

The problem with critical and non-critical inhaler errors

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Summary

Incorrect use of inhalers is common in real life despite advances in inhaler technology. Inhaler misuse, a consequence of device-related and/or patient-related factors, is associated with worsened health outcomes poorer disease control and increased use of health-care resources. The errors in the use of inhalers can be identified as 'critical' (sometimes defined as 'essential' or 'crucial') errors, which are likely to significantly impair the delivery of adequate medication to the lungs, and 'non-critical' errors, which are likely to result in a reduced amount of drug reaching the lungs compared with that attained using the correct technique. However, there is a wide variation in how critical errors are defined. Given the negative impact diminished disease outcomes impose on resource use, correct inhaler technique (mastery) is fundamental for effective therapy, and that inhaler device type and mastery play important roles in improving adherence, clinical outcomes, quality of life, and use of healthcare resources. There is a need for a consensus on defining critical and non-critical errors.

Key Message

The multitude of definitions of inhaler "errors" indicates that there is an urgent need for a consensus in the way in which critical (and non-critical) inhaler errors are defined.

Main body

Inhaled drug delivery is the cornerstone treatment for asthma and chronic obstructive pulmonary disease (COPD). In the majority of patients, inhaled therapy can be given via hand-held inhaler devices such as pressurised metered dose inhalers (pMDIs) or dry powder inhalers (DPIs). However, the use of inhaler devices can be challenging, potentially leading to errors in handling that can reduce drug delivery to the lungs and effectiveness of treatment. Indeed, mastering an inhaler device involves correct preparation and handling of the device before inhalation, and an optimal inhalation technique; an error in any step of this process may lead to inadequate drug delivery to the lungs. There is no one 'perfect device' and several studies have shown that inhaler technique errors made by patients with asthma and COPD are common in real life with both pMDIs and DPIs despite advances in inhaler device technology. In a cross-sectional study of more than 3,500 asthma patients, inhaler errors were found to be common and not exclusive to a specific type of inhaler (Figure 1)¹. Specifically, insufficient inspiratory effort with both the Turbuhaler and Diskus inhalers was associated with an increased likelihood of uncontrolled asthma and exacerbation. By contrast, a lack of knowledge, incorrect preparation, timing or inhalation, incorrect head position and hand-breath dis-coordination with pMDIs was associated with an increased likelihood of uncontrolled asthma, but not exacerbation.¹ Data from a real-life study of almost 3,000 COPD patients have indicated that inhaler handling errors are also frequent in patients with COPD (only 25% of whom did not make any error) and are associated with an increased rate of severe COPD exacerbations². The societal and health-economic burden of poor inhaler technique is increasingly being recognised³. Worryingly, in three countries (the UK, Spain and Sweden) poor inhaler technique accounted for over €750 million in direct and indirect costs in 2015, for the two most commonly used DPIs³. These cost data, together with the increasing prevalence of obstructive lung diseases and restriction in healthcare spending is propagating the imperative need for correct and effective inhaler use. Recently, a systematic review was conducted to define 'critical' errors and their impact on health outcomes and resource in asthma and COPD⁴. Astonishingly, about 300 different descriptions of critical inhaler errors were observed. Even for the same inhaler device type, different terminology was used between different study authors to describe the same inhaler error, thus increasing the confusion observed in clinical practice concerning best inhaler practice and the limitations in determining associations with inhaler errors⁴. Furthermore, with the variety of definitions identified, difficulties arise in determining whether a particular inhaler type is inherently more vulnerable to critical inhaler errors.

Taken in the context of a systematic review which found that inhaler use has not improved among patients over the past 40 years (1975–2014)⁵, these results should collectively serve as an urgent call to action for clinicians to ensure that they include patient education as an essential component of disease management. Overcoming problems with the use of inhalers starts with the prescriber choosing the most appropriate device for the individual patient^{26,27}. This must be followed by educating and training the patient in the use of the device (alongside more general asthma and COPD education and training). A system of monitoring should be in place, along with ongoing training in order to maintain an appropriate level of patient skill. The multitude of definitions cited within the literature indicates that there is an urgent need for a consensus in the way in which critical (and non-critical) inhaler errors are defined. There is a real need for an independent international panel of inhalation experts to collectively determine, through evidence and consensus, the definitions of critical and non-critical inhaler errors. If done for each device type, this would demystify the current confusion within the respiratory community. Hopefully, future studies will classify individual errors into categories such as inhalation manoeuvre, dose preparation, inhaler handling, device-specific

or generic, in order to make comparison and analysis simpler in order to ultimately help healthcare professionals help their patients.

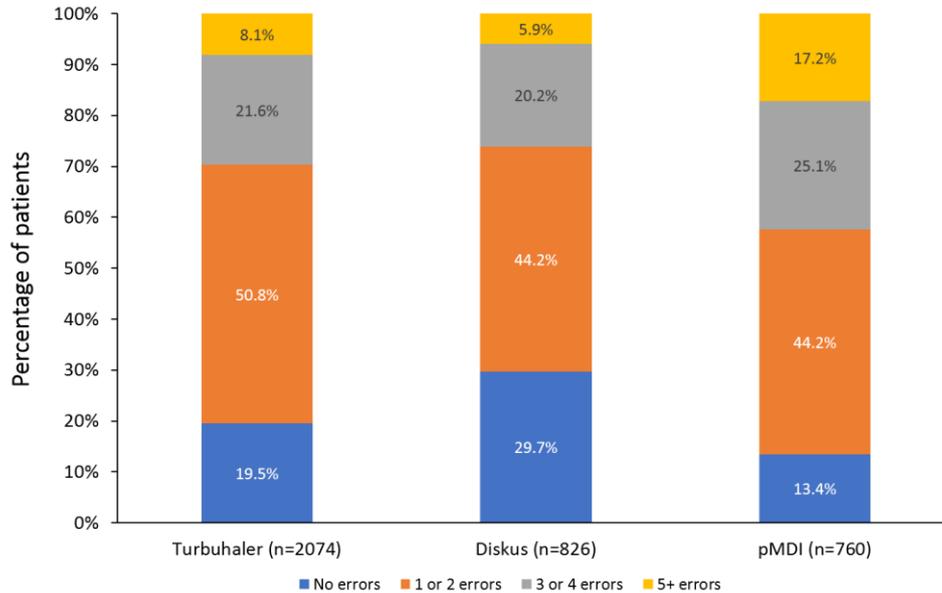


Figure 1 - Percentage of patients making errors by device type in the CRITIKAL study

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