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ORIGINAL ARTICLE

Do Egyptian patients use their inhalers correctly? A checklist auditing for inhalation devices usage techniques



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KEYWORDS

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Abstract *Background:* Handling of inhaler devices in actual Egyptian pulmonary clinical care practice is not well studied. This study aims at performing checklist audit regarding the Egyptian patients' usage technique of the inhalation devices.

Methods: Asthma or chronic obstructive pulmonary disease (COPD) patients using any type of inhaler devices in 9 various health services in 3 different Egyptian governorates were recruited during the period between April 2011 and June 2012. Patients were asked to demonstrate their inhaler techniques and errors were recorded against inhaler-specific checklists. Then patients were interviewed regarding their knowledge of inhalation devices.

Results: We included 533 patients (71.9% asthma and 28.1% COPD). Pressurized metered dose inhalers (MDI), Diskus, aerolizer/handihaler and turbuhaler were used by 70.5%, 10.5%, 14.1% and 4.9% of patients, respectively. More than 99% of asthma and COPD patients claimed to know how to use the inhaled devices. One error at least in all and essential inhalation steps was committed in 91.7% and 35.8% of the patients, respectively. Among essential steps, Diskus inhaler had the lowest rate of incorrect handling (7.1%) and MDI had the highest rate of incorrect handling (44.7%). MDI use was associated with a significant higher rate of incorrect technique than other devices. COPD group patients committed non-significant more errors than did the asthma group patients when using MDI or aerolizer/handihaler.

Conclusions: Improper inhaler technique is common among our patients. Discrepancy between patients understanding and actual usage technique of different inhalation devices was noted.

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Background

Nowadays the most common chronic airway diseases, such as asthma and chronic obstructive pulmonary disease (COPD), are mainly treated by inhaled therapy [1–3]. Inhaled medications

are administered directly to the airways, providing a higher local concentration and a lower risk of systemic side effects [1]. Unfortunately the physician often simply prescribes inhaler therapy, taking for granted that the patient will carry it out properly, whereas the majority of patients do not realize that the efficacy of inhaler therapy often depends on whether it is carried out correctly [4].

It is most important that physicians choose the technique best suited to each patient [5]. Studies have shown that at least half of all adult patients are probably obtaining little or no benefit from conventional pressurized inhalers because of incorrect inhalation technique [6,7]. While, others announce that only one in five patients uses their inhaler properly [8]. Teaching patients how to use devices appropriately can be crucial. Patient technique is influenced by factors such as patient experience, education, physical ability and effective teaching of technique [9].

Inhalation device had been introduced in Egypt since a long period and in the recent years a new variety of devices are available in the market, but still limited information in the literature is available about the patients' correct usage technique. Thus, this study aims at performing checklist audit regarding the Egyptian patients' usage technique of the inhalation devices.

Methods

This prospective observational study was conducted in 3 different Egyptian governorates (Cairo, Dakahlia and Qena) and 9 various health services including 5 private clinics in Cairo and 4 state funded services: one university hospital (Ain Shams University Hospitals, Cairo), 3 tertiary care hospitals [Sherbin Chest Hospital {Dakahlia}, Shobrahour Chest Hospital {Dakahlia}, Qena Chest Hospital {Qena}], in an attempt to present various socioeconomic and health care sectors in Egypt.

Consecutive adult (≥ 18 year old) stable patients receiving service in the above mentioned health services during the period between April 2011 and June 2012 and using any type of inhaler devices for at least one month were included in the study. Study population was confined to asthma and COPD patients as they represent nearly all patients who used inhaler devices during study period. The patients were defined of having asthma or COPD according to the Global Initiative for Asthma (GINA) management [2]. and the Global initiative for Chronic Obstructive Lung Disease (GOLD) management [1], respectively.

Initially, the use of inhalation devices was evaluated in a practical manner, by asking patients to demonstrate their inhaler technique with a placebo device. A trained pulmonary physician acquainted with proper use of inhaler devices and on how to score each step of the inhalation process audited the patient inhalation technique. The procedure was assessed through filling out a checklists form containing all steps for correct usage of different inhalation devices that has been validated in the literature for checking the use of such devices (Tables 3–6) [10–13]. For each inhaler certain steps were considered necessary for optimal delivery of the active drug into the lungs, were termed "essential" inhalations steps (see foot notes of Tables 3–6).

Subsequently, participants were interviewed and demographic characteristics (age, occupation, diagnosis, treating

Table 1 Demographics and characteristics of the patients, inhaled devices and physicians.

Age, # (years)	49.6 \pm 14.2 (18–83)
Sex, (M/F) (%)	52.6/47.4
Duration of usage in days#	2015.4 \pm 2234.2 (30–15330)
<i>Diagnosis (%)</i>	
Asthma	71.9
COPD	28.1
<i>Type of practice (%)</i>	
Private	52.7
OPC state funded hospital	37
Inpatient state funded hospital	10.3
<i>Type of device</i>	
MDI	376 (70.5%)
Diskus	56 (10.5%)
Aerolizer/handihaler	75 (14.1%)
Turbuhaler	26 (4.9%)
<i>Treating physician (%)</i>	
Pulmonologist	91.7
GP	6.2
Internist	1.7
Allergologist	0.4

COPD, chronic obstructive pulmonary disease; GP, general practitioner; MDI, metered dose inhaler; OPC, outpatient clinic.

Data in parentheses represent range.

physician specialty, type and place of inhalation device prescribed as well as the duration of its usage) were recorded as well as questionnaires regarding patient knowledge of inhalation devices were completed (Table 2).

Spacers are seldom used in study populations and therefore were not included in the study. Some patients were using more than one type; in these cases the study was confined to one device only.

Informed consent was obtained and the ethical committee of the department of Chest Diseases, Ain Shams University approved the study.

Statistical analysis

Analyses of all checklist items, essential checklist items only and all essential checklist items correct for each of the inhalers used are presented. The total score for each inhaler was calculated by dividing the number of items correctly completed by the total number of items tested and the result was expressed as a percentage. Incorrect handling among different inhaler devices was compared with Mann–Whitney test. Also, incorrect handling committed by asthma patients and by the COPD patients was compared for each device separately using the Kruskal–Wallis test. Regarding the questionnaire, the responses obtained in asthma patients were compared to those obtained in COPD patients using Mann–Whitney test. Also, the responses obtained among different inhaler devices were compared with Kruskal–Wallis test. The mean error of steps was compared among the different devices using the Kruskal–Wallis test and among each pair of devices using Mann–Whitney test. Pearson correlation coefficient was used to test the correlation between the incorrect use of each device and the answers of the significant questions regarding the

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