

ORIGINAL RESEARCH

To study the knowledge and practice of Nurses regarding inhaler in Bronchial asthma and Chronic obstructive pulmonary disease

Aaliya Mohi Ud Din Azad¹, Haamid Bashir², Gauri Godbole¹, Tejas Deshpande¹, Bharat Toshniwal¹

¹Department of Pulmonology, Smt. Kashibai Navale Medical College, Pune.

²Researcher and Medical Writer, Department of Biochemistry, GMC Srinagar.

Corresponding author

Aaliya Mohi Ud Din Azad

Department of Pulmonology, Smt. Kashibai Navale Medical College, Pune

Received: 17 June, 2023

Accepted: 22 July, 2023

ABSTRACT

Background: Studies in many countries revealed deficiencies in “Nurses” knowledge about the inhalation therapy in patients of Bronchial Asthma and Chronic obstructive pulmonary disease. Inhaler therapy is preferred treatment of these diseases and Metered Dose Inhaler are most commonly used in the treatment.

Aim and Objectives: To determine knowledge and practice of Nurses’ regarding inhaler technique.

Method: It is a cross sectional study. The questionnaire was designed which consisted of 20 questions for assessing the knowledge and practice related inhalational therapy.

Results: A total of 800 respondents completed the questionnaire. 800 participants were given questionnaire for the study. Out of which, 24 questionnaires were only partially filled and were thus excluded from the data analysis. Total 776 questionnaires were analysed. 576(73.8%) participants have heard the term inhalational therapy. 596(76.8 %) of nurse swere of the opinion that inhalers are habit forming. According to 651 (83.89 %) nurses inhaler causes weight gain and causes stunted growth. 526(67.78%) nurses responded that it is advised to start inhalation prior to pressing the canister. According to 451(58.11%) nurses spacer should not be held between the teeth. 381(49.09%) participants knew that we should shake the Metered Dose Inhaler (MDI) before use. 325(41.88%) nurses responded that dry-powder inhaler (DPI) should also be shaken before use.

Conclusion: The study reveals the poor status of knowledge of MDI and DPI technique among Nurses. Special educational programmes are required to address the treatment failure due to inadequate knowledge among ‘Nurses’.

Keywords: Inhalational therapy, knowledge, metered dose inhaler, healthcare worker, dry powder inhaler

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

A notable advancement in the treatment of bronchial obstructive illnesses, particularly asthma and chronic obstructive pulmonary disease (COPD), was the introduction of aerosol delivery systems. Nearly 70 years have passed since the first inhaler device (Medihaler-Epi™) went on sale, and with to advancements in technology during this time, modern inhalers provide significant benefits over earlier models. There are now a variety of inhalers available, which allows treatment to be customised for each patient, but it also means that doctors and other healthcare professionals who prescribe and demonstrate these devices must stay up to date on all of their features, potential drawbacks, and especially their inhalation technique. An individual who offers people, families, or communities systematic preventive, curative, promotional, or rehabilitative healthcare services is referred to as a healthcare

professional (HCP), particularly a nurse. All areas of healthcare, including medical, dentistry, midwifery, pharmacy, psychology, nursing, and allied health professionals, are open to HCP practise. About 300 million people worldwide today suffer from asthma, one of the most prevalent chronic diseases. The number of asthmatics in India is estimated to be between 15 and 20 million, with a frequency of between 10 and 15% among children aged 5 to 11. [1, 2] According to a Global Initiative for Asthma (GINA) report, increased urbanisation and pollution will cause an additional 100 million individuals to develop asthma by 2025. [3] Most asthma patients receive prescriptions for inhaled medicines. There are many other inhaler devices on the market, but the Metered Dose Inhaler (MDI) is the most widely used delivery method for those inhalational medications. [4] The effectiveness of inhaler therapy will largely depend on how the inhaler is utilised properly,

regardless of the kind of inhaler device that is employed. The appropriate inhaling method is mostly involved in appropriate use. According to earlier research, inappropriate usage of inhaler devices is linked to reduced medication delivery, decreased treatment compliance, uncontrolled asthma, and frequent trips to the emergency room [5, 6, 7, 8]. Thus effective delivery of medication leads to improvement the condition. Patients must receive the proper instruction in the proper self-administration of inhaled medication since their knowledge of proper inhaler technique is crucial to the treatment of pulmonary disorders. [9, 10]Asthma patients frequently misuse their metered-dose inhalers, which is linked to noncompliance and treatment failure. This may be due to a dearth of counselling by medical professionals (doctors, nurses, and chemists), and most paradoxically, the fact that many of them lack the necessary training. [11, 12, 13]. Hence knowledge of such delivery method is essential for all prescribers, dispensers and consumers. Drugs administered via inhalation have a number of advantages over other methods, but they also have certain drawbacks. The most critical of these is that patients must utilise them correctly in order for a small amount of medication to effectively reach the lower airways. Inhaler device misuse can result in therapeutic failure and subpar illness control [14-16].Because of this, teaching patients how to utilise their inhalation devices is seen as an essential component of non-pharmacological components of treatment in clinical practise guidelines for asthma and COPD [17-19]. The International Society for Aerosols in Medicine (ISAM) and the European Respiratory Society (ERS) recently created a consensus statement for the pulmonary physician that provides thorough instructions on how to utilise inhalation devices correctly [20]. Most patients who utilise inhaler devices don't handle them properly, according to several studies [21-26]. Additionally, it has been noted that the doctors and nurses who recommend or oversee the use of these inhalers possess inadequate knowledge and abilities in this area [27-30].Nurses are one of the major components of health care system of hospital and have an important role in educating and training of patients and also providing inhalational therapy for respiratory disorders.

Effectiveness of inhalational therapy depends on nurses' knowledge, attitude and experience and the way nurses educate patients [31].There are limited studies assessing nurses' knowledge on inhalational technique in India. Assessing the baseline knowledge of practitioner nurses on inhalational technique add value to develop educational intervention and training to update their knowledge and skills to improve patient's outcome. So, this study can provide database by assessing knowledgeand practices of inhalational therapy among nursing staff posted at tertiary care hospital. Hence, aim of study is to determine knowledge practice among nurses related to inhalation therapy.

MATERIALS AND METHODS

Study Design: The cross-sectional study was designed to assess the level of knowledge, attitudes, and preferences related to inhaled therapy among Nurses in Tertiary Care,We developed a questionnaire consisting of 20 questions. Participation in the survey was voluntary, individual, and anonymous. The questionnaires were distributed to nurses in all wards and emergency section. The survey was carried out between June2016 and October 2018. Study was approved by Institution ethical Committee

Questionnaire: The 20 item medical survey questionnaire (Table -1) was designed as per standard guidelines [32] to fill in 20 minute. This questionnaire consists of 20 questions for assessing level of knowledge and practices related to inhalational therapy among nurses. The questionnaire was designed in demographics and 20 direct questions. In demographics, age, gender, name, posting, education, speciality of respondents are recorded. The questionnaire was based on questions and reply was recorded in YES or No Format. This questionnaire was validated with the help of five experts in the field of respiratory medicine. They were asked to fill the questionnaire without any assistance. Written informed consent of the participants was taken, after which, the questionnaire was given to nurses. They were asked to fill the questionnaire without any assistance. Incompletely filled questionnaires were excluded from the final analysis

Table 1: Questionnaire to Nurses for Inhalation therapy.

DEMOGRAPHICS	
Name:	Age:
Gender:	Occupation:
Education	Posting (Ward/Emergency):
Speciality	Contact Number
QUESTIONNAIRE	
1. Have you heard the term Inhalers?	YES or NO
2. Inhalers are habit forming?	YES or NO
3. Inhalers are very strong .They are used as a last resort?	YES or NO
4. Do inhalers causes weight gain?	YES or NO

5. Do inhalers causes stunted growth in children?	YES or NO
6. Inhaler and spacer should be cleaned with hot water?	YES or NO
7. Should we put canister in water to see whether it floats in water to check whether it contains drug in it or not?	YES or NO
8. Does spacers increases the amount of medicine reaching the lung?	YES or NO
9. Is amount of medicine in inhalers is quite less as compared to nebulisers?	YES or NO
10. Does spacers decrease the amount of medicine deposition in mouth?	YES or NO
11. Is inhaler less effective then nebulisers?	YES or NO
12. Should we shake the inhaler before use?	YES or NO
13. Should we breath-out fully through mouth before putting mouthpiece fully into our mouth?	YES or NO
14. Should we hold the breath for 10 seconds after puff?	YES or NO
15. Is it better to use spacer with MDI?	YES or NO
16. Spacer should not behold between the teeth?	YES or NO
17. Should we wait for 5 seconds before taking the next puff?	YES or NO
18. Is it good to inhale too early before pressing the canister?	YES or NO
19. Can we breath out through a dpi because the moisture of a breath can gum up the mechanism and increases the effectiveness?	YES or NO
20. Is it necessary to shake the DPI before use?	YES or NO
MDI, metered-dose inhaler; DPI, dry-powder inhaler	

STASTICAL ANALYSIS

Data was entered on MS Excel Sheet 2013. SPSS Package software stastical analysis tool 12.1 (Chicago,IL) was used for stastical analysis. Data collected in questionnaire was analysed using suitable statistical tests like Chi-square and Student T-test. Data were expressed as a number as well as percentages of participants.

RESULTS

Total 800 questionnaires were collected from nurses who participated in the study. 24 questionnaires were incompletely filled which were not involved in the data analysis. Finally, 776 questionnaires were analysed. Table -2 and figure 1 displays the responses

from nurses regarding inhalation therapy and there findings are as under:-489(63.01 %) were female and 287 (36.98%) were male .576(74.22%) have heard the term inhalational therapy.596(76.80 %)responded that inhalers are habit forming.651(83.89 %) nurses responded that inhaler causes weight gain and stunted growth.526(67.78%) nurses responded that it is advisable to start inhalation before pressing the canister .According to 451(58.11%) nurses spacer should not be hold between teeth.381(49.9 %) of the participants knew that we should shake the MDI before use.325(41.88 %) nurses responded that DPI should also be shaken before use.

Characteristics	Total Sample/ Percentage N=800	Nurses responded YES ONLY
Age, Mean (SD)	Men=43.5 (9.6±5) Woman= 35.7 (10.5±5)	-
Men/Women , %	Men=287, Woman = 489 36.98/63.01	-
Have you heard the term Inhalers?	74.22 %	576

Inhalers are habit forming?	76.80 %	596
Inhalers cause weight gain and stunted growth	83.89 %	651
Good to inhale too early before pressing canister.	67.78 %	526
Spacer should not be hold between teeth	58.11 %	451
Shake the MDI before use	49.09 %	381
DPI should be shaken before use	41.88 %	325

Table: 2 Results from the Questionnaire for the whole sample and each nursing speciality.

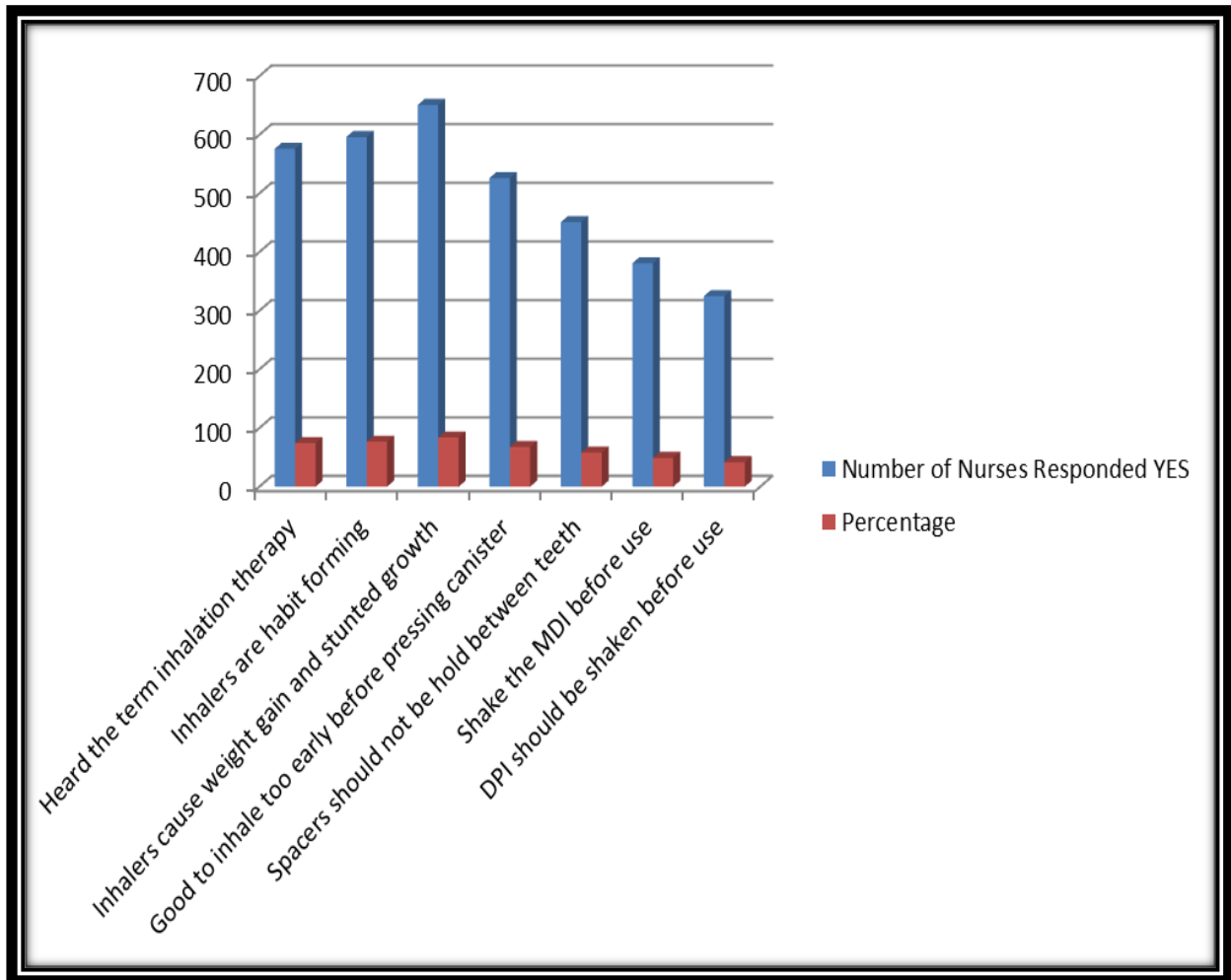


Figure 1: Histogram depicting response from nurses about the inhalation therapy.

Out of 800 study population, 150 nurses were randomly selected for MDI demonstration session practically. Female participants were more (80%). Figure 2: showed the MDI demonstration before and after educational session. Among the 6 essential steps, Breath out slowly and Hold breath for 10–20 sec were incorrectly performed steps by 90% and 87% subjects respectively, while 92% nurses failed to hold inhaler in upright position in pre-test session. None of the nurses demonstrated all steps correctly before educational session. There was statistically significant improvement MDI use after educational session.

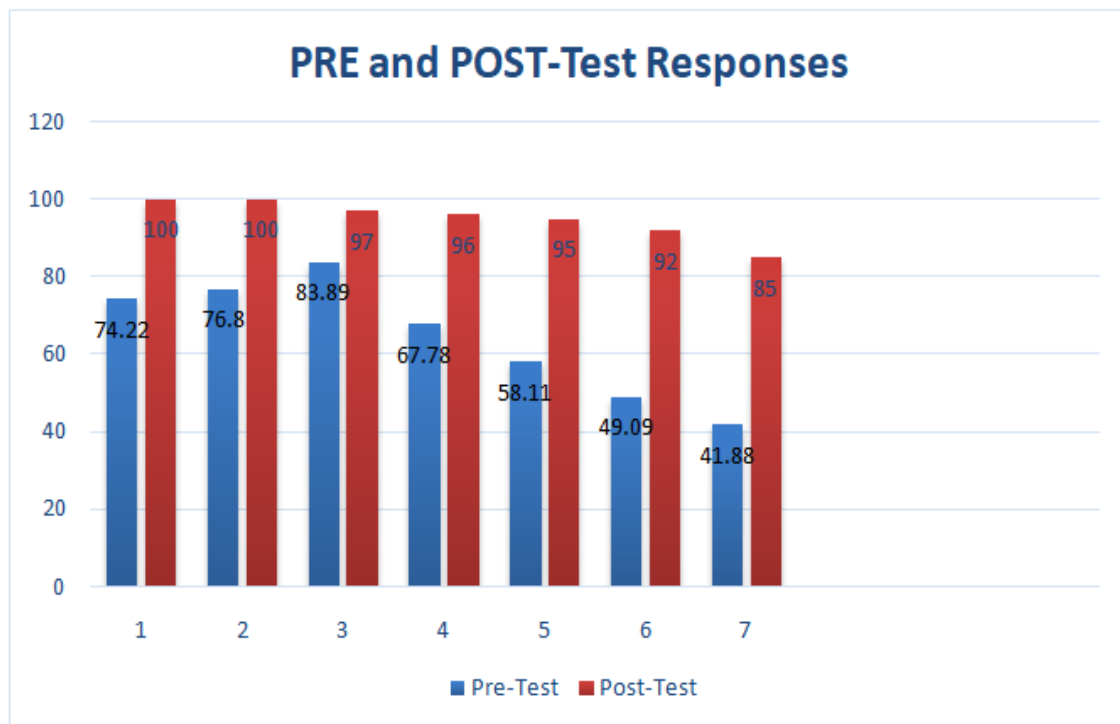


Figure: 2 Histogram depicting information recorded by nurses about Inhalation therapy after Pre and Post-test.

DISCUSSION

A very large percentage of nurses who frequently demonstrates inhaler devices to patients in hospital setting lacked the necessary understanding of inhaled therapy and related educational features. Only 24.2% of the sample were found to have appropriate knowledge of inhaled therapy according to the composite variable, general inhaled therapy knowledge, which combined the responses to the four related questions on the questionnaire. Poor asthma control /COPD has repeatedly been shown in a number of studies [33-35] and it has been suggested that one cause could be the inappropriate use of inhalers. In a recent prospective study involving 1664 (COPD and asthma) patients done by Melani et al [36] observed a strong association between increased unscheduled healthcare resource use and poor clinical control with an inappropriate use of their inhaler devices. Fortuna et al. reported [37] found that although 76% of 1363 patients with asthma were treated with a combination of inhaled corticosteroid plus a long acting beta agonist, 44% of the total sample had suffered a moderate to severe asthma exacerbation in the previous year. As the pharmacologic treatment prescribed follows present guidelines, issues such as incorrect inhalation techniques could be involved in these unexpectedly low results. Lack of proper knowledge and practice of inhalation therapy among the nurses is in agreement with other population studies, same is reported by our study. Nursing staff are the key component of patients' education in the health care system of hospital. Lack of adequate knowledge in nurses leads

to increased risks of exacerbation to patients and may influence patient's outcome. In the present study nurses age range was from 25 to 56 years old. This shows that in our study both new inexperienced as well as senior experienced nursing staff was available for patient care. Many nurses were having diploma and degree educational qualification in speciality. 596 (76.8 %) of nurses responded that inhalers are habit forming which is nothing but a myth regarding inhalers. 576 (74.22%) have heard the term inhalational therapy. This shows that this terminology is quite commonly used at tertiary care hospital level. 652 (83.89 %) nurses respond that inhaler causes weight gain and stunted growth. These findings revealed that total knowledge about side effects was at an unsatisfactory level. The reasons might be due to inadequate education about the side effects amongst nurses. 381 (49.09%) nurses considered inhalers should be shaken before inhalation which is the most important step for correct pMDI inhalation. 526 (67.78 %) nurses responded it is good to inhale too early before pressing the canister. 325 (41.88%) nurses responded that DPI should be shaken before use. According to 451 (58.11 %) nurses, spacer should not be held between teeth. Inhaled therapy is effective only when the inhaled drug particles reach the lungs where they can demonstrate their effects; which can only be ensured by regular training programme in the form of demonstrating the steps or by workshops. The findings of our study revealed that total knowledge about steps for correct inhalation was at an unsatisfactory level. Various other studies on nurses have also reported similar results about demonstration

of these important steps. This finding is of particular clinical relevance given the large volume of chronic respiratory patients (asthma and COPD) attended Chest medicine physicians in routine care and the emergency room when patients present exacerbations. Specific educational policies should be addressed to these medical groups. Given our failure to improve general inhalation therapy knowledge with traditional educational methods, different strategies should be devised. These should include inhalation therapy topics to be addressed during residency training and in recertification programs. One of the potential weaknesses of this study could be related to the method used. The data are based solely on the results of a survey on self-perceived knowledge and may not reflect respondents' behavior in actual clinical practice. Our studies have some limitation regarding less sample size and more responses are need to be added in further studies. Further studies are recommended with large sample size in nurses and physicians treating these patients.

CONCLUSION

This study was conducted to assess the knowledge of in haler sand correct method of their use among nurses. We were able to conclude that there exists a considerable gap in the present and expected knowledge of inhaler therapy amongst the nursing professionals. This gap can be easily overcome by regular teaching programs and workshops in the place of work. A basic level of knowledge of inhaler therapy is extremely essential for the nursing staff of any hospital dealing with respiratory cases as it has a considerable effect on the training of patients for inhaler therapy and in turn both directly and indirectly affect the prognosis of the disease.

FUNDING

Nil

CONFLICT OF INTEREST

Nil

ACKNOWLEDGEMENT

Thanks to all Nurses and staff of Department of Pulmonology and Medical College for participating voluntarily in this Study.

REFERENCES

1. WHO. Bronchial Asthma fact sheets. Available at <http://www.who.int/mediacentre/factsheets/fs206/en/> last assessed on 12-01-2016 at 1pm.
2. Peter JB. Asthma. In: Longo D L, Fauci A S, Kasper D L, Hauser S L, Jameson J L, Loscalzo J editors. Harrison's Principles of Internal Medicine. 18 edition. New Delhi, McGraw Hill publication; 2012. Chap. 254. Page no. 2102-2115.
3. Sodhi R, Prasad R, Kushwaha RAS, Surya K, Verma SK, Garg R et al. A study to know the knowledge, attitude, and practices of patients of bronchial asthma. *Int J Med Public Health* 2013; 3:159-162.
4. Kishore PV, Palaian S, Alam K, Shankar PR, Bajracharya B, Den Ende JV et al. A correct use of a metered dose inhaler: a prospective interventional study among healthcare professionals in a nepalese teaching hospital. *J ClinDiagn Res.* 2008; 2:720-725.
5. Melani AS, Bonavia M, Cilenti V, Cinti C, Lodi M, Martucci P, et al. Inhaler mishandling remains common in real life and is associated with reduced disease control. *Respir Med.* 2011, 105(6):930-938.
6. Molimard M, Le Gros V: Impact of patient-related factors on asthma control. *J Asthma.* 2008, 45(2):109-113.
7. Coelho AC, Souza-Machado A, Leite M, Almeida P, Castro L, Cruz CS, et al. Use of inhaler devices and asthma control in severe asthma patients at a referral center in the city of Salvador, Brazil. *J Bras Pneumol.* 2011, 37(6):720-728.
8. Lavorini F, Magnan A, Dubus JC, Voshaar T, Corbetta L, Broeders M, et al. Effect of incorrect use of dry powder inhalers on management of patients with asthma and COPD. *RespirMed.* 2008, 102(4):593-604.
9. Parvin IA, Ahmad SA, Islam MN. Knowledge about inhaler use among the chronic asthma patients in selected hospitals. *Bangladesh Medical Research Council Bulletin.* 2011; 37(2):47-50.
10. Small M, Anderson P, Vickers A, Kay S, Fermer S. Importance of inhaler-device satisfaction in asthma treatment: real-world observations of physician-observed compliance and clinical/patient-reported outcomes. *AdvTher.* 2011 Mar; 28(3):202-212.
11. Basheti IA, Armour CL, Reddel HK, Bosnic-Anticevich SZ. Long-term maintenance of pharmacists' inhaler technique demonstration skills. *Am J Pharm Educ.* 2009 Apr 7; 73(2): article 32.
12. Zeraati E, Nadi F. Evaluation of the metered-dose inhaler technique among healthcare providers. *ActaMedicalIranica.* 2005; 43(4):268-272.
13. Dudyala NS, Amarendra MA, Subbarao PV. The use of metered dose inhalers: where are we? *Journal of Clinical and Diagnostic Research.* 2012; 6:612-614.
14. Lindgren S, Bake B, and Larsson S: Clinical consequences of inadequate inhalation technique in asthma therapy. *EurJ Respir Dis.* 1987;70:93-98.
15. Giraud V, and Roche N: Misuse of corticosteroid metereddose inhaler is associated with decreased asthma stability. *EurRespir J.* 2002;19:246-265.
16. Barnes PJ: Achieving asthma control. *Curr Med Res Opin.* 2005;21(Suppl 4):S5-S9.
17. GINA. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention NHLBI/WHO Workshop Report. 2009. Available from: <http://www.ginasthma.com>.
18. GOLD: NHLBI/WHO: Gobal Initiative for Chronic Obstructive Lung Disease. NHLBI/WHO workshop report. National Institutes of Health, National Heart, Lung and Blood Institute. Publication Number 2701. 2010. Available from: <http://www.goldcopd.com>.
19. GEMA: Spanish Guideline on the Management of Asthma. *Arch Bronconeumol.* 2009;45(Supl. 7):2-35. Available from <http://www.gemasma.com>.
20. Laube BL, Janssens HM, de Jongh FH, Devadason SG, Dhand R, Diot P, Everard ML, Horvath I, Navalesi P, Voshaar T, and Chrystyn H: ERS/ISAM TASK FORCE REPORT: what the pulmonary specialist should know about the new inhalation therapies. *Eur Respir J.* 2011;37:1308-1331.

21. De Blaquiere P, Christensen DB, Carter WB, and Martin TR: Use and misuse of metered-dose inhalers by patients with chronic lung disease. *Am Rev Respir Dis.* 1989;140:910–916.
22. Thompson J, Irvine T, Grathwohl K, and Roth B: Misuse of metered-dose inhalers in hospitalized patients. *Chest.* 1994;105:715–717.
23. Goodman DE, Israel E, Rosenberg M, Johnson R, Weiss ST, and Drazen JM: The influence of age, diagnosis, and gender on proper use of metered-dose inhalers. *Am J Respir Crit Care Med.* 1994;150:1256–1261.
24. Van der Palen J, Klein JJ, Kerkhoff AHM, and Van der Herwaarden CLA: Evaluation of the effectiveness of four different inhalers in patients with chronic obstructive pulmonary disease. *Thorax.* 1995;50:1183-7.
25. Van Beerendonk I, Mesters I, Mudde AN, and Tan TD: Assessment of the inhalation technique in outpatients with asthma or chronic obstructive pulmonary disease using a metered-dose inhaler or dry powder device. *J Asthma.* 1998;35:273–279.
26. Molimard M, Raheison C, Lignot S, Depont F, Abouelfath A, and Moore N: Assessment of handling of inhaler devices in real life: an observational study in 3811 patients in primary care. *J Aerosol Med.* 2003;16:249–254.
27. Kelling JS, Strhol KP, Smith RL, and Altose MD: Physician knowledge in the use of canister nebulizers. *Chest.* 1983;83: 612–614.
28. Hanania NA, Wittman R, Kesten S, and Chapman KR: Medical personnel's knowledge of and ability to use inhaling devices. *Chest.* 1994;105:111–116.
29. Self TH, Arnold LB, Czosnowski LM, Swanson JM, and Swanson H: Inadequate skill of healthcare professionals in using asthma inhalation devices. *J Asthma.* 2007;44:593–598.
30. Kim SH, Kwak HJ, Kim TB, Chang YS, Jeong JW, Kim CW, Yoon HJ, and Jee YK: Inappropriate techniques used by internal medicine residents with three kinds of inhalers (a metered dose inhaler, Diskus, and Turbuhaler): changes after a single teaching session. *J Asthma.* 2009;46:944–950.
31. Plaza V, Sanchis J, Roura P, Molina J, Calle M, Quirce S, et al. Physicians' knowledge of inhaler devices and inhalation techniques remains poor in Spain. *J Aerosol Med Pulm Drug Delivery.* 2012;25:16-22.
32. Petra M Boynton. Selecting, designing, and developing your questionnaire. *BMJ* 2004; 328.
33. Prieto L, Badiola C, Villa JR, Plaza V, Molina J, Cimas E, on behalf of the ASMAP1 investigator group: Asthma control: do patients' and physicians' opinions fit in with patients' asthma control status? *J Asthma.* 2007;44 :461–467.
34. Chapman KR, Boulet LP, Rea RM, and Franssen E: Suboptimal asthma control: prevalence, detection and consequences in general practice. *Eur Respir J.* 2008;31:320–325.
35. Demoly P, Paggiaro PL, Plaza V, Bolge SC, Kannan H, Sohler B, and Adamek L: Prevalence of asthma control among adults in France, Germany, Italy, Spain and U.K. *EurRespir Rev.* 2009;18:105–112.
36. Melani AS, Bonavia M, Cilenti V, et al Cinti C, Lodi M, Martucci P, Serra M, Scichilone N, Sestini P, Aliani M, Neri M; Gruppo Educazionale AssociazioneItaliana PneumologiOspedalieri: Inhaler mishandling remains common in real life and is associated with reduced disease control. *Respir Med.* 2011;105:930–938.
37. Fortuna A, Plaza V, Olaguibel JM, Quirce S, Molina J, and Julia´ B: ACQ cut-points and asthma control. Measuring Asthma GINA Control. (MAGIC study). *Eur Respir J.* 2010; 36:E246.