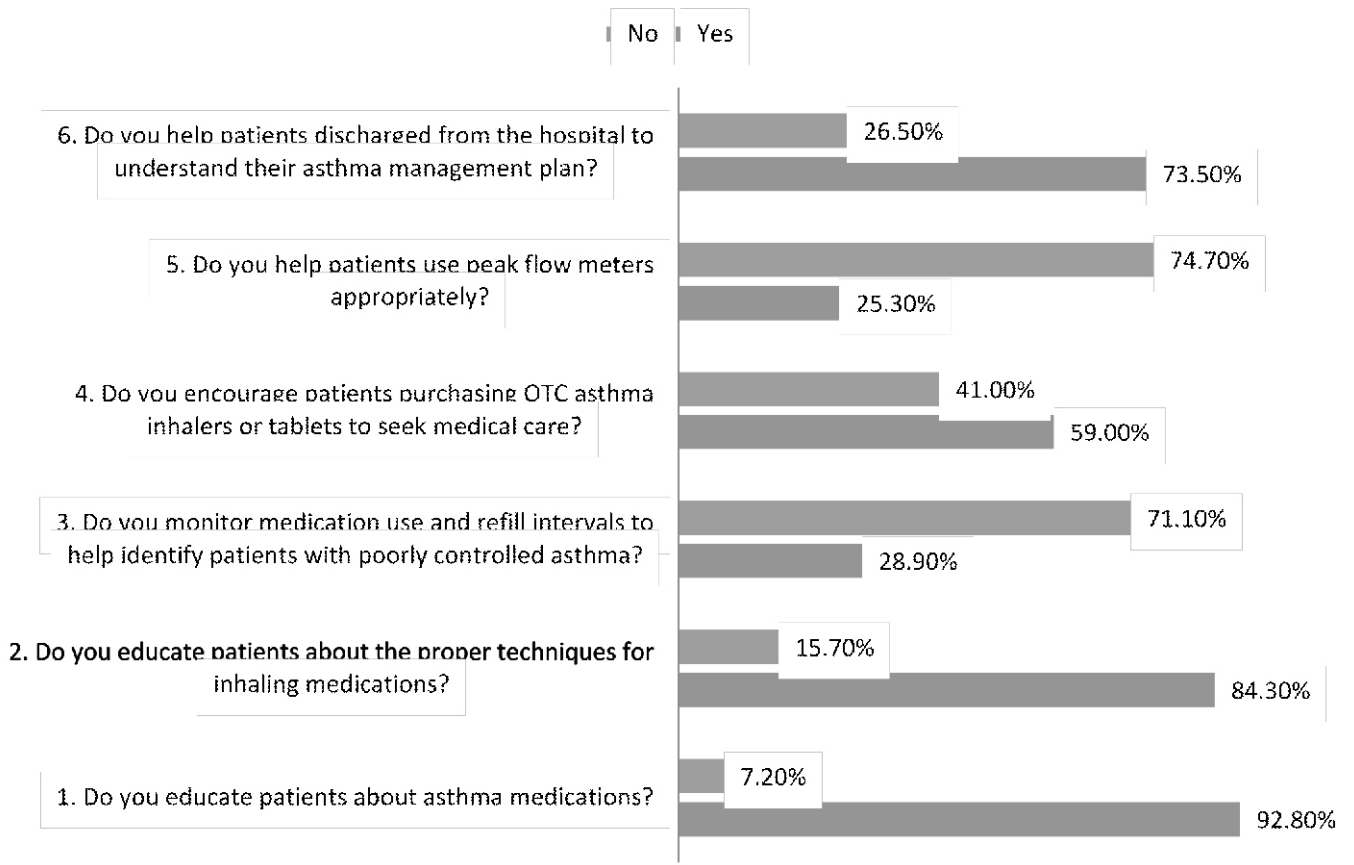


Figure 2: Action plan for pharmacists

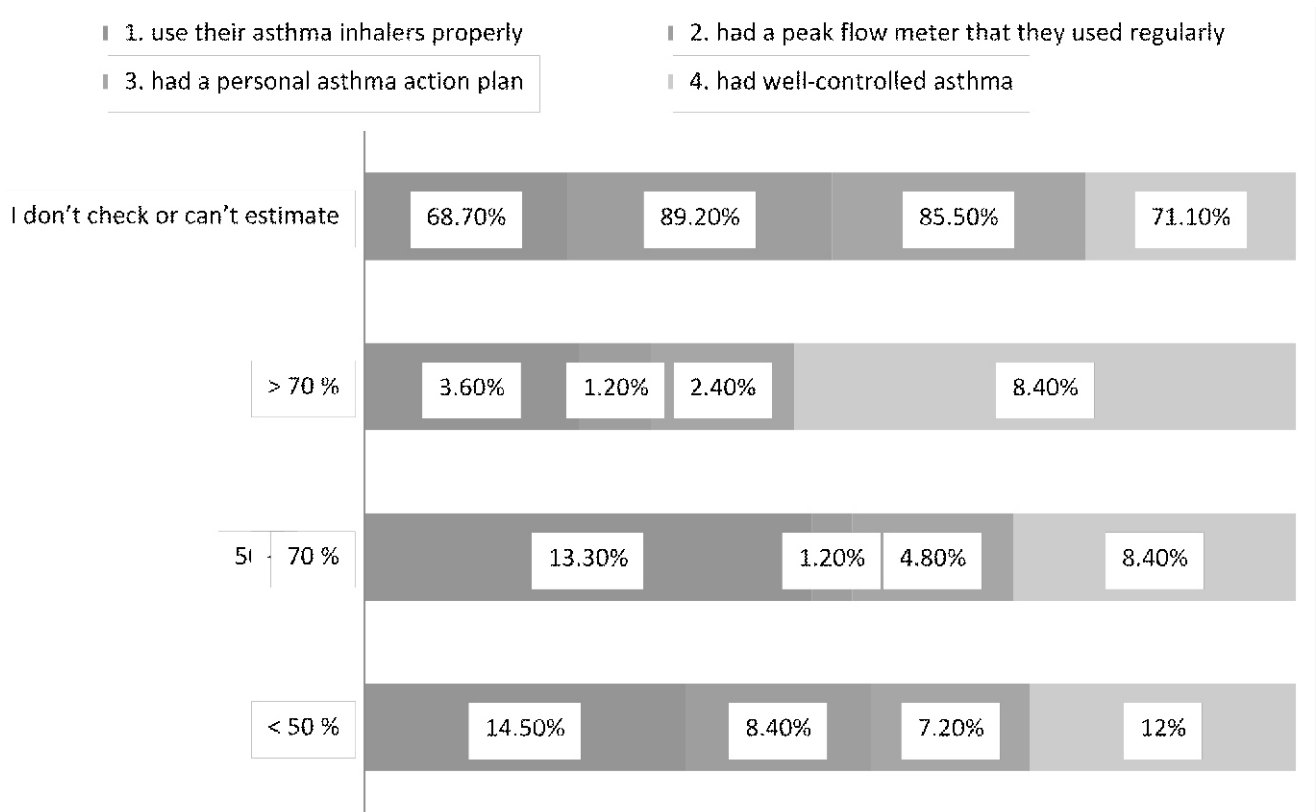


Figure 3: Opinions on current asthma management

Hospital pharmacists' roles in promoting asthma self-management

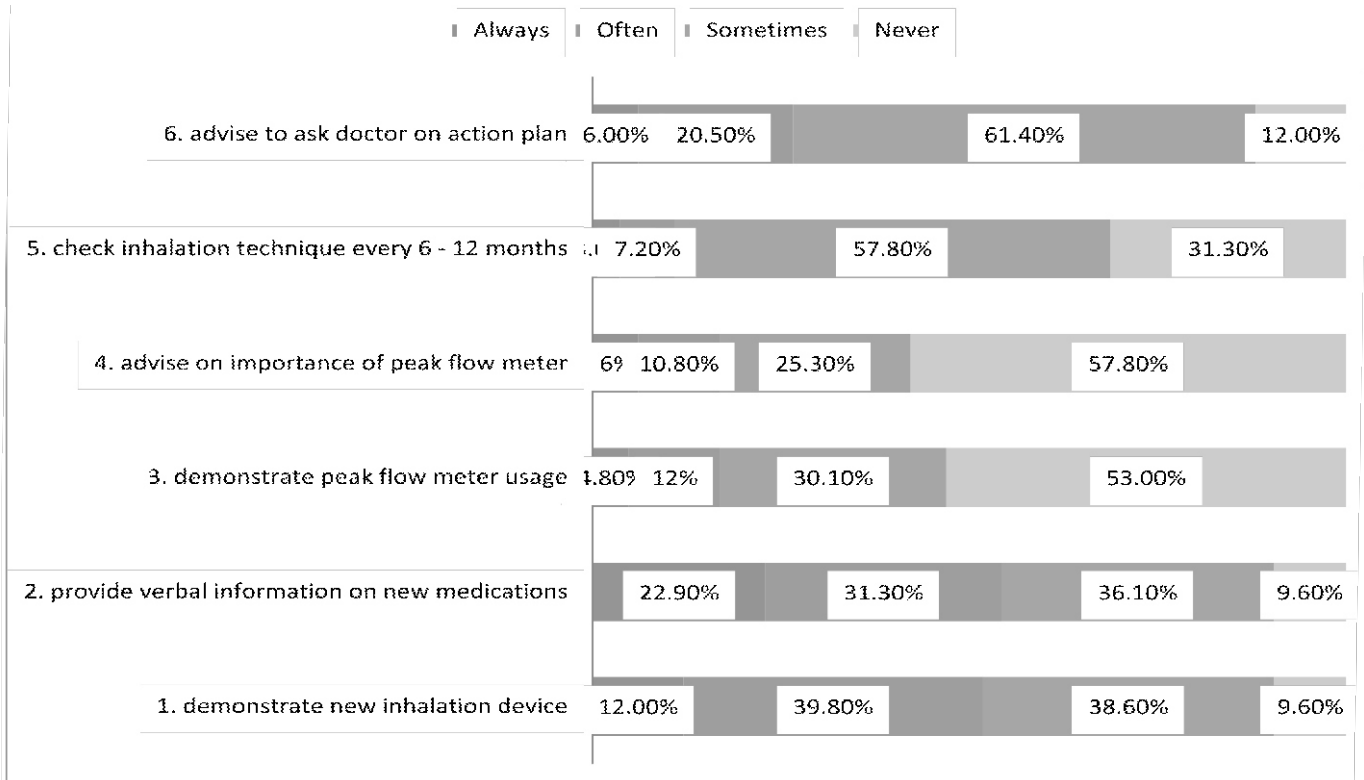


Figure 4: Interventions with asthma patients

Table 2: Hospital pharmacists' demonstration of asthma devices assessed against the eight steps for correct use in the checklists

Steps for asthma devices	Yes (%)
pMDI	
1. Remove the cap from the inhaler	76 (91.6)
2.* Shake the inhaler	33 (39.8)
3. Hold inhaler upright	49 (59.0)
4. Exhale to residual volume	10 (12.0)
5. Place mouthpiece between lips and teeth to seal the mouthpiece	63 (75.9)
6.* Inhale slowly and simultaneously and activate the canister	13 (15.7)
7.* Continue slow and deep inhalation	71 (85.5)
8. Take inhaler out of mouth and hold breath for 5-10 seconds	39 (47.0)
Accuhaler	
1. * Hold Accuhaler horizontally	19 (22.9)
2.* Push the lever away from the mouthpiece until you hear the 'click'	29 (34.9)
3. Exhale as much as you can	5 (6.0)
4. Exhale away from the mouthpiece	3 (3.6)
5. Place mouthpiece between lips and teeth to seal the mouthpiece	29 (34.9)
6.* Inhale forcefully and deeply	28 (33.7)
7. Remove Accuhaler from the mouth	29 (34.9)
8. Hold breath for 5-10 seconds	18 (21.7)
Turbuhaler	
1. Remove the cap from inhaler	19 (22.9)
2.* Keep inhaler upright	19 (22.9)
3.* Rotate grip anti-clockwise then back until a click is heard	13 (15.7)
4. Exhale to residual volume	2 (2.4)
5. Exhale away from mouthpiece	1 (1.2)
6. Place mouthpiece between teeth and lips	18 (21.7)
7. * Inhale forcefully and deeply	17 (20.5)
8. Hold breath for 5-10 seconds	12 (14.5)
pMDI + Spacer	
1. * Shake the inhaler well	6 (7.2)
2. Fit the inhaler into the opening at the end of the spacer	1 (1.2)
3. Place mouthpiece between lips and teeth to seal mouthpiece	2 (2.4)
4. Breathe out gently	0 (0.0)
5.* Press the inhaler once only	2 (2.4)
6. Take 5 – 10 slow breaths in and out through the mouth	1 (1.2)
7. * Do not remove the spacer from the mouth between breaths	1 (1.2)
8. Remove spacer from the mouth	2 (2.4)
Peak Flow Meter	
1. * Set marker to zero	1 (1.2)
2. Hold meter upright	1 (1.2)
3. Do not block marker movement	1 (1.2)
4. * Take a deep breath with mouth open	1 (1.2)
5. Place meter in mouth and close lips tightly around meter	1 (1.2)
6. * Exhale hard and fast into meter	1 (1.2)
7. Check the result	1 (1.2)
8. Repeat the step 1 – 7 two more times	0 (0.0)

pMDI = pressurized metered dose inhaler essential steps

Table 3: Device technique scores for different asthma devices

Type of inhaler/device	*Good technique n (%)	*Poor technique n (%)
1. pMDI	22 (26.5)	61 (73.5)
2. Accuhaler	20 (24.1)	63 (75.9)
3. Turbuhaler	12 (14.5)	71 (85.5)
4. pMDI plus Spacer	1 (1.2)	82 (98.8)
5. Peak flow meter	1 (1.2)	82 (98.8)

* Good technique was defined as having at least five out of eight steps correct, including all three essential steps on the checklist for inhaler techniques and peak flow meter^{28, 29}

* Poor technique was defined as not reaching the standard defined as good technique.

Table 4: Factors influencing hospital pharmacists' interventions with asthma patients

Variables	SA	A	N	D	SD	Mean (SDv)
What factors influence your interactions with asthma patients?						
1. Time is a major limitation	24 (28.9)	35 (42.2)	15 (18.1)	7 (8.4)	2 (2.4)	2.13 (1.01)
2. Patients are receptive to counseling	15 (18.1)	49 (59.0)	12 (14.5)	3 (3.6)	4 (4.8)	3.82 (0.94)
3. I have sufficient knowledge to counsel effectively	20 (24.1)	35 (42.2)	24 (28.9)	4 (4.8)	0 (0.0)	3.86 (0.84)
4. I am not competent to educate on inhalation technique	0 (0.0)	1 (1.2)	22 (26.5)	29 (34.9)	31 (37.3)	4.08 (0.83)
5. I am not competent to educate on peak flow meter usage	0 (0.0)	19 (22.9)	37 (44.6)	18 (21.7)	9 (10.8)	3.20 (0.92)
6. Not my role to counsel to improve asthma control	0 (0.0)	1 (1.2)	22 (26.5)	22 (26.5)	38 (45.8)	4.17 (0.87)
7. I do not counsel. I am underpaid to do so	0 (0.0)	0 (0.0)	10 (12.0)	15 (18.1)	58 (69.9)	4.58 (0.70)

SA – Strongly Agree; A – Agree; N– Neutral; D – Disagree; SD – Strongly disagree; SDv – Standard Deviation

DISCUSSION

From the results obtained, majority of the hospital pharmacists were less than 40 years old with only a tenth having more than 10 years hospital pharmacy experience. Overall, they demonstrated poor device techniques for all the inhaler devices and the peak flow meter.

Peak flow meters were not stocked in any of the hospital pharmacy units. Less than a tenth of hospital pharmacists in UNTH adequately demonstrated the correct steps in peak flow meter use. This could be as a result of poor awareness on the device. In the study conducted in England and Wales on incorrect use of peak flow meters among patients, it was found that almost all the patients missed step 4 (take a deep breath with mouth open); a third of the patients missed step 6 (exhale hard and fast into the meter).³⁰ This is consistent with the findings of our study where steps 4 and 6 were also the least known steps among the hospital pharmacists surveyed with only about one per cent demonstrating the steps correctly. The hospital pharmacists in our study scored poorly in all the steps demonstrating peak flow meter use. The peak flow meter is essential in checking the peak expiratory flow rate (PEFR) of a patient. The PEFR is normally checked in the morning, before the use of any medication, to measure the extent of improvement of the lung.²⁹ Self-monitoring of asthma involves the regular measurement of either symptoms or peak expiratory flow. The unavailability of the peak flow meter in all the hospital units may have further contributed to the pharmacists' poor knowledge about the device. This is a pointer to the urgent need for seminars and workshops to be conducted in hospitals to educate pharmacists on the use of peak flow meters.

No hospital pharmacist failed to counsel asthma patients because of financial remuneration. This shows that, in this regard, hospital pharmacists keep to the ethics of the profession and the desire to save lives supersedes financial benefits. Similarly, other studies in Australia and Saudi-Arabia have shown that lack of financial incentives and conflict between professional and commercial interests were not perceived by pharmacists as having a great impact on their ability to provide specific asthma services.^{31,32} Although most of the hospital pharmacists believed that asthmatic patients are receptive to counseling, a large percentage opined that time constraint is a major barrier to interacting with these patients. This concurs with findings from the Australian study where over 95% of pharmacists reported that pharmacists' lack of time and patients' perception that they were already well

cared for by the doctor were major barriers to pharmacists rendering specific asthma services.³¹

For the demonstration of the pMDI technique, less than half of the hospital pharmacists surveyed correctly demonstrated step 2 (shake the inhaler) and step 6 (inhale slowly and simultaneously activate the canister) respectively. It is very vital that the pMDI is well shaken before use, as it is pressurized. If steps 6 (inhale slowly and simultaneously activate the canister) and 7 (continue slow and deep inhalation) are not properly done, enough drugs may not get to the lungs leading to a sub-optimal effect of drug treatment. These are essential steps that must be done to get the best from the device. The most well-known essential step among the pharmacists in our study was demonstration for step 7 (continue slow and deep inhalation). However, a study conducted in Saudi-Arabia on the comparative evaluation of metered-dose inhaler technique demonstration among community pharmacists, showed better results for step 2 (54.4%) and step 6 (63%).³³

While only about a third of the hospital pharmacists surveyed on accuhaler technique correctly demonstrated steps 1 and 6, more than half (62%) of the pharmacists surveyed in a study conducted amongst pharmacists in UAE correctly demonstrated step 1 (hold accuhaler horizontally), and step 6 (inhale forcefully and deeply).³² In another study conducted in Auckland, North shore and New Zealand on adequacy of inhaler technique used by people with asthma or chronic obstructive pulmonary disease, it was deduced that for the turbuhaler technique, 91% of patients got the step 2 (keep inhaler upright); 91% of the patients got step 3 (rotate grip anticlockwise then back until a click is heard) and 77% of the patients got step 7 (inhale forcefully and deeply).²⁸ This result obtained shows that these patients were more conversant with the turbuhaler than the hospital pharmacists in this study as less than a quarter of our study participants correctly demonstrated these essential steps. The same study also evaluated the use of a pMDI with a spacer device, where 79% of the participants got step 1 (shake the inhaler well); 74% of the participants got step 5 (press the inhaler once only) and 79% of the participants got step 7 (do not remove the spacer from the mouth in between breaths). This is in sharp contrast with the findings of our study as less than a tenth (1.2%) of the pharmacists surveyed got any of the three essential steps correctly. Spacer devices were poorly stocked in the pharmacy units surveyed. Spacers are essential for patients who have lost coordination in the use of pMDI alone and to increase the quantity of drugs getting into

the airway.³¹

In this study, almost all of hospital pharmacists who participated claimed to educate patients about their asthma medication. This concurs with findings of the Saudi-Arabian study where 85% of the pharmacists claimed to educate patients on the basic facts about asthma medication.³⁴ However, only about a quarter of the hospital pharmacists in our study reported that they help asthma patients use peak flow meters appropriately, monitor medication use and refill intervals to help identify patients with poorly-controlled asthma. This proportion is much lower than that of the Saudi Arabian study where almost three-quarters (70%) of the pharmacists monitored medication use and refill intervals to help identify patients with poorly controlled asthma.³³

Again, most of the hospital pharmacists surveyed either did not check or could not estimate the percentages of patients who used their asthma inhalers properly; used peak flow meters regularly; had an individualized asthma action plan or had well-controlled asthma. The few pharmacists who checked these parameters found out that the asthma patients scored very low (less than 15%) on the measured items. This is in contrast with the Saudi-Arabian study on the contribution of community pharmacists in educating asthma patients where as much as 90% of the community pharmacists help and check patients who use their asthma inhalers properly.³¹

Despite the recent awareness campaigns and advocacy for pharmaceutical care interventions amongst pharmacists, more than half of the hospital pharmacists in our study were unwilling to intervene with asthma patients. This is appalling and worrisome since pharmacists are considered the most accessible healthcare professionals.

Hospital pharmacists should be willing to be actively involved with asthma management especially those that have Respiratory Clinics in their sites. They should provide answers to the drug-related questions on asthma that may be posed by other healthcare professionals and patients. Sufficient knowledge on asthma would boost their confidence in providing asthma-related interventions.

We recommend that the curriculum in pharmacy schools be reviewed and updated, if necessary, to include active demonstration of inhaler techniques to pharmacy students. Hospital pharmacists should have dummy inhalers for demonstration of inhaler techniques to asthmatic patients on purchase, counseling or during ward rounds. Pharmaceutical companies that manufacture or market inhalers should

be encouraged to provide dummy inhalers for hospital pharmacists. Besides symptom monitoring, peak flow meters are important for asthma self-management. Peak flow meters should be recommended for asthmatic patients. Hospital pharmacists should stock peak flow meters, especially when they have a Respiratory Clinic. They should also be versed in the knowledge of their use.

This study had some limitations. Pharmacists in the same unit had to demonstrate their inhaler techniques and peak flow meter use in different sections of their unit to avoid prejudice. This was difficult, as some units were small. Thus, the researcher requested that they all filled their questionnaires and did the demonstrations before he educated them on the proper inhaler techniques and peak flow meter use. The study was cross-sectional and conducted in one tertiary hospital. The results obtained may not be generalized to other study settings.

CONCLUSION

Although the hospital pharmacists believed that they had competence to educate on inhaler techniques, they demonstrated poor inhaler techniques and were deficient in the knowledge of peak flow meter use. It is expedient that pharmacists counsel asthma patients appropriately, since pharmacists are custodians of drugs and integral members of the healthcare team.

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