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Understanding the Gap Between Prescribed and Actual Inhaler Use Among Adults Receiving Long-Term Treatment for Asthma

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Abstract

Inhalers are the key tool in the management of chronic respiratory disease asthma, but it is necessary to make sure about the correct use of inhalers to achieve successful treatment and prevent exacerbations. But unfortunately, in spite of the fact that inhalation drugs are prescribed to patients as a therapeutic approach in asthma, there is usually some gap between recommended use of inhalers and inhalation behaviors of patients. It is important to learn about the reasons of this gap since it will help to cope with the problem of non-adherence to treatment and make the treatment more effective. The aim of this research is to identify the differences between prescribed and real inhaler use in the case of asthma treatment among adult patients, focusing on such factors as adherence to medication, proper inhalation technique, barriers, and perceptions. It has been highlighted that it is essential to realize that adherence involves not only taking the prescribed medicines but also employing the appropriate inhalation technique and sticking to the appropriate treatment plan. The discrepancy between the prescribed and actual inhaler usage might explain inadequate asthma control, increased symptoms, and unnecessary utilization of medical services. This research stressed the importance of personalized patient education, evaluation of the inhaler technique, improved communication between clinicians and patients, and adherence monitoring. Having in mind the behavioral and psychological obstacles within the patient-centered approach, one can avoid the discrepancy between the prescribed and actual inhaler usage.

Keywords: Asthma Management, Inhaler Use, Medication Adherence, Inhaler Technique, Long-Term Treatment, Patient-Related Barriers, Respiratory Health.

1 INTRODUCTION

1.1 Background of Asthma and Long-Term Treatment

Asthma is a respiratory disease caused by inflammation, whose symptoms consist of wheezing, difficulty breathing, chest tightness, and coughing. Such a condition can be diagnosed in patients from various age groups and requires constant treatment to keep its symptoms under control and prevent exacerbations. Concerning the therapy of adult patients, inhaled medications play a significant role in the treatment of airway inflammation and improving lung function. In this case, one of the most popular

medications is inhaled corticosteroids (ICS), which are prescribed to patients for controlling the inflammation and decreasing the number of asthma attacks. Not only does the effectiveness of the therapy depend on the selected medication, but also on the patients' adherence and correct use of the inhaler. This has already been discussed in the literature (Cochrane et al., 2000).

The control of asthma also requires patient behavior concerning how they handle treatment on a daily basis. Even though physicians prescribe inhalers depending on the personal condition, the fact is that they misuse them. Factors such as the intricacy of the instrument, the number of times medication is taken, and the views of the treatment process may be some of the reasons affecting inhaler usage. Research studies have indicated that particular factors such as those concerning treatment, behavior, and patients are vital for inhaler adherence among asthmatic patients (Dima et al., 2015).

1.2 Importance of Inhaler Therapy in Asthma Management

Inhalers used for the treatment of asthma are extremely important due to their ability to provide a direct effect on the respiratory system without creating any systemic side effects. Long-term treatment with ICS helps to control the inflammatory process in the airways and prevent the development of possible complications due to asthma. However, this strength might be weakened due to irregularities in the treatment process, its interruption, and the absence of a strict schedule. According to the results of the systematic review carried out in the Cochrane library, the use of various interventions aimed at improving adherence to inhaled corticosteroid treatment is very effective (Normansell et al., 2017). Proper inhalation technique is another essential aspect that is required to achieve the proper effect from the use of the medication. Mistakes in the use of the inhaler might result in the insufficient absorption of the drug even in the case of regularity in the intake of the medication. Patient education in inhalation technique is extremely important.

1.3 Research Problem, Objectives, and Significance of the Study

However, despite having found the inhalable drugs, the recommendations on the application of the inhalers, as well as having a prescription for the inhaler use, it is still not easy to ensure that the adult population will use the inhalers properly. Prescribed use of inhalers is a kind of inhaler use recommended by medical specialists. Actual use of inhalers stands for a particular way patients use their inhalers. There may be some differences in terms of frequency of the dose, duration of the treatment, and methods of use of inhalers, which lead to improper use of the drug, inadequate control over the condition, and persistence of symptoms. The aim of the research is to find out how much difference there is between prescribed inhalers regimen and actual inhaler use of adult patients undergoing the asthma treatment. It is also necessary to measure the patients' adherence, inhalation technique errors, and patient barriers, including attitude towards the therapy and the medicine.

2 REVIEW OF LITERATURE

2.1 Prescribed Inhaler Therapy and Patterns of Actual Inhaler Use

The prescription for inhalers depends on several different things, which include the level of asthma, the frequency of symptoms, and the response to previous medications. Nevertheless, recommended prescriptions do not always coincide with the patient's medication practice. Patients can skip doses, use the drugs at a different frequency, or resort to using inhalers only in case of asthma attacks. The research about asthma control in clinical practice has revealed factors such as adherence, inhaler technique, patients' understanding, and communication with healthcare providers. This means that asthma control cannot rely solely on the prescription; the actual medication use has to be taken into account too (Haughney et al., 2008). Patients' understanding of their treatment and their capability to follow consistent practice affect the actual use of inhalers. Patients can consistently adhere to the prescription; however, some of them have intermittent adherence or modify their medication usage intentionally. These cases are hard to detect during routine consultations since the patient's memory regarding usage might be inaccurate. The systematic review and meta-analysis of inhaler adherence in adult patients with asthma focused on the significance of evaluating actual medication-use practices (Alwadhahi et al., 2022).

2.2 Medication Adherence in Long-Term Asthma Treatment

Adherence to medications is defined as compliance with the medication schedule agreed upon between patients and their healthcare providers. In chronic asthma care, adherence means the administration of drugs as prescribed regarding dosing and regularity of the treatment course. Adherence can be deliberate because of the fear of side effects or dependency on drugs, or unintentional, stemming from forgetfulness and problems with adherence to the schedule of drug usage. Patient-reported adherence to therapy can be affected by various barriers, including personal views, treatment-related concerns, and practical difficulties (Bender & Bender, 2005). Questionnaire-based and prescription-based adherence measurement tools cannot capture the real use of inhalers by patients. While some patients can declare their adherence even though there were missed doses of the medication, refills cannot be an indicator of adherence but only confirm that medication was available for the patients. The data gathered with the help of electronic devices can shed light on the timing and frequency of the use of inhalers. This information can be helpful in making personalized treatment decisions and detecting discrepancies between prescribed and actual adherence (Dhruve & Jackson, 2022).

2.3 Common Errors in Inhaler Technique and Their Impact on Treatment

The importance of correct inhaler technique cannot be overstated since proper drug delivery is contingent upon the patients' ability to manipulate the devices appropriately. Each type of inhaler requires a certain procedure, and sometimes patients face difficulties in working with certain types of

devices or change of devices. The most common mistakes made by patients are improper preparation of the device, improper positioning, incomplete inhalation, poor coordination, and non-adherence to instructions for a particular device (Sanchis et al., 2016). Another problem associated with inhaler technique errors is the reduced efficacy of the treatment even when the medications are taken consistently. Patients may adhere to their prescribed schedule but still take insufficient amounts of medication due to incorrect manipulation of the device. There has been much research done that proves the association between inhaler technique and adherence (Braido et al., 2016).

The consequences of different inhaler mistakes are not always equal. While some can considerably limit drug delivery, others will cause only minimal effects. Research on critical inhaler mistakes showed that identification of clinically significant errors is necessary for further treatment and needs special attention from a patient-education perspective (Bosnic-Anticevich et al., 2018). In addition, evidence showed that critical inhaler mistakes were associated with the risk of adverse respiratory outcomes, and thus needed frequent evaluation (Usmani et al., 2018).

2.4 Patient-Related Barriers, Adherence Interventions, and Research Gap

Patient factors might be responsible for the discrepancy between prescribed and practiced inhaler use. Such factors could comprise forgetfulness, fear of addiction and side effects, lack of information, absence of symptoms, and the inability to operate inhalers. Those patients who have experienced relief from their symptoms might believe that taking medicine is no longer necessary for them, whereas others find the use of inhalers difficult. These problems could be related to patient-doctor communication as well. Thus, it should be taken into consideration when working on improving inhaler use. Such professionals as healthcare workers and especially pharmacists might be able to encourage patients to adhere to medication therapy and use inhalers correctly. A systematic review and meta-analysis of the effectiveness of pharmacist interventions showed the significance of pharmaceutical care in terms of improving the inhalation technique and medication adherence among asthma and chronic obstructive pulmonary disease patients (Jia et al., 2020).

Research Gap

The previous research on the topic covered the areas of adherence, inhaler technique, and barriers in relation to asthma treatment. They were researched separately despite the need for a combined view of the problem. The gap between the prescribed inhaler therapy and actual inhaler use is still relevant for adult patients who undergo treatment for a long period of time. Adherence is not necessarily an indicator of the effectiveness of the treatment since patients can be adherent and use the inhaler inappropriately. The technique does not indicate whether the patients use the prescribed medicine regularly. Patient-related barriers can also vary depending on different conditions, such as patients' experiences, attitude to treatment, and practical problems. Thus, combining the examination of the prescribed medication regimen, actual inhaler use, inhaler technique, and patient-related barriers will

help gain a more complex understanding of asthma treatment. The present research fills the gap by researching the differences between prescribed and actual inhaler use.

3 METHODOLOGY

3.1 Research Design and Treatment-Use Investigation Framework

The current research study employed a descriptive, cross-sectional research design in order to determine the difference between prescribed and actual inhaler use among adult patients suffering from asthma and undergoing long-term treatment. A descriptive, cross-sectional research design has been used to study medication use, inhaler use practices, and treatment issues among patients at a specific point in time. In particular, it is important to understand whether the patients adhered to the inhaler treatment regimen as prescribed by their healthcare providers and to identify the issues related to differences in the use of prescribed medication. An investigation framework has been designed to evaluate three major dimensions: prescribed treatment features, actual inhaler use practices, and patient-related barriers. Prescribed treatment features include type of medication, dose, frequency, and length of the treatment. On the other hand, actual inhaler use practices include medication adherence, missed doses, treatment interruption, and inhalation practice. Patient-related barriers include forgetfulness, concerns about medications, lack of knowledge, and inhaler device issues.

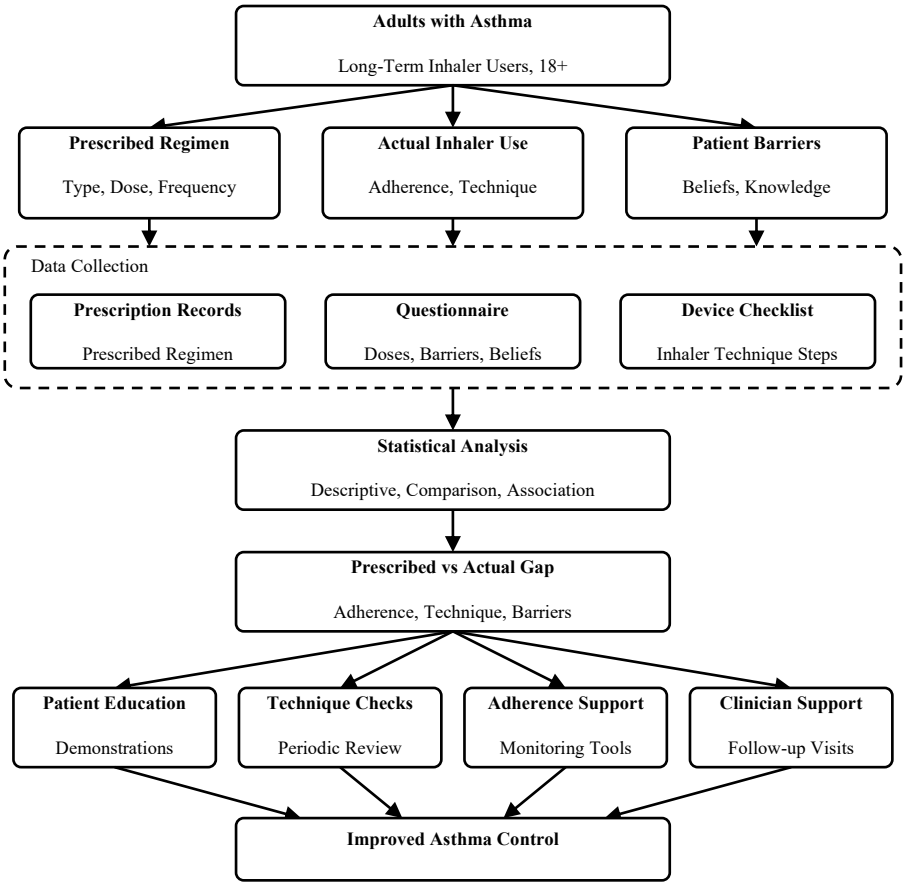


Figure 1: Methodological Framework for Assessing the Prescribed–Actual Inhaler Use Gap

Figure 1 shows the research procedure, which includes the selection of participants and data collection up to the statistical analysis of adherence, inhaler techniques, and patient barriers. The resulting gaps help determine patient education, technique assessment, adherence intervention, and follow-ups.

3.2 Participant Selection and Long-Term Asthma Treatment Profile

The study sample involved adults aged 18 years and above who had been using inhalers for an extended period of time to treat their physician-diagnosed asthma condition. The recruitment of the study participants was done through the inclusion criteria related to their experience of using inhalers in treatment, as well as their capability to provide data about their medical treatments. Purposive sampling was found to be a suitable approach that would help identify individuals with experience in long-term inhaler use. In this instance, the sample included individuals who had been prescribed inhalation drugs to treat their asthma for no less than six months and who could participate in the collection of data. Individuals with acute respiratory emergencies, those who could not provide any information on their drug use, and those who used inhalers to treat other diseases apart from asthma were excluded from the study. The process of participant recruitment helped to select individuals with an established pattern of asthma treatment. Various demographic and clinical factors such as age, gender, duration of asthma, duration of inhaler treatment, inhaler device, and healthcare visits were identified as the participants' background.

3.3 Prescribed–Actual Inhaler Use Assessment and Data Collection

The process of collecting the data involved comparing the inhaler treatment prescribed by health care professionals with the use of the medicine in reality. Information about the prescribed treatment was collected based on the existing prescriptions, the patient's medical history, or the patient's report of the treatment instructions. The process of using the inhaler was examined using a structured questionnaire, which focused on frequency of taking the medication, missing medication, disruption of the treatment, intentional adjustment of the dose, and taking the medication based on the symptoms. Additionally, patients were interviewed concerning their knowledge of the instructions related to the use of inhalers and possible issues connected with inhaler use in reality. The inhaler technique was assessed using an inhaler-specific checklist that included all critical aspects of proper technique, such as preparation of the inhaler device, inhalation technique, coordination, and holding of breath, if necessary.

3.4 Measurement System, Statistics, and Ethics

The study variables have been categorized into those that are characteristics of the prescribed treatment, behavior of using the inhaler, technique of using the inhaler, and those that are barriers for the patient. Medication adherence was to be measured in terms of the percentage of prescribed doses taken within a given period of time, and inhaler technique in terms of how many steps were performed

correctly from the checklist. Prescribed and actual treatment differences would be determined through frequency of taking the medication, missed doses, and treatment interruptions. Descriptive statistics will be employed for demographics and inhaler usage behavior. Differences in treatment practices between prescribed and actual behaviors were supposed to be compared using comparative analysis, while associations between patient characteristics and inhaler use behaviors were analyzed using association analysis. Depending on variables' distribution and nature, chi-square test, independent-samples test, and correlation analysis might be used, among other approaches. Ethical issues include obtaining informed consent from participants, ensuring confidentiality, voluntariness, and securing collected data. Participants were assured that their participation would have no impact on asthma management and care. The project had to comply with institutional ethical requirements prior to conducting research.

4 RESULTS AND DISCUSSION

4.1 Participant Characteristics and Prescribed–Actual Inhaler Use Patterns

Demographic and clinical characteristics analysis is essential in order to understand the behavior of using inhalers in adults with asthma who are treated on a regular basis. There are several patient characteristics (age, gender, duration of asthma, duration of inhaler use, type of prescribed medication, inhaler) that can affect the way patients use the medication. The comparison between prescribed and actual use of inhalers is based on the identification of discrepancies in terms of frequency of drug use, missed doses, pauses in treatment, and inhalation. Prescribed use of treatment involves recommendations made by health care specialists, while the actual use of inhalers implies patients' actions in relation to taking the drugs on a daily basis. Discrepancy between the two can indicate problems related either to patients' understanding of the treatment process or to the way they use the inhaler. The results should be considered in view of both clinical and practical features of patients.

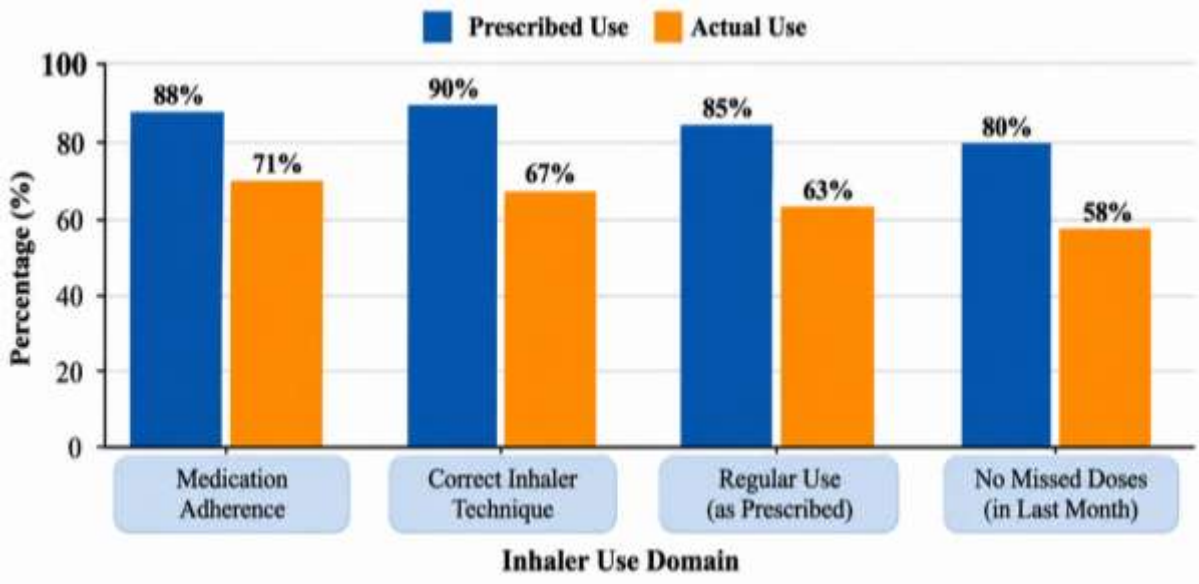


Figure 2: Comparing Prescribed and Actual Use of Asthma Inhalers in Adults

This is illustrated in figure 2 above, where there is a depiction of how medication adherence, technique for inhalation, and frequency of use could vary from the prescription to the patient's behavior.

4.2 Medication Compliance, Inhaler Use, and Related Barriers

Taking medication and proper inhaler technique may both be viewed as different facets of managing asthma. The assessment of medication adherence will show whether the study participants comply with their inhaler usage regimen, such as the frequency of medication administration and the number of missed administrations. Inhaler technique assessment, on the other hand, will concentrate on how accurately the participant prepares the device, performs inhalation, etc. Deviations from the above criteria may suggest that patients have problems with regular and proper medication administration. Barriers that patients may face in this process include forgetfulness, fear of developing drug dependence, feeling better due to medication usage, lack of knowledge, and inability to use inhalers correctly. While discussing the results obtained, it is necessary to differentiate between intentional and unintentional non-adherence and between medication-taking and inhalation technique mistakes.

Table 1: Summary of Key Indicators for Assessing the Prescribed–Actual Inhaler Use Gap

Assessment dimension	Key indicators	Assessment method
Medication adherence	Missed doses, regularity, treatment interruptions	Structured questionnaire
Inhaler technique	Device preparation, inhalation, coordination, breath-holding	Device-specific checklist
Patient-related barriers	Forgetfulness, medication concerns, limited knowledge	Patient questionnaire
Prescribed–actual gap	Differences in dose frequency and medication-use practices	Prescription and patient-use comparison

Table 1 shows the main metrics used in analyzing medication adherence, inhaler technique, and patient-related barriers. This helps to make an effective comparison between the prescribed treatment instructions and the use of inhalers by patients.

4.3 Clinical Implications and Strategies for Improving Long-Term Inhaler Use

The results obtained by the study could be very significant for improving the process of managing asthma in the long term and ensuring the proper use of the inhalers. The differentiation between the prescribed use of the medication and its actual usage could help the healthcare practitioners identify the patients who might need some further assistance or counseling in regard to the correct use of their medications and inhalers. Individual counseling could become especially helpful for those patients who find it difficult to follow the instructions on medication taking or keep to the established regimen. The demonstration-based inhaler education, reassessment of the technique, and the discussion of the importance of long-term treatment could help overcome the problems with inhaler usage. Besides,

pharmacists and respiratory healthcare specialists could help the patients through medication review, counseling, and reassessment. In some cases, it could also be helpful to use electronic inhaler monitoring and adherence tools.

5 CONCLUSION

5.1 Summary of Findings and Overall Conclusion

In the current research, the attention was paid to the investigation of the problem of the discrepancy between recommended and actual inhaler use among patients with long-term asthma therapy. The main attention was paid to the relevance of the analysis of medication adherence, proper inhaler technique, and patient barriers as integrated parts of the adequate treatment of this disease. The analysis of the discrepancy between the recommendations regarding the prescribed treatment and actual medication use allows establishing the differences in the frequency of medication intake, skipped dosages, interruptions of therapy and inhaler techniques. In addition, it is necessary to take into consideration the role of such factors as forgetfulness, problems related to the therapy itself, lack of information, and device problems in patients' daily inhaler use. The necessity of considering the above-mentioned issues lies in the fact that the success of asthma treatment largely depends not only on the drugs prescribed but also on their proper use.

5.2 Clinical Implications, Limitations, and Future Research Directions

There are some practical implications from the study for health care practice, as it is clear that it is crucial to enhance the education of patients and monitoring of inhaler usage technique and adherence in adults suffering from asthma. Health practitioners may provide assistance to their patients through the provision of individual consultations, training in inhaler technique, and the assessment of medication intake and adherence. The combination of assessments of adherence and inhaler technique may be useful in identifying the patients requiring additional assistance. There are some limitations in relation to the research framework used in this study. First, a cross-sectional design may restrict the capability to identify the causation between the patient-related variables and behavior. Second, self-reports of medication intake may be subject to recall and social desirability biases. Finally, the results of the research conducted in a particular sample group may not be generalized to all adult asthma patients. Further research may employ the longitudinal research design as well as a larger and diverse sample size and objective monitoring tools to evaluate the inhaler usage in adults suffering from asthma.

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