NARRATIVE REVIEW

Prevalence of asthma and its management: A review

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Abstract

Among respiratory problems, asthma is one of the most rapidly growing disorder which has victimised about one-third of the world's population and almost 2.5 million patients die annually as a result of severe exacerbation. Asthmatic patients most of the time fail to receive maximum benefits from the therapy because of drug-related problems, side effects of steroid medication and special skill required for the administration technique of drug inhalation. The current review was planned to highlight the most frequent problems of asthmatic patients and their possible management suggested during the last few years. The greatest challenge is to ensure adherence to medication along with appropriate inhalation technique among asthmatic Patients Proper selection of drug and Device. According to Global Initiative for Asthma Guidelines 2017, proper counselling, training sessions, dosage calendars, patient reminders and evaluation of inhalation technique are found to be very helpful in improving the quality of life of patients.

Keywords: Management of asthma, Asthma prevalence, Asthma.

Introduction

Asthma is a heterogeneous disorder characterised by chronic inflammation of airways. It is usually defined by having a history of respiratory symptoms i.e. severe shortness of breath, cough, tightness in chest and wheezing sound in breathing. The symptoms may vary over time and in terms of intensity. Commonly observed phenotypes include allergic, non-allergic, late onset, asthma with fixed airflow limitation and asthma with obesity.[1]

Prevalence

Asthma, the hyper-responsiveness of respiratory tract, is emerging as one of the most serious medical conditions worldwide.[2] About 1-18% of population from various countries are sufferers of asthma.[1] The fact sheet of the World Health Organisation (WHO) revealed that among the world population around 235 million people are found victimised by asthma. It is declared to be a public health problem and does not get affected by the levels of economic and structural development of the country. It remained not only under-diagnosed, but also untreated, disturbing all the activities of its victims for lifetime, creating burden on families, societies and countries.[3] Global Initiative for Asthma (GINA), after consideration of the increasing prevalence of asthma, decided not only to specify a day (May 1, 2018) to lay emphasis on generating worldwide awareness regarding asthma but also to regularly update the treatment guidelines.[4] The severity of situation can be imagined by the death rate of asthmatic patients during and after intense exacerbation of asthmatic attacks which were preventable up to some extent, but ended up with lack of immediate provision of emergency medical care. WHO estimated annual deaths of almost 250,000 asthmatic patients. During the 21st century, medical advancements in the field of asthma control improved at exponential rates but people suffering from this respiratory misery have also increased in numbers, although deaths of these patients decreased prominently compared to the last century. The introduction of the inhaled corticosteroid medication along with short and long-acting beta agonist helped in improving asthma control and decreased the exacerbation frequency as well.[2]

Social and Cultural Beliefs

Another Drug-Related Problem is of inappropriate dosages which patients increase or decrease by themselves either due to side-effects or beliefs and concerns related to drugs and inhalation devices prescribed to them. Barnes et al. reported that 60-70% of the asthma sufferers fail to take medications, including steroids, as prescribed to them by their healthcare providers. Some patients are found to have opinion that the device they are using will produce serious side-effects and some feel shame in using inhalation devices in front of people. On the other hand, the relatives and other people in the surroundings of asthmatic patients were reluctant to meet or live nearby because they think the patient has some contagious disease that may be transferable from person to person. This leads to the need of improvement, clarification or modification the beliefs

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and concerns of the patients so that the behaviour of patients regarding dose of the drug and devices can be changed.[5]

The factors associated with mishandling or poor handling can be device-related, patient-related, cultural beliefs associated with patients and their relatives and even related to healthcare professional.[6]

Triggers and Risk factors of Asthma

There are triggers of asthma very widely studied and explored, like allergies, airway constriction/inflammation, viral infections, air pollution, exercise, physical and emotional stress which can be avoided up to some extent. There is a need to discover and explore the biomarkers which may tell something about predisposing factors of asthma so that the onset of disease can be prevented and burden of asthma on world could be lowered.[7]

The important scenario in the treatment of asthma is recognising the trigger factors which may stimulate the attack or generate respiratory crisis. These risk factors have two categories i.e., fatal or life-threatening, and non-fatal or manageable. These categories incorporate pollens, airborne virus, fungus, smoke, dust, flu germs, thunderstorms, exercise, depression, anxiety, symptoms denial, excessive physical and emotional stress and much more. Even the trigger factors are so many that they are difficult to classify and control. The poor control on the manageable risk factors is due to lack of patient information, education and training to avoid them, thus creating a wide scenario to explore and work.[2]

Clinical Presentation and Diagnosis

The clinical presentation involves usually breathlessness, increased heart beat (tachycardia), clear wheezing sounds in breathing and other allergic symptoms. Family history of the asthmatic patient regarding asthma, allergies or hypersensitivity is crucial in ruling out asthma because of strong genetic evidences. Asthma classification and diagnosis is done by considering frequency, duration, intensity of exacerbation, frequency of using reliever medications as mild asthma, moderate asthma and severe asthma. Spirometry, methacholine challenge test and X-ray findings are important landmarks in making the diagnosis. Predisposing risk factors for asthma were found to be allergies, obesity, smoking, pollution and poverty.[8]

Medications

Treatment for acute symptoms is started with short-acting beta 2-agonist (SABA) and oral corticosteroids. In case of severe exacerbation, intravenous (IV) therapy and magnesium sulfate or hospitalisation is considered. Then long-acting beta2-agonists (LABA) or leukotriene antagonists are used in addition to inhaled corticosteroids (ICS).[9]

Asthma is sometimes found to be overlapped with chronic obstructive pulmonary disease (COPD) treated with triple regimen of drugs including a combination of corticosteroids (inhaled), LABA and long-acting muscarinic antagonists (LAMA). In some countries these are available in already combined form, while some use these three agents in separate inhalers.[10]

If started soon enough after discharge from post-exacerbation hospitalisation, controller medications can produce long-lasting impact on patients in terms of adherence to these drugs and can reduce hospital readmissions.[11] Inconsistent or insufficient use of ICS may result in high prevalence of exacerbation events, increased use of healthcare resource, high burden on financial position and compromised quality of asthmatic patient's life.[12] ICS and LABA, when used combined, are helpful in the management of asthma and are not related to the adverse effects and exacerbation frequencies compared to prescription of either of them alone.[13]

Route of Drug Administration and Devices Used

The route of administration of drugs used for asthma treatment is usually inhalation because this route targets directly the affected part of the body and saves the rest from the systemic side-effects of the steroid-containing drugs, thus making the administration of medicines very critical as it required specialised devices for the drug delivery to the lungs. Dry powder inhalation devices, like Rotahaler and Revolizer, and pressurised metered dose inhalation (pMDI) devices are frequently available in market and are prescribed quite frequently to asthma sufferers. Patients using pMDI for drug delivery are found to produce better improvement than patients with dry powder.[14]

Important steps in the development of the care plan for the asthmatic patients is the choice of the device that should be done by the critical analysis of the patients, its disease states, level of the obstruction in the lungs of the patients and their ability to follow the regimen as prescribed. Studies revealed that patients using inhalers make mistakes in the administration of medicines, leaving the therapy compromised.[15]

Asthma sufferers usually depend on inhalation devices for the administration of their medicines. In this way, the best outcomes of the therapy becomes dependent on proper

use of the device, and training and education are needed in this regard. Pharmacists are responsible for this task because they actually provide the device and drugs in physical form, but unfortunately, sometimes lack of training and skills of pharmacists or sometimes lack of interest hinders this activity. It either ends up in the failure of therapy and the loss of trust among patients on physician, pharmacist and drugs.[16]

There are several inhalation devices available in the market with difference in their usage technique. Each device demands different set of steps to perform proper actuation of drug from that device. These specifications, associated with each device, create chances and points for errors and at the same time provide opportunities for the pharmacists for improvement in the use of these devices.[17]

Effects of Poorly Controlled Asthma

Acute asthmatic exacerbations result in high rate of morbidity and mortality, resulting in increased economic burden on healthcare resources. There must be a control over the trigger factors. Viral infections are found to be the number one trigger that can be prevented by flu vaccines available during high-risk pollen season. With the provision of all advancements in the field of medicine, frequency of the people seeking relief for acute and chronic asthmatic exacerbations has been increased on a daily basis.[18]

Financial burden on the patient and the community affects the quality of life of asthmatic patients as well. Direct and indirect costs to patients and societies regarding medication and emergency hospital admissions cause minimisation of health benefits available for the patients through medicines. Special medical devices required for the administration of asthmatic medications, like inhalers, spacers, MDIs, nebulising equipment, dry powder inhalation devices, are considered an extra financial burden and require special training for the proper and correct administration of medicines. Time, distances of available medical facility, travelling cost, cost of resource of healthcare used, work off days due to asthmatic attacks, inability to control over weather conditions and trigger substances, giving up of hobbies, sports are different forms of burdens on the asthmatic patients.[19]

Chipps et al. suggested that the most recent exacerbation give information about future exacerbations up to some extent. The healthcare professional attending the emergency exacerbation attack must assess the patient more critically and should document every single detail of history of this attack. The information is found to be helpful in preventing the next attack in the near future, and if such information is shared with patients and their attendants, such wastage of financial and healthcare resources, if not prevented, can be minimised at least.[20]

Among Drug Related Problems of asthmatic patients the main problem is compliance issues. Compliance or adherence to medications sometimes suffers due to side-effects of steroids drugs experienced by patients or sometime they suffer because of special technique required to administer the inhaled drugs. The technique used for inhaled medications, if not performed correctly, results in decreased benefits of medications, loss of patient's trust on the medication and loss of financial and health resources as well. Sometimes there is large differences in the prevalence of side-effects of drugs reported by patients themselves and the frequency of side-effects described by healthcare professionals.[21]

Risk factors associated with decreased adherence to the asthmatic therapy, when investigated, are found to be increase in age and misconceptions about steroid drugs and the drug delivery devices. There are health and social concerns among the patients and even in their attendants about the medical devices they have to use for drug delivery. This is the area where health educators are to focus to make patients at home with the medicated inhalation devices with proper training and critically-designed information aids.[18]

Interventions to improve outcomes

For better compliance, technologies used for reminding the patient or attendants, like text messages, calls, alarms, are considered to have potential benefits. In this regard, there is a lack of documented results of producing better patient outcomes. The irregularity of these aids hinders in getting long-term effects on patients compliance. But the unavailability of documented proof must not be considered a shortcoming of this intervention.[22]

With the aim of improving the quality of life of asthma victims, many educational programmes and training sessions were introduced in many healthcare settings, but these programmes lost their essence due to irregularity and discontinuity. Another factor of almost failure of such programmes is barriers between patients and these services, such as time, distance, expense, lack of interest of patients or programmers etc. Current situation demands that such education should be made credible, critically evaluated and planned, and their continuity must be made first priority, as continuous reminders, repetitive education and training are key tools to

improving asthma patient's quality of life.[23]

As asthmatic patients suffer a lot due their respiratory problems in daily life, so there should be a need of recording of the symptoms on a daily basis to have a complete picture of their medical condition during any specific time duration. If it happens, the physician who took the responsibility to manage asthmatic patients, will be better able to manage patient's problems according to conditions. Asthma diaries, time schedule of medication, and timetable of daily activities seemed to be very useful in this regard, generating the points at which proper and required necessary step should be taken or considered to improve patient's quality of life. And, above all, it will provide opportunities to incorporate medicines and precautionary measures in daily routine of asthmatic patients.[24]

Failure of the patients and/or their attendants to refill their prescription contribute to the worsening of patient's financial problems because it results in the progression of disease symptoms and end up with off days from work, school leaves and poor social life of patients with chronic diseases.[25]

In Germany, researchers investigated the role of videotapes showing the correct use of inhalation devices in improving incorrect administration of drugs with these devices and found them to be a helping tool to minimise errors in the use of these gadgets.[26]

Advancements made in the medical field related to asthma remain less understandable and are manageable with difficulties. For the generation of significant improvement in the control of asthma, a new approach suggests use of recombinant mono-clonal antibodies, like omalizumab along with beta agonists and corticosteroids, is found to be effective in decreasing exacerbation frequencies.[27]

Apter et al. studied the relationship between health literacy, adherence and its outcomes in the victims of asthma, and concluded that low rate of health literacy end up with less accessibility to healthcare settings, non-compliance, dis-satisfaction, increased socio-economic burden and wastage of resources. Patients provided with written aids for understanding their condition and care plans were less improved as compared to the patients who were provided with visual and electronic aids. The situation indicates the barriers associated with written aids i. e. literacy, hearing and visual issues of the older patients.[28]

A research included daily text service reminder for the patients to improve adherence to medication of asthma for achieving the goal of therapy i.e., less symptoms, decreased use of relieving medicines, and ability to perform their daily activities along with asthma. When control and intervention groups were compared, the patients receiving daily text alerts were experiencing better quality of life compared to their counterparts in the other group. So it can be concluded that the impact of daily reminders for increasing patient's adherence cannot be overlooked.[29]

Mishandling of asthmatic medication inhalation devices causes failure of the therapy to produce best outcomes, and contribute to unscheduled meetings of doctors and patients and visits to emergency department. Repetitive reminders, evaluation of the techniques and multiple follow-up with one trusted healthcare setting are found to be satisfactory in gaining best of the best selected medicine. There is nothing a good therapy can do if not administered properly.[30]

Pharmacists, by virtue of their position, have to play their part in managing the therapy of asthmatic patients. When they do so, it leads to better outcomes of therapy but the difference is significant only when accompanied by lifestyle modifications.[31]

Reminder programmes for improving patient behaviour towards compliance, if uninterrupted, are found to be effective in removing barriers between patients and their therapy in the long run.[32]

Awareness programmes regarding minimisation of out-of-pocket expenses for the management of disease, enhances patient's heed towards interventions available for the self-care of chronic diseases like asthma, COPD, diabetes, hypertension etc. and result in increased usefulness of such strategies.[33]

Conclusion

Inhaled drugs are considered an important pillar in the formation of a care plan for asthmatic patients. Common problems of asthmatic patients are related to adherence, side-effects and special technique required for the administration of drugs. The choice of drug and device must be made after critical evaluation of individual patient. Pharmacists are the last contact of the patients with any healthcare professional and constitute the final checkpoint where the deficiencies of counselling and training can be identified and resolved. Studies provide evidences that if appropriate training, adherence and counselling aids, like printed instructions, calendars, mobile dose reminders, refill records and refill reminders, are incorporated in the patients care plan, the best-suited therapy will produce better quality of life for asthma

patients.

Disclaimer: None.

Conflict of Interest: None.

Funding Sources: None.

References

1. Global Initiative for Asthma, Global Strategy for Asthma management and prevention, updated 2018. [Online] [Cited 2018 March 25]. Available from: URL: www.ginasthma.org.
2. D'Amato G, Vitale C, Molino A, Stanziola A, Sanduzzi A, Vatrella A, et al. Asthma-related deaths. Multidiscip Res Med 2016; 11: 37.
3. World Health Organization, Media centre, Asthma fact sheet. [Online] [Cited 2017 Dec 11]. Available from: URL: http://www.who.int/mediacentre/factsheets/fs307/en/
4. Global Initiative for Asthma, World asthma day. [Online] [Cited 2017 Dec 11]. Available from: URL: http://ginasthma.org/wad/
5. Chapman SCE, Barnes N, Barnes M, Wilkison A, Hartley J, Piddock C, et al. Changing adherence-related beliefs about ICS maintenance treatment for asthma: feasibility study of an intervention delivered by asthma nurse specialists. BMJ 2015; 5: e007354.
6. Inhaler Error Steering Committee, Price D, Bosnic-Anticevich S, Briggs A, Chrystyn H, Rand C, Scheuch G, et al. Inhaler competence in asthma: Common errors, Barriers to use and recommended solutions. Respir Med 2013; 107: 37-46.
7. Szefler SJ. Advancing asthma care: The glass is only half full! J Allergy Clin Immunol 2011; 128: 485-94.
8. Patadia MO, Murrill LL, Corey J. Asthma: symptoms and Presentation. Otolaryngol Clin North Am 2014; 47: 23-32.
9. Pakistan Chest Society, Asthma. [Online] [Cited 2018 March 25]. Available from: URL: http://Pakistanchessociey.pk/asthma/
10. Barnes PJ. Therapeutic approaches to asthma–chronic obstructive pulmonary disease overlap syndromes. J Allergy Clin Immunol 2015; 136: 531-45.
11. Sadatsafavi M, Lynd LD, De Vera MA, Zafari Z, Fitzgerald JM. One year outcomes of inhaled controller therapies added to systemic corticosteroids after asthma-related hospital discharge. Respir Med 2015; 109: 320-8.
12. Laforest L, Licaj I, Devouassoux G, Eriksson I, Caillet P, Chatte G, et al. Prescribed therapy for asthma:therapeutic ratios and outcomes. BMC Fam Pract 2015; 16: 49.
13. Hernandez G, Avila M, Pont A, Garin O, Alonso J, Laforest L, et al. Long-acting beta-agonists plus inhaled corticosteroids safety: a systematic review and meta-analysis of non-randomized studies. Respir Res 2014; 15: 83.
14. Price D, Roche N, Virchow CJ, Burden A, Ali M, Chisholm A, et al. Device type and real-world effectiveness of asthma combination therapy: An observational Study. Respir Med 2011; 105: 1457-66.
15. Scichilone N, Benfante A, Bocchino M, Braido F, Paggiaro P, Papi A, et al. Which factors affect the choice of the inhaler in chronic obstructive respiratory disease? Pulm Pharmacol Ther 2015; 31: 63-7.
16. Khan MT, Azhar S. A study investigating the community pharmacist knowledge about appropriate use of inhaler, estern Region Alahsa, Saudia Arabia. Saudi Pharm J 2013; 21:153-7.
17. Briggs A, chrystyn H, Rand C, Scheuch G, Bousquet J. Inhaler competence in asthma: common errors, barriers to use and recommended solution. Respir Med 2013; 107: 37-46.
18. Jackson JD, Sykes A, Mallia P, Johnston LS. Asthma exacerbations: Origin, effect and prevention. J Allergy Clin Immunol 2011; 128:1165-74.
19. Akinbami JL, Sullivan DS, Campbell DJ, Grundmeier WR, Hartert VT, Lee AT, et al. Asthma outcomes: Healthcare utilization and costs. J Allergy Clin Immunol 2012; 129: S49-64.
20. Chipps EB, Zeiger SR, Borish L, Wenzel ES, Yegin A, Hayden LM, et al. Key findings and clinical implications from the Epidemiology and natural history of asthma: Outcomes and Treatment Regimens (TENOR) study. J Allergy Clin Immunol 2012; 130: 332-42.
21. Cooper V, Metcalf L, Versnel J, Upton J, Walker S, Horne R. Patient-reported side effects, concerns and adherence to corticosteroid treatment for asthma, and comparison with physician estimates of side-effect prevalence: a UK-wide, cross-sectional study. NPJ Prim Care Respir Med 2015; 25: 15026.
22. Tran N, Coffman M J, Sumino K, Cabana DM. Patient reminder systems and asthma medication adherence: a systemic Review. J Asthma 2014; 51: 536-43.
23. Boulet LP, Boulay MÈ, Gauthier G, Battisti L, Chabot V, Beauchesne MF, et al. Benefits of asthma education program provided at primary care sites on asthma outcomes. Respir Med 2015; 109: 991-1000.
24. Voorend-van Bergen S, Vaessen-Verberne AA, Landstra AM, Brackel HJ, van den Berg NJ, Caudri D, et al. Monitoring childhood asthma: web-based diaries and the asthma control test. J Allergy Clin Immunol 2014; 133: 1599-605.
25. Vaidya V, Gupte R, Balkrishnan R. Failure to refill essential prescription medications for asthma among pediatric Medicaid beneficiaries with persistent asthma. Patient Prefer Adherence 2013; 7: 21-6.
26. Muller T, Muller A, Hubel C, Knipel V, Windisch W, Cornelissen GC, et al. Optimizing inhalation technique using web-based videos in obstructive lung diseases. Respir Med 2017; 129: 140-4.
27. Rubin AS, Souza-Machado A, Andradre-Lima M, Ferreira F, Honda A, Matozo TM; QUALITX Study Investigators. Effect of Omalizumab as Add-On Therapy on Asthma-Related Quality of Life in Severe Allergic Asthma: A Brazilian Study. J Asthma 2012; 49: 288-93.
28. Apter JA, Wan F, Reisine S, Bender B, Rand C, Bogen DK, et al. The association of health literacy with adherence and outcomes in moderate-severe asthma. J Allergy Clin Immunol 2013; 132: 321-7.
29. Strandbygaard U, Thomsen FS, Backer V. A daily SMS reminder increases adherence to asthma treatment: A three month follow up study. Respir Med 2010; 104: 166-71.
30. Melani SA, Bonavia M, Cilenti V, Cristina C, Lodi M, Martucci, P, et al. Inhaler mishandling remains common in real life and is associate with reduced disease control. Respir Med 2011; 105: 930-8.
31. Apikoglu RS, Yesilyaprak G, Izzettin FV. Drug-related problems and pharmacist interventions in a cohort of patients with asthma and chronic obstructive pulmonary disease. Respir Med 2016; 120: 109-15.
32. Foster MJ, Reddel KH, Usherwood T, Sawyer MS, Smith L. Patient-perceived acceptability and behaviour change benefits of inhaler reminders and adherence feedback: A qualitative study. Respir Med 2017; 129: 39-45.
33. Patel RM, Caldwell HC, Deen ID, Clark MN. Experiences addressing health-related financial challenges with disease management among African American women with asthma. Asthma J 2014: 51: 467-73.