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REVIEW ARTICLE

MEDICATION ADHERENCE IN ASTHMA PATIENTS: A REVIEW

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ABSTRACT

Asthma is one among the major health problem affecting a number of individuals. Effectiveness of treatment not only depends on righteousness and efficiency of drug used, but also depends on the patient adherence to the prescribed treatment. Non-adherence to treatment prescribed by a physician is an important cause for asthma. Rates of asthma treatment nonadherence among patients have been shown to be in the range between 30% and 70%. This increase is associated with increased health care costs and poor health care outcomes. Surrogate measures, like prescription counting, are not infallible. Therefore, assessment of adherence is of prime importance for asthma management, for reducing exacerbations and steroid-related adverse effects as well as hospitals and intensive care admissions, health care cost and inappropriate treatment. It is a common scenario which exists depending on the severity of asthma Patient outcomes can be improved by implementing methods to improve knowledge as well as use of preventive medications during the period when they feel better. Also, patients should be informed about the importance of regular intake of medications and also about long term use of inhalers.

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INTRODUCTION

Patient behaviour as well as guidelines based treatment are both as important for effective control of asthma.[1] Non-adherence to asthma medication is an ongoing problem in the health care system. People presenting with multiple disease will receive more number of medicines, may often tend to skip medication leading to nonadherence.[2] WHO defines the term, adherence as "the extent to which person's behaviour corresponds with agreed recommendations from health care provider".[3] The problem arising during asthma management include nonadherence to medicines prescribed by health care provider, non-adherence of provider, improper inhaler technique etc.[4] Thus, adherence is multifactorial and it is very essential to prevent problems arising with medication non adherence.[5] Asthma is one of the major public health problem affecting a large population.[6]It is a disease that has both acute and chronic components and often requires a complex management. Most of the patients with asthma are prescribed a complex regimen that includes multiple medications having different actions and also use of one or more different devices for the delivery of medications.[7, 8] The severity of asthma varies between and also within individuals.[9]

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Patients non adherence to asthma medication depends on various parameters including the total cost of the medication, inadequate knowledge about the condition as well as medication, etc., which determines the complexity of the condition and leads to increased morbidity and mortality.[10, 11]

Effect of patient knowledge and adherence

During the last few decades, various international guidelines have been generated with the aim of improving the management of patients with asthma as well as to improve the quality of care.[12] The guidelines focus on the use of anti-inflammatory medicines for asthma treatment and introduction of prophylactic medicines for controlling asthma. But it is very hard to gain long-term adherence to prescribed therapy.[13]

Different aspect of managing asthma is crucial for the effective control of the disease. It is important to have a deep knowledge of the disease, its management and various treatment techniques available.[14] Lung function tests play a vital role in knowing about the disease progression. It is also important to consider the patient's knowledge about the condition.[15] Asthma medications are directly designed to be directly delivered into the lungs. For effective output, the patient or caretakers must have a good knowledge about the correct delivery methods of various medications.[13] Rate of medication non-compliance with the therapeutic management in asthma in high.[16]

Patient should be educated about the logic behind treatment, which help them to lead a healthy life. Therefore, maintaining adherence is challenged in asthma management.[17]

METHODS FOR MEASURING ADHERENCE

Measuring of medication adherence is vital in order to reduce problem arising from non-adherence. WHO categorizes measurements for medication adherence as subjective and objective measurement.[18] Subjective includes those measurements which require the provider or patient assessment of proper medication taking behaviour. Two most common tools to measure adherence include self-reporting and medical professional assessment.[19] One of the major disadvantage with this same patient either may not report or under report this noncompliance in order to avoid disapprovals from the provider (physician).[20] Objective measurements are electronic monitoring pill counts, analysis using secondary data basis and biochemical measures. Objective measurements are often used to correlate and validate the subjective ones.[21] The subjective and objective measurements may sometimes call as direct or indirect.[22] Modi et al., had reported an average of 88% and 86% adherence rates before and after the visit and decreases to 67% after one month of visit.[23] A new tool for assessing self-reported medication adherence called the Medication Intake Survey-Asthma (MIS-A) was made which is delivered via computer-assisted telephone interviews (CATIs) and asks about different complementary adherence properties like therapeutic coverage ,correct dosing, taking adherence, drug holidays, overdosing etc.[24]

MEASURING USING ELECTRONIC MEDICATION PACKAGING (EMP) DEVICE

Electronic Medication Packages (EMPs) are introduced into the packaging of a medication which has been prescribed. These devices are available in different forms. This includes those which records and store dose events, others having audio visual reminders, real time monitoring, digital displays, feedback on performance of adherence, etc.[25]All the features will not be present in one device. Medication events monitoring system (MEMS) is most widely used.[26] In MEMS, a macro-processor will be present, which would record the date and time, whenever a medicine has been removed from the system in assumption that the patient has consumed dose at that particular time.[27]

INTERVENTIONS FOR NONADHERENCE

Patients tend to face many barriers while taking asthma medications. The problem faced by one population will not be similar to those in other population.[11]Various interventions for improving adherence include patient education programmes to improve communication between clinicians and patients. This intervention is based on barriers like misunderstanding about life.[28] Emerging interventions are simpler methods when compared to older ones using electronic monitoring and feedback system, including text message which focus on the younger population. Reminder system is used in smart inhaler [29, 30] and MDIlog II has shown to be well accepted by patients, which failed to improve adherence.[31] Use of web based programme and also text messaging also improve the compliance. For effective control of this barrier, we have to first identify the underlying cause for non-adherence.[32] Sometimes the adherence may be unintentional which occurs when patient incorrectly hear the instructions given by healthcare provider.[33] A shared decision-making process on decision of treatment regimen was used by Wilson et al., which improves adherence and outcomes in poorly controlled asthma. Adherence for each year can be measured by continuous medication acquisition (CMA) index. It is defined as the total days of supply acquired in a given year divided by 365 days. Shared decision-making compared with clinician decision-making resulted in better controller adherence (CMA, 0.67 vs. 0.46, $P<0.0001$) and better clinical outcomes (quality of life, asthma control, health care utilization and lung function) over a 1-year period.[34]

FACTORS AFFECTING MEDICATION ADHERENCE

- **Social/ Economic**

The patient having good support from friends or caretakers showed better adherence with treatment. Poor socioeconomic status, those who cannot afford the medication cost and burdensome-work schedule are factors causing decreased adherence.[35] Patients may not be able to take time off work for treatment; as a result, their rate of compliance could be threatened.[36, 37]

- **Provider / health care system**

A good relationship should exist between patient and the health care provider, which provide a positive impact on compliance, lack of communication, unaware about the medication adverse effect, etc. also led to non-adherence.[38] The main factor identified relating to healthcare systems include availability and accessibility. Lack of accessibility to health care, long waiting time for clinic visits, difficulty in getting prescriptions filled and unhappy or unsatisfied clinic visits all contributed to poor compliance.[37,39,40]

- **Condition related**

In case of chronic disease, drugs should be taken for a long time, which leads to adherence over time. When the patient feels like he has no symptoms and every illness has been used means the patient think that there is no need for further treatment or no use with continuation of therapy.[41-43]

- **Therapy related**

The total number of medicines, the number of daily doses required, the duration of therapy etc is crucial. Noncompliance may also occur when the therapy interfere with lifestyle factors or when heard about side effects.[44,45]

- **Patient related**

Patient-related factors include patient's age, gender, education, marital status, etc. Cognitive limitations and physical impairment increase risk of non adherence. Poor knowledge, lack of motivation, low efficacy also associated with poor medication adherence.[46]

Age

The effect of age affecting compliance can be divided into 3 groups from a review of articles showing a correlation between age and non-compliance; the elderly group (over 55 years old), the middle-age group (40 to 54 years old) and the young group (under 40 years old). Focusing on younger people (mean age 46–50 yr) has indicated the trend that compliance increased with the increasing age Caspard et al.,[47]

Middle-aged patients (40–59 years) were less likely to be compliant to medication therapy Iihara et al.,[48] For elderly people, the results from different studies are not unidirectional. A large proportion of retrieved studies suggested that they might have higher compliance Hertz et al.[49]

Educational level

Several studies found that patients with higher educational level might have higher compliance Yavuz et al., [50,51]. This is because patients with higher education level should have better knowledge about the disease and therapy and therefore be more compliant. But some studies found no association with the education level Wai et al.[40]

Marital status

One of the main reasons for married patients to be more compliant with medication than single patients is because of the help and support from the spouse. However, in 5 percent studies, marital status was not found to be related to patient's compliance Kenya et al.[52]

Other factors

Smoking or alcohol intake

These were many studies which confirm non-adherence in hypertension, asthma or kidney transplantation patient who consumed alcohol or smoked.[53] A study conducted in Finland among hypertensive patients, non-smokers are more complaint to diet restriction.[54] Another study conducted about the hypopnea syndrome obstructive sleep apnea, no relationship exist among alcohol intake or smoking and patient compliance with continuous positive airway pressure treatment.[53]

Route and duration

A more convenient route of administration improves patient compliance. According to a study conducted in asthma patients better compliance was found among oral administration[55].

HOW TO IMPROVE MEDICATION ADHERENCE?

First, it is very important to identify the exact cause for over or under treatment. The new method should be very simple and easily implementable in all setting.[56] Information and education regarding the treatment regimen to patients as well as their caregivers is very important. In case of complex regimens, find a method to simplify treatment either by decreasing dose or reducing frequency may be very helpful.[57] Inhalers are often prescribed for patient suffering from asthma. In the chronic condition may be patient have to use two inhalers, in such case combination will be more effective and help to improve adherence. But comparing oral and inhaler, oral therapy is showing improved adherence.[58] Patients can make use of telemonitoring devices like phone or messaging services to improve adherence.[59] Different categories of interventions are considered effective and safe for improving adherence. The strategy used for each population may be different.[60]

Self-management education

Educating the patient is very effective for self-management of asthma. For successful adherence promotion, we have to provide reinforcement for patient's in order to promote efforts to change, tailor education to patients needs and circumstances, providing feedback on progress and continuity of care and education.[61] Jansen et al.,[62] showed that participants who received an individualized self-management intervention, had 3-fold greater odds of higher than 60% adherence at the end of the study and were less likely to report night time awakenings or use of rescue medication. It is very important that the provided information should be understandable by either the patient or his care giver. Educational materials, its format and presentation style should therefore be appropriately provided according to the literacy needs of each patient and health care providers should confirm understanding using a "tell me back" style of education.[62]

Patient adherence monitoring and feedback

Monitoring of patient's adherence has shown promise in improving asthma self-management along with providing feedbacks. With the help of an electronic MDI to monitor inhaler adherence in adults with asthma Onyirimba et al.[63] In present day, various electronic adherence data using this devices were used to provide direct clinician-to-patient feedback. After a 12 week period, a 70% increase in adherence has been shown in the intervention group when compared with adherence below 50% in the control group.[64]But the use of this electronic monitoring devices is generally impractical in most clinical settings. The clinicians who used patient pharmacy-based adherence data during an asthma clinical encounter shown an increase in adherence Williams et al.[65] However, providing feedback through monitoring of pharmacy records has also found to be an effective strategy for improving adherence.[66]

Patient-provider visits and communication

Providers should be encouraged to use their visits to know a review on the key aspects of patient care, such as medication treatment plans, inhaler technique, adverse effects, adherence, etc. The use of validated objective assessments of asthma control such as Asthma Control Test (ACT) is recommended by NAEPP (The National Asthma Education and Prevention Program**)** guidelines.[67] All these recommendations are provided not only to improve patient care and outcomes but also for provider Maintenance of Certification (MOC) for board certification. The quality and the nature of patient-clinician communication about asthma has also been shown to be related to improved adherence to therapy.[68]

Technological interventions

Patient compliance with asthma self-management is an ongoing and a very active, long term method which should be adaptable to patients. Its tools are widely being used in current scenario. It offers many different applications at a reasonable cost with reminders, monitoring and prompt facilities.[59] Example: adherence promotion messages are sent to patient at a lower cost using interactive phone messaging systems, helping to improve compliance SMS, text messaging is also widely used today. Texting using individualized messages according to medications also help to improve adherence to a small extent.[33, 69]

PHYSICIAN'S ADHERENCE TO ASTHMA GUIDELIENES

A medical practitioner's adherence to asthma treatment guideline is very essential and play a vital role for improved

outcome. An experienced practitioner always writes a prescription with regard to standard regimen.[70] In order to improve prescribing pattern, physician can make use of the CMS programme (continuing medical education).[71] Interactive case discussion in a small group will be very helpful and compliance with new guidelines also promotes improved practice like enhancing information materials like patient specific interventions are also effective.[72,73]

CONCLUSION

Non-adherence to the prescribed treatment is often a frequent problem in patients with asthma. It is a common scenario which exists depending on the severity of asthma. In order to reduce the non adherence, patients should be informed about the importance of regular intake of medications and also about long term use of inhalers. Patients having faith in the physician and the prescribed method of treatment are more likely to adhere to the treatment. Non-adherence arising in asthma is an individualized phenomenon. No single compliance, improving strategy is as effective as multiple approaches in the context of a good physician–patient relationship become of the following. Physicians should access to be organized about the proven methods to assess, tailor and treat medication nonadherence in asthma patients. It is a key hindrance in combating the challenges of public health in both developed and developing countries. For the success of pharmacotherapy, healthcare professionals and researchers have to utilize all the available methods existing within their limits of practice in order to improve medication adherence.

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