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Assessment of Pharmacists' knowledge on correct inhaler technique

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ABSTRACT

Inhaled delivery systems such as the metered dose inhalers (MDIs) are important forms of drug administration devices in asthma treatment. They have the advantage of direct drug delivery to the respiratory system and thus fewer side effects. Their incorrect use is a major cause of sub-optimal treatment. This study aims to determine pharmacists' knowledge of proper inhaler technique, and the effect of an educational intervention on pharmacist's knowledge. The study was carried out in Benin-City, Nigeria. The study population consisted of pharmacists resident in the city. A questionnaire was used to collect respondent's demographic data and other information. Baseline and post intervention knowledge and proficiency of the use of MDIs by pharmacists was assessed using the National Asthma Education and Prevention Program (NAEPP) 11 step criteria for the administration of an MDI. Pharmacists' knowledge score before and after an educational intervention was 4.17 $\pm$ 2.4 (37.9%) and 9.39 $\pm$1.5 (85.4%) respectively. $P<0.0001$. The most common knowledge deficit include forgetting to prevent aerosol loss, (96.1%), and omitting the minimum time of 1minute in between puffs (96.1%). These were greatly improved after education to (37.3%) and (5.9%) respectively. Pharmacists in this study lack complete knowledge of the correct use of metered dose inhalers. However, exposure to the proper technique improved pharmacists' knowledge and proficiency.

Keywords: Inhaler technique, Knowledge, Pharmacist.

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INTRODUCTION

Asthma is now one of the world's most common chronic conditions. It is estimated to affect about 300million people in the world and it is projected that the prevalence could increase by 100 million by the year 2025.[1] In Nigeria there appears to be no standardized data on the prevalence of asthma [1]. However, few reports suggest a high prevalence of bronchial asthma [2] and an urgent need to increase the awareness of the risk factors and promote preventive strategies to control the disease. [3] Inhaled medications are commonly prescribed for the treatment of asthma [4] but they are not properly used by patients [4-9]. Patient's knowledge of correct inhaler technique is essential in the treatment of pulmonary diseases hence they require appropriate education in the correct self administration of inhaled medication. [9, 10] It is the pharmacist's responsibility to ensure that patients know how to make the best use of their medication. Studies elsewhere have shown that health providers including many pharmacists lack the skills needed to demonstrate correct inhaler technique [9,11,12] This study therefore seeks to determine the level of knowledge of the Nigerian pharmacist with regard to proper inhaler technique, and the effect of an educational intervention on their knowledge.

METHODOLOGY

The study was carried out in Benin City, Edo state amongst consenting pharmacists in different practice settings. Pharmacists in different practice sites particularly in the public tertiary and secondary health facilities were approached and those who were available and willing to participate in the study were included. A questionnaire which contained two parts was used in the study. The first part elicited the demographics of the subjects as well as questions about any recent education or training about asthma. The second part utilized the National Asthma Education and Prevention Programme (NAEPP) [13]11 step criteria for the administration of a metered dose inhaler (MDI) to score the knowledge/proficiency of use of MDIs by the subjects. The subjects were expected to state the steps involved in the use of an MDI before and then after an educational session. The subjects were requested to complete both parts of the questionnaire in the presence of the researcher thereafter the second part was scored, and the subject was taught the proper technique of inhaler use. The subjects were allowed to ask the researcher questions or seek clarifications on any step they did not understand. At the end of the educational session the subject was again requested to complete the knowledge aspect of the questionnaire.

Every omitted or wrongly stated step received a score of 0 while every correct step was given a score of 1. Total scores were computed for all subjects based on a maximum of 11 (100%). Finally, post education knowledge was assessed again by using the NAEPP criteria. The correct MDI use according to the NAEPP criteria is as follows: (1). Shake vigorously, (2). Remove cap, (3). Hold upright (4). Tilt head back or keep head level (5). Breathe out gently, not fully (6). Close lips on inhaler keeping tongue flat and teeth apart (7). Start breathing in slowly then actuate inhaler once during inspiration (8). Continue slow and deep inhalation through mouth (9) No aerosol loss is visible (10). Hold breath for 10 seconds (11) Next dose after 1 minute.

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The data were recorded scored and entered into Microsoft Excel Software, checked for accuracy and analyzed using the statistical package for social sciences SPSS (Version 11) for descriptive statistical analysis. Inferential statistics was done using GraphPad Instat. Student's t-test was used to compare pre and post intervention knowledge scores.

RESULTS

A total of 51 out of 70 pharmacists approached consented to participate in the study. The mean age of the respondents was 30 years there were equal numbers of male and female pharmacists. All the pharmacists had a B. Pharm degree as their pharmacy professional qualification. 30 (58.9%) of the respondents had an additional qualification of which the Doctor of Pharmacy (Pharm.D) degree was the most common 26 (51%). The mean number of years of qualification of the respondents was 8years with a range of 6 to 10 years. Only 22 (43.1%) of the respondents agreed that they had a recent training on correct inhaler technique. Table 1. Seven (13.7%) of the respondents failed all steps and only 1 (1.96%) of the respondents got all steps right before the intervention. After the educational intervention the minimum score obtained was 6 (54.5%) while 17 (33%) of the respondents got all the steps right. The average knowledge score of the pharmacists before education was 4.18 $\pm$ 2.5 (38% $\pm$ 22.7%) and after the educational intervention 9.39 $\pm$ 1.5 (85.4% $\pm$ 13.6%) $P<0.0001$. The steps most frequently missed by the respondents before the intervention were "take appropriate precaution to prevent aerosol loss", and "the minimum time to wait in between puffs". These steps were omitted by 49 (96.1%) of the respondents respectively. Others are as shown in table 2. The total score of pharmacists before education was not significantly affected by either years of qualification $P=0.162$ or gender $P=0.980$, there was also no difference in the knowledge scores of the pharmacist irrespective of whether they had received a recent training on asthma or not. $P=0.492$. Pharmacists who had received an additional Pharm D degree had a higher score than others $P = 0.03$ (table 1).

TABLE 1: SOCIO-DEMOGRAPHICS OF RESPONDENTS WITH KNOWLEDGE SCORES

Sex	**N (%)**	**SCORE MEAN (SD)**	**P VALUE**
Male	29 (56.9)	4.17 (2.49)	0.989
Female	22 (43.1)	4.18 (2.53)	
Marital status			
Married	26 (51.0)	4.15 (2.49)	0.948
Single	25 (49.0)	4.20 (2.53)	
Any Recent training			
No	29 (56.9)	3.96 (2.29)	0.492
Yes	22 (43.1)	4.45 (2.75)	

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TABLE 2: NO. OF RESPONDENTS' WITH CORRECT PRE AND POST EDUCATIONAL SCORE FOR EACH MDI USE STEP

	MDI STEP	PRE EDU. SCORE	POST EDU. SCORE
1.	Shake vigorously	37	49
2.	Remove cap	29	42
3.	Hold upright	13	44
4.	Tilt head back or keep head level	13	38
5.	Breath out gently, not fully	18	40
6.	Close lips on inhaler keeping tongue flat and teeth apart	33	50
7.	Start breathing in slowly then actuate inhaler once during inspiration	34	48
8.	Continue slow and deep inhalation through mouth	12	44
9.	No aerosol loss is visible	2	32
10.	Hold breath for 10 seconds	20	44
11.	Next dose after 1 min	2	48

DISSCUSSION

The pharmacist has a responsibility, as does the prescribing physician, to ensure that patients use prescribed medications correctly. But this cannot be achieved when those who teach patients have questionable skills. [9] 27.2% of pharmacists approached did not participate, although we could not ascertain whether they were familiar with the proper use of MDIs or not, we suspect they were likely to have performed no better or possibly even worse than the respondents as we observed that their unwillingness to participate in the study may have stemmed from a feeling of inadequacy in relation to the subject area.

The most common knowledge deficit included forgetting to check and prevent aerosol loss, and the minimum time to wait in between puffs which were greatly improved after education. It was good to find that pharmacists were familiar with shaking the canister and simultaneous actuation of dose with inspiration which was a major difficulty among patients assessed for their knowledge in other studies [9, 14] The fact that having undergone a recent

training in asthma did not impact significantly on the knowledge score of such respondents may be an indication that such training was inadequate particularly as regards correct MDI use, it is also possible that lack of regular use of the knowledge to train patients maybe the cause of a decline in technique [9] There was no gender difference in knowledge of MDI use in our study. This is similar to a finding reported elsewhere [15].

This study identified that the Doctor of Pharmacy (Pharm.D) certificate holders among the respondents performed significantly better than the rest, this is commendable and shows that the programme which is clinically and patient oriented has content that impacts on the practice of its graduates.

The educational intervention in this study impacted greatly on the knowledge of the respondents. However, there is a need to ascertain the long term effectiveness of such an intervention. We conclude therefore that pharmacists in this study lack complete knowledge of the correct use of metered dose inhalers. However, exposure to the proper technique improved their knowledge and proficiency considerably. We recommend regular practical oriented training of pharmacists on the use of not only MDIs but also all other inhaled delivery systems/devices so as to improve the quality of counseling that patients with asthma receive.

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