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ASTHMA IN PRIMARY CARE: THE ROLE OF BASIC HEALTH UNITS IN THE PREVENTION OF EXACERBATIONS

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Abstract: Asthma is a chronic, inflammatory lung disease characterized by a hyperresponsiveness of the airways that limits the respiratory flow, mainly triggered by environmental exposure and inadequate management of the disease. This disease affects about 300 million people worldwide and a good part of the Brazilian population. Its epidemiological characteristic is the generation of extensive expenses for the federal governments and for the SUS, having as the basis of its pharmacological treatment the use of corticosteroids and bronchodilators of short and long duration, using inhalation devices as essential equipment and more modern according to new studies to avoid its most important complication: exacerbation (with its main symptoms of hypoxemia, dyspnea and lowered level of consciousness). The objective of this work is to understand the role of health professionals in Primary Care and how to prevent these exacerbations and effectively reduce morbidity and mortality and reduce costs. A search was carried out in review articles, in order to understand the best ways to approach the patient in primary care, based on 3 main pillars: environmental control for the asthmatic patient; the correct use of inhaler devices and the initial management of an asthma attack. It is concluded that, with this review article, the role of professionals in Primary Health Care and Basic Health Units are essential for better asthma control, reducing possible crises and improving the patient's quality of life.
Keywords: Asthma, Primary Health Care, Beclomethasone, Allergens, Chronic Illness.

INTRODUCTION

Asthma is a disease of genetic character and chronic inflammatory nature, which is characterized by a process of hyper-responsibility of the lower airways. These changes end up generating a variable flow limitation that is triggered by environmental exposure to certain pathogens. According to the latest studies, bronchial asthma is one of the most prevalent chronic diseases, with an average of 300 million people in the world, with a prevalence of 15-20% in Brazil.

The lack of correct management in the treatment and diagnosis linked to the high prevalence of this disease generates an average of 350 thousand hospitalizations by the Unified Health System (SUS), occupying the 4th place in the causes of hospitalizations and the 3rd cause among children and young adults. In addition to these data, it is possible to observe a significant increase in the number of hospitalizations between 1993 and 1999, bringing evidence of an increase in the prevalence of asthma, in view of the worsening of exposure to causal factors.

Ministerial ordinances authorize municipalities to address and prioritize their local initiatives. There is still no specific program for continuing asthma care in primary care (LEAL et al. 2011).

The local units related to the treatment and control of asthma must follow a master plan, as well as programs that are focused on the active search and notification of diseases must be implemented. It is the primary care duty to care for mild and moderate asthma, in order to ensure a correct diagnosis, adequate treatment and to avoid or reduce the number of exacerbations observed in secondary and tertiary care.

Within primary care, planning an Asthma Program (AP) has essential steps. Initially, a correct identification and relevance of the disease in the community is necessary, always remembering to adapt as much as possible to the social context of the population served and a multidisciplinary team. Following the process, it is necessary to create training programs, which aim to train, inform and train all components of the unit in addition to the target population.

The basic treatment used in primary health care substantially follows smooth muscle relaxants (bronchodilators) and inflammation suppressants (corticosteroids). To maintain the recommended treatments, municipal resources must include specific allocations guaranteed by ministerial decrees (ZORZETTO, 2006).

In the public network, there is still no specific program or assistance for the asthmatic patient if we correlate the programs for high blood pressure or diabetes. Consequently, asthmatic patients classified as intermittent mild are excluded from a longitudinal follow-up, and therefore only relief bronchodilators are used to improve symptoms, without effectively improving the inflammatory and obstructive process.

Patients classified as having mild persistent or moderate asthma are erroneously referred to specific clinics (BARCLAY, 2009). In this context, it is the duty of public management to ensure the correct use of medications and especially the correct, safe and effective prescription according to protocols. (LEAL et al. 2011)

After the correct diagnosis, it is essential to establish a connection between the symptoms of the asthmatic patient and occupational exposure. This correlation often implies complex and expensive diagnostic algorithms such as specific provocation tests. Thus, correct management in a sphere of primary care is often unfeasible.

One of the main reasons for the emergence of asthma exacerbations is due to poor adherence to pharmacological treatment, even though it is distributed free of charge. According to the IV Brazilian Guidelines on Asthma, a large percentage of people do not continue the treatment regularly correctly because they do not know the importance of it, highlighting the importance of patient education.

The risk for a patient with asthma to develop an exacerbation depends on fun factors (BRANDÃO et al. 2009). Asthma exacerbation is nothing more than an extremely debilitating clinical situation for the patient who starts to present with evident signs and symptoms of a severe bronchospasm crisis (such as high frequency cough, severe dyspnea, wheezing, cyanosis and change in the level of consciousness due to the process hypoxemic) requiring immediate emergency medical assistance and in many cases hospitalization to restore organic respiratory homeostasis. What must be effectively understood is that every asthma exacerbation stems from a past history of poor disease control. Factors may be related to this lack of control: incorrect diagnosis of asthma; poor environmental control (permanence of factors that trigger atopic asthma); associated comorbidities; smoking; and the incorrect and inefficient use of Inhalation Devices (one of the main causes.

Regarding the IV Brazilian Guidelines for Asthma Management, it is important to define and reduce exposure to possible irritants and allergens. Physical exercise can be an important reason for asthma symptoms, however it must not be contraindicated, on the contrary, it must be encouraged, seeing that it improves the conditioning of the patient's aerobic part, and reduces the bronchospasm induced by it.

The pharmacokinetics and pharmacodynamics of drug classes cover the pathophysiology of asthma in a succinct manner (although this is extremely complex and not well known): reduce chronic bronchospasm caused by a hyperresponsiveness of the lower airways to topical and/or atopic factors, as well as the chronic inflammation caused by it. According to the IV Brazilian Guidelines for the Management of Asthma, the medications available for the control and treatment of asthma are: Inhaled corticosteroids

(IC), antileukotrienes, short-acting and long-acting beta-adrenergic agonists, oral glucocorticosteroids, theophylline, omalizumab, chromones and immunotherapy. IC is classified as the main resource for the maintenance treatment and prophylaxis of asthma, as it helps to reduce the frequency of asthma attacks and, if exacerbated, it will be less severe. To control the disease, a period of one to two weeks of correct and regular use of ICs is necessary. There are some side effects associated with this drug, such as: oral candidiasis, growth deficit, chronic cough, among others. A CI widely used in Brazil is beclomethasone. Beta agonists can be divided into long-acting (LABA) and short-acting. Short-acting ones are used in times of crisis. Long-lasting ones are used in association with ICs in people older than 4 years, because up to that age, the contralateral effects are greater than the benefit. Formoterol and salmeterol are available in Brazil.

In addition to these, another medication widely used in association with IC are leukotriene receptor antagonists (antileukotrienes). In Brazil we have Montelukast and Zafirlukast.

Every asthmatic patient must have a prescription for medication for home use of exacerbations. Initially, the use of short-acting beta agonists must be started, as they are a pre-treatment for the bronchospasm situation of both the exacerbation and the crisis triggered by exercise. A second medication is oral glucocorticoids (OC), as it reduces inflammation. Inhaled anticholinergics are only used in times of exacerbation associated with short-acting beta agonists or as a replacement for this in cases of intolerable adverse effects.

However, the Popular Pharmacy Program in Brazil has only made available, free of charge, for the continuous treatment, in primary health care, of asthma, Beclomethasone Dipropionate and oral corticosteroids such as Prednisone. There are two other drugs available at the pharmacy, but which must only be used in times of exacerbations, which are Salbutamol, a short-acting beta agonist, and Ipratropium bromide, an anticholinergic, which helps in bronchodilation.

Nowadays, medications are administered preferably by Inhalation Devices (DI): a set of equipment that contains drugs that are the basis for the treatment of the aforementioned disease (bronchodilators and corticosteroids) and allowed to improve the supply of drugs to the lung and reduce the side and systemic effects previously caused by nebulizers (SOUZA et al. 2009).

As already said, the use of DI are the basis for the most modern treatment in relation to the treatment of asthma. However, it is important to emphasize that choosing the correct drug in relation to the stratification of the type of asthma (in terms of severity and control) is not the only strategy that must be addressed by clinical and pulmonology physicians for the treatment of asthma: the use correct ID is a substantial step towards this control and it is the role of health professionals (doctors, nurses, physiotherapists and others) to guide and teach the mechanisms for using each of them. This factor is one of the main pillars for the verification of therapy for asthma control and must be associated with other questions that the health professional must ask: If asthma control is not being obtained correctly, the veracity of the diagnosis, whether the environmental control is adequate and whether or not there are associated comorbidities.

There are several types of Inhalation Devices that have the most diverse techniques and modes of use (as well as different forms of drug presentation). However, according to the Brazilian Society of Pulmonology and Phthisiology (MACIEL, 2017), drug therapy

by inhalation is much more complex than oral therapy and, for it to be effective, it needs a device that has the proposed drug, in the specified amount and that produces appropriately sized particles to reach the lower airways. The criteria for indicating these varies depending on whether the lung disease exists, the severity or need for other forms of medication and doses.

One of the most used inhalation devices (both in the form of steroids and bronchodilators) are Oral Inhalation Sprays or Pressurized Metered-Dose Inhalers (PDI), popularly known as "pumps". They are the most common forms of presentation of inhaled medications used in the treatment of asthma, both in exacerbations and in periods of inter-crisis, and these devices release liquid or solid particles associated with a propellant gas in the form of an aerosol, capable of reaching the tract lower respiratory (PRONAP, 2014). Several studies have shown that PIDs are safe and effective, as they produce particles between 1 and 50 μm (those between 1 and 5 μm are able to reach distal portions of the tracheobronchial tree). Portable, easy to transport, have a standardized inhaled dose, have a quick onset of action, have fewer side effects and shorter administration time (MUCHÃO et al, 2005). The use of the IDP (without spacer) comprises 6 steps as shown in the figure 3.

The difficulties of the technique are the synchronization between the aerosol firing and the beginning of slow and deep inspiration, especially in children, the elderly and during dyspnea episodes. Many patients make mistakes that can compromise the availability of medication for the most distal portions of the lung (thus compromising its effectiveness) such as not shaking the device, inhaling through the nose, inhaling through the mouth after triggering, not inhaling deeply and not performing an inspiratory pause (MACIEL, 2017).

A variation that can be used with the PIDs is the spacers, which were created to facilitate the use of these devices, which are subject to technical errors in use, due to the fact that they eliminate the breathing coordination bias of the use of the PID without a spacer. That is, with the use of the spacer, the deep inspiration manoeuver is started after the device is triggered. These devices vary in shape and size (ranging from 90 to 800ml) and most are made of plastic. Studies show that the best

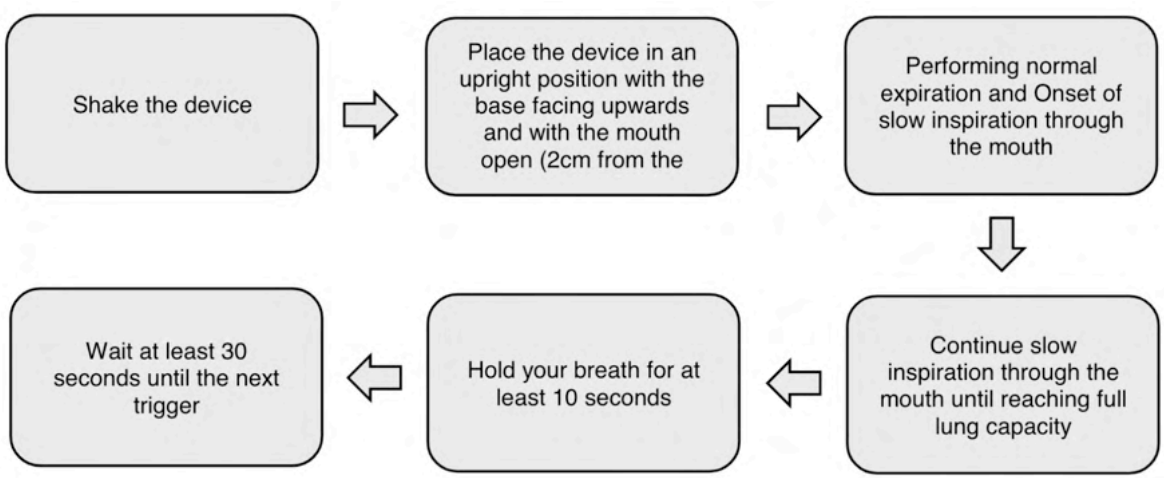

Figure 3- Scheme for using the IDP

spacers are valved and with greater volume. Relative disadvantages are being related to these device accessories such as the price and also the cleaning of these devices. The "cleaning" of the spacers is more related to the electrostatic component than to the dirt itself, since, as they are made of polymeric material, the spacers have an internal electrostatic charge that attracts aerosols to their walls and reduces pulmonary deposition of drugs. To reduce this electrostatic effect, it is recommended to soak the spacer in a solution of water and neutral detergent (1 liter of water for some detergents) for 30 minutes and allow it to dry in the open air as drying with cloths would induce transfer of electrons to the device, changing its electrostatic component (MACIEL, 2017). Another benefit of the spacer is the possibility of attaching the valve mask, excellent for use in children under 7 years of age or elderly people who do not have the capacity to coordinate due to pathological neurological impairment. The procedure for using the IDP with spacer (with or without mask) is shown in the figure 4.

Another important class in the classification of Inhalation Devices are the Dry Powder Inhalers (IPS), which are equipment capable of converting solid particles into aerosol, being activated when the patient performs inspiratory movement with a maximum peak. IPS are increasingly being used due to their greater degree of ease of use (since they do not need coordination of application and breathing as IDPs), having, however, the disadvantage of requiring an inspiratory suction flow of 30L/min, a factor that would be disadvantageous for patients with motor incapacity restricting the inspiratory movement necessary for medication deposition, as well as for patients with neuropsychomotor incapacity (such as children under 7 years of age and the elderly) of understanding the technique.

The types of IPS available and most used in Brazil are: Turbuhaler®; Pulvinal®; Aerolizer®; Diskus®. All of them have advantages, disadvantages and specific methodologies for use, however they share the same general mode of use and technique, present in figure 5.

It is always important to emphasize that the use of jet nebulizers and ultrasonic nebulizers are falling into disuse due to their proven inferiority in the deposition of intra-pulmonary drugs in relation to the aforementioned IDs (MACIEL, 2017), in addition to having extensive disadvantages in relation to its use, as they are static, require constant maintenance and cleaning, use electricity, have greater side effects of medications, require a long time to use and produce noise. The only advantages for use are related to factors such as the possibility of mixing medications, use with tidal volume breathing during exacerbations of obstructive diseases (which can cause changes in the state of consciousness, such as Delirium) and ease use at any age (including still well used by mothers of infants and preschoolers). It is noteworthy that the use of jet nebulizers is still the most used in Emergency Room units and wards for the administration of bronchodilators, however, several studies confirm the superiority of the bronchodilator effect of PID coupled to large-volume spacers with mask in the use of urgencies and emergencies related to acute bronchospasm crises (MACIEL, 2017).

A significant number of studies related to the use of IDs demonstrate their inefficient use, significantly impacting the clinical course of asthma. The technique and understanding of the use of ID in patients with lung diseases that 94.2% of asthmatic patients committed at least 1 error when using an inhalation device (SOUZA et al. 2014). It is known that the device that has the greatest difficulties

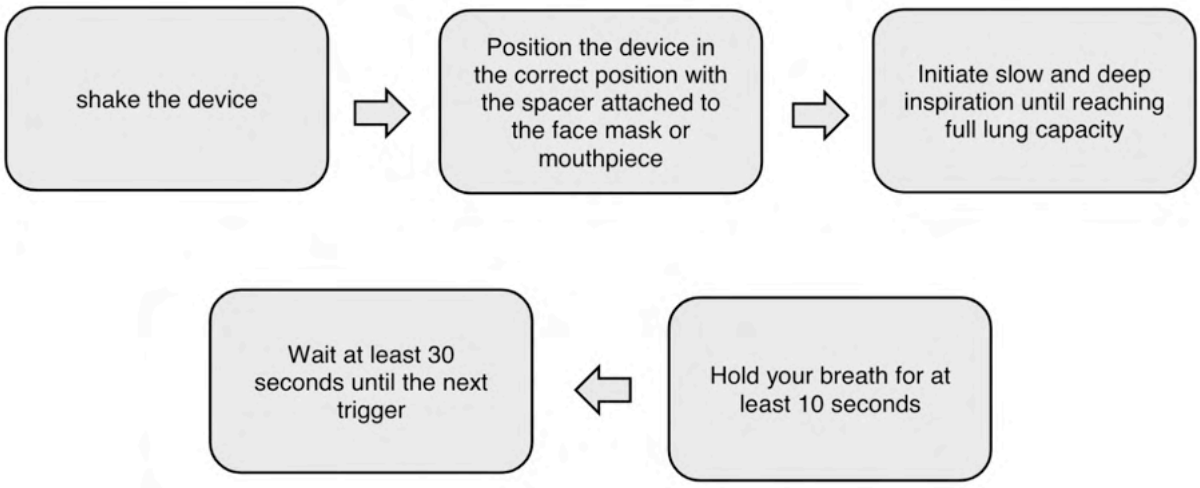

Figure 4- Schema of steps for using IDP with spacer

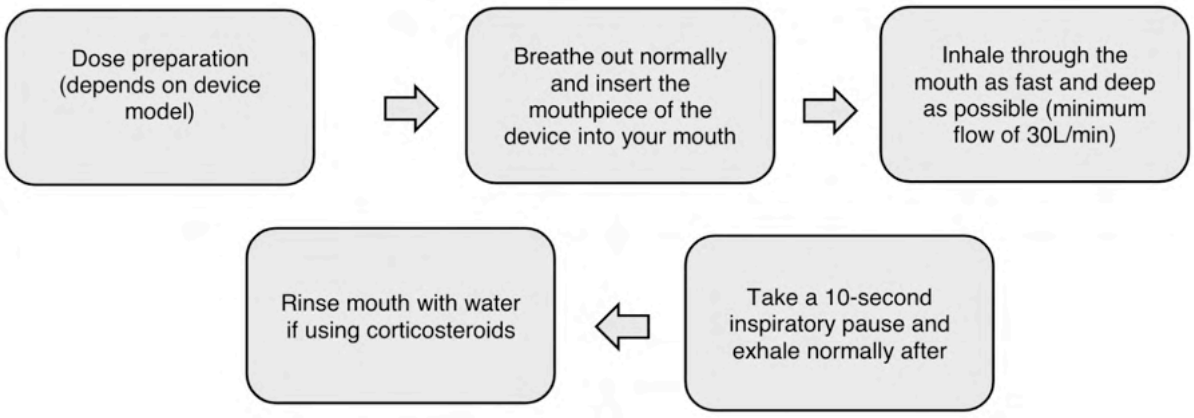

Figure 5- Scheme of steps for using IPS

in use, resulting in greater chances of errors in its use, are the PDI, which is perhaps explained by the difficulty in respiratory coordination necessary for its correct use. The steps in the use of PID that have more errors are the incorrect distance from the lips to the device (73% error); inadequate expiration before inhaling the medication (61.2% error); no agitation of the medication (41.8% error) and no inhalation slowly (34.3% error) (SOUZA et al. 2014). It is noteworthy that the step "inadequate expiration before inhaling the drug" refers to the non-normal expiration before use, since forced expiration and volume before use is in theory incorrect, as recent literature does not recommend such a respiratory maneuver. Other studies reinforce the evidence of the PDI as the device most prone to use errors (93%), and the act of not shaking the device, not performing an inspiratory pause and not performing a slow and deep inspiration after triggering the device are at a frequency of error of 57.7%, 50% and 57.1% of the individuals, a factor that systematically reinforces the difficulty of using this type of device.

However, despite having the objective of therapeutic facilitation, there are still a large number of individuals who make mistakes when using IPS (although this proportion is relatively smaller compared to individuals who use PID). The most common error, among the most diverse types of Dry Powder Inhalation Devices, is the failure to perform adequate expiration before inhaling the drug (present in 54.5% of patients), and the DI which this error was the most present was Aerolizer® when compared to Pulvinal® (SOUZA et al. 2014).

Therefore, the techniques for using ID are, in general, unsatisfactory. However, it is noteworthy that these technical checks were carried out by a health care professional with significant knowledge to assess the effectiveness of the use of these equipment, a factor that counteracts the fact that health professionals (such as doctors and nurses) have in their daily lives such detailing capabilities. Importantly, most patients claim that they know how to use inhaler devices and that their respective physicians have already visually checked the technique. However, few patients claim that the physician systematically and constantly monitors and reassesses whether the patient is using the ID correctly and satisfactorily (SOUZA et al. 2014)

There are certainly factors and causes related to the misuse of these devices. The causes are related to the disagreement between the physician-patient binomial, such as the lack of initial guidance by the physician on how to use the ID; lack of maintenance of medical guidance throughout the treatment and also the lack of understanding of the patient, as well as their negligence towards the seriousness of the treatment (SOUZA et al. 2014). The factors are conditions involving various aspects of the characterization of the patient regarding their current life condition that concretely influence the performance of an efficient treatment, and studies have shown that the factors that most interfere in this process are comorbidities associated with asthma (COPD, tremors, decreased visual and hearing acuity, arthritis, cognitive and memory disorders); widowhood; age over 60 years old; low education level; low family income and general socioeconomic status (DALCIN et al. 2014). These elements demonstrate the importance of proper anamnesis and clinical management for the asthmatic patient, and the choice of the inhaled device depends on a refined clinical sensitivity that takes into account variants related to the patient and the device itself, providing an individualized treatment. The variants of choice for the best DI are shown in the table 4.

• Age
• Associated comorbidities
• Degree of obstruction
• Personal Preference
• Presentation/dose
• Cost benefit
• Transport and Cleaning
• Pulmonary deposition

Table 4- Variants in choosing a DI

Therefore, it can be inferred that most individuals with asthma do not use inhalation devices effectively, as a result of a series of elements that favor this. Thus, several studies have tried to concretely correlate the incorrect technique with the degree of disease control (DALCIN et al. 2014). This study showed that, among 281 patients verified, 81 of them (corresponding to 30.2% of the total) had the inhalation technique using a device unsatisfactory, and the PDI were the ones with the highest rates of error in use. Probably, because they were followed up in an outpatient clinic specializing in pulmonology, the error rate, in general, was lower (although it still remains high). It was found that among these 30.2%, only 8 of them (10%) had controlled asthma; 17 of them (21%) had partially controlled asthma; 56 of them (70%) had uncontrolled asthma, taking the asthma control criteria of the: *Global Initiative for Asthma (GINA)*, document of world importance for the maintenance and control of this pneumopathy, which is so relevant nowadays. These factors reveal the important correlation between the incorrect use of IDs and poor disease control, which would culminate in the most feared clinical evolution: exacerbation.

However, it must be considered that the inefficiency of the use of these devices is not entirely centered on patients (despite most errors being focused on them), but also on healthcare professionals. Such a proposition can be proven by a study (MUCHÃO et al. 2014) where knowledge about the use and management of ID in health professionals (including the most diverse types such as preceptor physicians, resident physicians, nurses and physiotherapists) was evaluated in a tertiary-level pediatric hospital. Questionnaires and practical tests were proposed to assess the correct use of these inhaler devices, providing adequate and necessary support materials, such as the devices themselves, spacers, masks and dolls, in order to carry out a theoretical and practical assessment of the proposed objectives. The results showed superiority of knowledge and technique on the part of preceptors and resident physicians (although not 100% satisfactory) compared to other professionals such as nurses and physiotherapists, a fact perhaps explained due to the better level of education that physicians have during the course of medicine on the handling and use of this equipment, and in this study the most relevant errors were inefficient agitation of the device; incorrect spacer cleaning (this being the topic with the most errors); cleaning the oral cavity after using inhaled corticosteroids and finally not using spacers in schoolchildren.

Given all the data, variables and arguments discussed, it is possible to question what solutions healthcare professionals can implement, in all areas, to alleviate or partially reduce this major problem of incorrect use of asthma inhalers, avoiding thus complications and reducing morbidity and mortality. Despite being an extremely complex topic, many studies have shown that the correct approach can be carried out in a simple and effective way, with the Basic Health Units as an important foundation for this construction, except for an article carried out in Salvador-BA (COELHO et al. 2011) which comprises a systematic assessment of the handling of inhalation devices and asthma control in severe asthmatics. Through an observational study, the maneuvers for using these devices in 467 patients were analyzed, 95% of whom used Aerolizer®, 30% used PID with spacer, 14.8% used Pulvinal® and 8% of these used PID without spacer. Although PIDs without a spacer were less used, the highest error rates in use still fell on this one (the step of keeping the mouthpiece at an adequate distance from the lips was the most common error, present in 84.2% of patients). However, despite these statements, the success rate in the use of PIDs without a spacer was 75% of the patients, a number that was also satisfactory in the use of Aerolizer® (73%), in which all individuals belonging to these percentages corrected all the steps in the use of the aforementioned IDs. Thus, it was confirmed that, of the group that got all the essential phases right, 80% had asthma classified as controlled. These data, according to the authors themselves, systematically diverge from the literature as few patients made mistakes in the most important step of using an ID: coordinating triggering and inspiration. All this would be properly explained by the implementation of a multidisciplinary and effective program called ProAr, a multidisciplinary project that aims, through a vision of different professionals in the health area (doctors, nurses, physiotherapists and pharmacists) to teach and spread knowledge for the control of asthma and allergic rhinitis.In this program, asthmatic patients are constantly evaluated regarding the technique of using IDs, as well as asthma control. Also according to this study, the ProAr program managed to reduce the number of hospitalizations for asthma in the city of Salvador by 74%, extremely relevant and important data (COELHO et al. 2011). Therefore, it would be necessary for family health strategy professionals and professionals linked to primary health care to concretely and directly carry out programs similar to ProAr in order to achieve an important scope of multidisciplinary involvement for patient education in general. In addition, there are other factors that can contribute to the evolution of better asthma control through the correct use of DI in these programs, such as practical and short classes given by visiting physicians (pulmonologists) for other health professionals ; application of theoretical and practical tests to verify the adhesion of knowledge by the professionals involved; practical reassessment of the technique by the physician carried out on a daily basis (even if the patient claims to know how to use the device) and scientific extension events programs by university courses in the health area are some of the many themes that could be addressed by multidisciplinary programs for management and asthma control (such as ProAr), carried out by primary health care, with the aim of the ultimate goal of this sector of medicine: promoting health and preventing diseases, always having the patient at the center of a complex balance between the health-disease process.

CONCLUSION

Therefore, this literature review article concludes that asthma is a lung disease of significant importance and seriousness due to its complications. However, with the role of health professionals in primary care, which has the ultimate goal of health prevention, the risk of asthma exacerbation (most feared complication) is considerably reduced. This is due to the fact that these professionals, in a multidisciplinary way, perform some functions such as guidance for environmental control for asthma patients; correct use of inhaler devices with active teaching methodologies for patients as well as carrying out programs such as ProAr and APGAR in basic health units; control and dissemination of knowledge about identifying exacerbations (and what to do in the face of a crisis). Thus, it is concluded that the implementation of a project to unify the Basic Units and Primary Health Care, with the respective union of knowledge of professionals in this area about such items, would enable a reduction in exacerbations and, consequently, a better control of asthma, reducing morbidity and mortality and improving the quality of life of these populations.

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