ASSESSMENT OF METERED-DOSE INHALERS WITH SPACER TECHNIQUE AMONG POSTGRADUATE TRAINEES

Tahir Iqbal[1], Qaisar Iqbal[2], Bahar Ali[3], Raza Ullah[4], Shahida Naz[5], Haleema[6]

Correspondence

[4]Raza Ullah, Assistant Professor of Pulmonology and Critical Care

✆: +92-333-9298991

✉: dr.raza127@gmail.com

[1]Medical Officer at Khyber Teaching Hospital, Peshawar

[2]Medical Officer at Khyber Teaching Hospital, Peshawar

[3]Medical Officer at Khyber Teaching Hospital, Peshawar

[5]Senior Registrar, Department of Dermatology, Peshawar Institute of Medical Science

[6]House Officer, Hayatabad Medical Complex, Peshawar

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ABSTRACT

OBJECTIVES

Most obstructive airway disease medications are used via inhalers, and their proper use is significant for effectively treating these diseases. Most patients misuse it. However, some studies showed that many physicians also do not know the proper meter dose inhaler with the spacer technique. This study aimed to assess metered-dose inhalers with spacer technique among postgraduate trainee doctors.

METHODOLOGY

This cross-sectional study was carried out in the Khyber Teaching Hospital Peshawar. The total time was six months, from Dec 6 2020, to Jun 5 2021. Postgraduate trainee (PGT) doctors of either gender with an age range of 25 to 35 years were included in the study from different departments. Those with every use of inhalers were excluded from the study. Demographic details of PGTs, like age and gender, were recorded.

RESULTS

Among 96 patients, males were 85 (88.54%), and females were 11 (11.46%). The mean age was 30.02±1.84 years, and the mean training experience was 2.0521 ±0.89. Inhaler technique was Proper in 20 (20.83%), Improper in 51 (53.13%) and Poor in 25 (26.04%) doctors. Those with more training periods, pulmonology rotation, attended workshops on inhaler techniques and with relatives using inhalers were more acknowledged of proper meter dose inhalers (MDIs) with spacer technique.

CONCLUSION

Only one-fifth of the postgraduate trainees know proper MDIs techniques. The attendance of workshops and pulmonology rotation is encouraged to enhance the knowledge of physicians regarding MDIs techniques.

KEYWORDS: *MDIs, Postgraduate Trainee, Inhaler Technique, Spacer*

INTRODUCTION

Inhaled medication is an essential component of treatment in obstructive pulmonary disorder (asthma and COPD), and inhalers are the principal appliances for efficiently delivering these medications in these diseases. They concede that a high accumulation of the drugs in the lung decreases systemic bioavailability, reducing possible systemic adverse effects. Pressurized meter doses and dry powder inhalers are widely used for managing asthma and COPD.[1] Despite the novel advances in managing obstructive airway disease and understanding its pathophysiology, asthma and COPD remain a leading source of morbidity and serious economic load to patients and the community. Uncontrolled asthma and COPD share many important and similar causes, such as Underdiagnosis, improper treatment, less patient education about the disease's treatment, poor adherence, and improper inhaler device technique.[2] Most asthma and COPD patients use the inhaler device improperly.[3] Improper meter dose inhaler with spacer technique has been found as a most accepted and constant problem by many studies throughout the world.[4] Most patients, including adults and children, on inhaled medications, were found to have a high error rate of improper MDIs technique that decreases the bioavailability and efficacy of inhaled medication.[5] There are many causes for the Improper use of MDIs techniques, including the lack of adequately educating among patients about its use, the low understanding capacity of patients and not assessing MDIs techniques regularly to ensure their proper use.[6] Many studies show that the prescriber and the provider do not know the MDIs technique properly.[7] It can also be influenced by factors like old age, lack of education, and knowledge and judgment of the disease and its management.[8] Proper training for health care workers and demonstration of MDIs techniques to the diseased population is critical for disease management.[9] A systematic review by Plaza V et al. from 55 studies involving 6,304 healthcare professionals demonstrated that the inhaler technique was accurate only in 15.5% of the cases.[11] A study by Khan S et al. shows that only 25% of Pakistani doctors know MDIs techniques properly.[12] Proper meter dose

inhaler with spacer technique is a shared difficulty among obstructive airway disease patients and healthcare workers, which adds to uncontrolled disease. Similarly, in a study, Amin SA et al. observed that only 17.3% of the physician had appropriate inhaled therapy knowledge while in another study conducted in Spain, proper inhaler technique was reported only in 14.2% of the physician.[13,14] Prescribers understanding of meter dose inhaler techniques remains deprived all around and remains a common public health problem in the management of obstructive airway disease. In our setup, the treatment of obstructive airway disease with inhalers is prescribed mainly by postgraduate trainees. Knowing their level of understanding of inhaler use is essential. There is minimal data available about inhaler techniques among postgraduate trainees. The purpose of the study is to assess the level of proper MDIs technique with spacer among postgraduate trainees and, if found improper or poor, will help to improve effective educational strategies to ensure patient care and further research.

METHODOLOGY

This cross-sectional descriptive study was carried out in the Pulmonology unit, Khyber Teaching Hospital Peshawar, from Dec 6 2020 to Jun 5 2021. The sample size was calculated using the World health organization (WHO) calculator for sample size determination and was 96, keeping 14.2% prevalence of proper meter dose inhaler technique in Postgraduate trainees, 95% confidence interval and 7% margin of error.[14] A non-Probability consecutive sampling technique was used to collect the data. The study included all the Post Graduate Trainee doctors of both gender and age between 25 to 35 years from the Department of General Medicine and allied. Those with every use of inhalers due to obstructive lung disease. The metered-dose inhaler is an apparatus made of a pressurized metal cylindrical container that transports a calculated amount of medicine as smog to the patient's lung. A spacer (additionally called a holding chamber) is a gadget that makes utilizing an inhaler simpler and connects to the inhaler toward one side and the mouthpiece on the opposite end. The proper Metered-Dose Inhaler Technique was assessed based on the checklist.[15] The meter dose inhaler with the spacer technique is divided into three categories, i.e., Proper technique; performing all nine steps correctly, Improper technique; missing three or fewer steps, but steps one, step two, and step five were mandatory to perform correctly, and Poor technique; missing any four steps out of the nine steps. PGs were given a placebo MDI with a spacer to perform the technique step by step. A trained examiner categorized PGs into Proper, improper and poor metered-dose inhaler procedure groups based on scores. The data were analyzed in SPSS 22. Descriptive statistics were calculated for both qualitative and quantitative variables. Mean and standard deviation was calculated for quantitative variables like age and long periods of experience, while frequency and percentages were calculated for qualitative variables like gender and workshops/lectures. Metered-dose inhaler with spacer technique was stratified among training duration, workshop attended, having a family member on MDI with spacer and rotation of pulmonology to observe the results of modification. Post-stratification chi-square test was applied in which a P-value of 0.05 was considered significant. Results were introduced in tables.

RESULTS

Among 96 participants, 85 (88.54%) were male, and 11 (11.46%) were females. The mean age was 30.02±1.84 years ranging from 26 to 33 years. Trainees were divided into two groups based on their experience. 44 (45.83%) were found to have attended workshops on MDI with spacers, while 32 (33.33%) had close relatives using MDIs with spacers. Pulmonology Rotation was present in 59 (61.46%). These are outlined in Table 1. The meter dose inhaler technique was Proper in 20 (20.83%), Improper technique in 51 (53.13%) and Poor technique in 25 (26.04%) doctors (Table 2). The technique was stratified to training experience in years, relatives with MDIs use and rotation in the pulmonology ward and the results are presented in Table 3.

Table 1: Demographics, Training Experience and Exposure to MDIs with Spacer

Gender	
Male	85 (88.54%)
Female	11 (11.46%)
Mean age	30.02±1.84 years
Training Experience (Mean 2.0521 ±0.89 years)	
< 2 years	69 (71.88%)
> 2 years	27 (28.13%)
MDIs Workshop Attended	
Yes	44 (45.83%)
No	52 (54.17%)
Close Relatives using MDIs	
Yes	32 (33.33%)
No	64 (66.67%)
Pulmonology Rotation	
Yes	59 (61.46%)
No	37 (38.54%)

Table 2: Knowledge of Meter Inhaler Technique among Participants (96)

Meter Dose Inhaler Technique	f	%age
Proper technique	20	20.8
Improper technique	51	53.1
Poor technique	25	26.0

Table 3: Stratification of Inhalers Techniques with Different Factors

Factors	Meter Dose Inhaler Technique			Total	P-Value
	Proper	Improper	Poor		
Training experience					
<2 years	6	50	13	69	
	8.7%	72.5%	18.8%	100.0%	
>2 years	14	1	12	27	0.04
	51.9%	3.7%	44.4%	100.0%	
Relatives with MDI use					
Yes	17	12	3	32	
	53.1%	37.5%	9.4%	100.0%	
No	3	39	22	64	0.05
	4.7%	60.9%	34.4%	100.0%	
Pulmonology Rotation					
Yes	16	23	20	59	
	27.1%	39.0%	33.9%	100.0%	
No	4	28	5	37	0.002
	10.8%	75.7%	13.5%	100.0%	

DISCUSSION

The high prevalence of improper meter dose inhalers with the spacer method by patients has been clarified by a few components. First, Most medicinal services suppliers do not invest adequate energy in instructing the proper utilization of inhalers. The second issue is the absence of appraisal of individual methods basics to guarantee legitimate use. Consequently, they may give wrong directions to patients. Furthermore, the correct utilization of the instrument demonstrated could be impacted by individuals attributes, for example, age, education, and comprehension of obstructive airway disease medications.[16] In our study, many doctors demonstrated the inhaler technique to be improper or poor, especially when using a spacer. This was consistent with a study by Hilton et al.[17] where more than 500 doctors were evaluated for inhaler technique with spacer. The majority were not aware of the importance of using spacers. Interestingly the majority of these doctors were non-pulmonologists. A similar study on children with asthma using inhalers for disease control by Pedersen S et al. 18. In this study, more than 25 children diagnosed with asthma were enrolled and assessed for inhaler use techniques and then followed by their primary physician for assessment of technique. The majority of the children and their physicians, around 60%, were found to be using inhalers with either improper or poor inhaler techniques. Training the physician in inhaler technique is essential. In our study, good performance was based on either attending workshops on the inhaler technique or those who had rotations in pulmonology wards. It is demonstrated by Interiano B et al.[19] In his study, physicians were assessed for inhaler technique pre-and post-training workshops. He observed dramatic improvement in the inhaler technique of physicians after training. As we know that asthma is a genetic disease and runs in families. In our study, we observed that those doctors with family members using inhalers were more familiar with the inhaler technique than those who did not have any relatives using inhalers. The same findings were reported by Hanania NA et al.[20] in a study where they were checking the impact of either direct (medical knowledge) or indirect (relatives, friends with inhalers) on inhalers technique among junior doctors. They showed that doctors with knowledge of inhalers were more familiar with proper inhaler techniques than those with limited knowledge. The inhaler technique is the most crucial factor in managing obstructive airway diseases, and its proper technique depends on healthcare workers proper understanding and demonstration to the patients. Doctors and pharmacists proper training can bring fruitful results in treating this diseases.[21]

LIMITATIONS

Our study is restricted to only one centre, with fewer participants and very few female doctors enrolled. Also, the study is restricted to only Postgraduate trainees. It is recommended to conduct a large-scale study with multi-centre involvement and more participants, including doctors from all cadres.

CONCLUSION

Only one-fifth of the postgraduate trainees know the proper meter dose inhaler with the spacer technique. Those who have attended the lectures/workshops on inhalers, the presence of relatives on the inhaler and those with pulmonology rotation were significantly associated with correctly knowing the proper meter dose inhaler with spacer technique. We recommend that all the doctors undergo pulmonology rotations or at least attend the lecture or workshop on inhaler technique for proper prescribing and making the patients understand the meter dose inhaler with the spacer technique.

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CONTRIBUTORS

1. ***Tahir Iqbal*** – *Concept & Design; Data Acquisition; Data Analysis/Interpretation; Final Approval*
2. ***Qaisar Iqbal*** – *Data Acquisition; Data Analysis/Interpretation; Supervision*
3. ***Bahar Ali*** – *Data Acquisition; Drafting Manuscript; Supervision*
4. ***Raza Ullah*** – *Data Analysis/Interpretation; Critical Revision; Final Approval*
5. ***Shahida Naz*** – *Data Analysis/Interpretation; Drafting Manuscript; Critical Revision*
6. ***Haleema*** – *Drafting Manuscript; Critical Revision*