Abstract

The rising importance of educating asthma patients about their medication and devices and how to use them and the impact of this knowledge on controlling the disease and improving the quality of life has attracted great interest from researchers in assessing the current situation of dealing with the disease in their community. The purpose of this study is therefore to assess the knowledge of asthma patients about their medication and devices, highlight the problems in the advice provided by health-care providers to asthma patients and study the potential impact of education on the management of asthma. The study was also designed to encourage health-care providers to provide appropriate education for patients and develop an educational program for the management of asthma. A cross-sectional study was conducted using two types of questionnaire, the first directed at asthmatic patients to assess their knowledge and the other directed at health-care providers to assess the challenges, which they faced in advising patients. The results showed that patients’ awareness of asthma was of a medium level. Moreover, the level of challenges faced by health-care providers when advising patients to teach them how to use asthma medications and devices was also of a medium level. The most significant problems were time and lack of patient interest. The findings explained that asthmatic patients in Hail region need improvement in their level of awareness about the use of asthma medications and devices in order to achieve a higher degree of disease control, which will be achieved through the development and implementation of an educational program by health-care providers.

Keywords: Asthma Devices, Asthma Education Program, Asthma Management, Prevention

1. Introduction

Asthma is a chronic inflammatory disorder of the airway characterized by a sense of shortness of breath, chest tightness, wheezing, dyspnea and coughing. There are many trigger factors for asthma-like symptoms, for example allergens (pollens, animals and house dust), indoor air pollution (soap, dishwashing liquids, cosmetics, facial creams and shaving cream), drugs (aspirin, ibuprofen, beta-blockers and penicillins), foods (nuts) and other industrial triggers such as wood and cotton dust. The medications for asthma include anti-inflammatory drugs (glucocorticoids, mast cell stabilizers, leukotriene antagonists) and bronchodilator drugs (Beta 2 adrenergic agonists, methylxanthines, anticholinergics). Inhaled drug device is the keystone in the management of patients across a spectrum of respiratory diseases such as asthma1.

There are some drug delivery systems and special devices which are used for asthma management such as Metered Dose Inhalers (MDIs), dry powder inhalers and nebulizers. Surprisingly this subject has not been discussed
much in spite of its importance. One of the few studies, which have addressed it, was an evaluation of an asthma education program for adults that focused on improving asthma control and reducing readmission rates through increased patient knowledge and the development of self-management skills. The result was substantial changes in illness behavior and the development of a brief asthma education program on the use of health care facilities\(^2,3\). Hilton (1996) carried out a controlled evaluation of the effects of patient education on asthma morbidity in general practice and the results encouraged the development of self-management skills in asthmatic patients. There were two different patient education programs for asthma in general practice involved in that study: One group received a maximum education program, the second group received a limited education program and a third group acted as a control group. In both of the intervention groups, the understanding of asthma was increased but only in the maximum intervention group was there a significant improvement in knowledge about asthma. These simple informational education programs were ineffective when applied to a general practice population. Further studies of the factors affecting attitudes, beliefs and actions are therefore needed in order to improve the advice and support given to asthma patients\(^4\). Wilson (1991) compared changes in asthma symptoms, the utilization of medical services, knowledge about asthma, MDI technique and self-management behavior in 323 adults before and after educating them about asthma and found that the self-management education programs were associated with significant improvements in the control of asthma\(^5\).

Asthma medications need to be accompanied by important instructions on how to use them and in this regard, health-care providers have a duty to educate patients on how to use asthma medications. Due to the lack of published research on this subject, the current researchers realized the importance of focusing on how health-care providers offer an educational service to ensure the provision of sufficient information on how asthma devices are used in order to improve the quality of life for patients with asthma in Hail region.

2. Methodology

A cross-sectional study using two types of questionnaire was carried out between November 2019 and April 2020. The questionnaires were self-designed to meet the objectives of the research and to encourage respondents to provide accurate, unbiased and complete information. The first online questionnaire for use with asthmatic patients had closed questions to assess their awareness of the use of asthma medications, and the other was designed for use with health-care providers to assess the challenges which they face when advising patients on how to use asthma medications. Ethical approval was not required since the nature of the data in the manuscript is not critical and the study would generally be considered a low-risk project (answering an online questionnaire and failed to meet the participants directly due to the corona virus pandemic). Depending on a CI of 95% and population percentage of about 10%, sample size was calculated to be about 150\(^6\). Patients who were able to participate and answering the online questionnaire were asthmatic patients who had already been diagnosed and had visited the public inpatient and outpatient clinics in Hail hospitals for this purpose. Mothers of young children were excluded from the study. Data entry and coding were carried out and analyzed using Statistical Analysis Software (SAS 9.3).

Table 1. Demographic Characteristics of Patients Participated in the Study

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*HTN: Hypertension.  
*DM: Diabetes mellitus.  
*CVD: Cardiovascular disease.  
*NM: Not mentioned.  
***Values are mean ± SD; (n = 120).  

| **Distribution of the Sample by Gender (%)** | **Distribution of the Sample by Age (%)** | **Distribution of the Samples According to Case History of Asthma** | **Distribution of the Sample According to Concomitant Diseases** | **Distribution of the Sample by Occupation** |
|---|---|---|---|---|
| Male Female | 15-30 Years 40-50 Years >50-60 Years >60 Years 5-10 Years 20-30 Years >30-40 Years >40 Years | *HTN* | *DM* | *CVD* | *NM* | Not-working Student Employed Self-employed |
|---|---|---|---|---|---|---|---|
| 62.5 37.5 | 37.5 29 26 7.5 | 45 45 7.5 2.5 | 27.5 22.5 12.5 37.5 | 45 20 30 5 |
3. Results

To assess patient awareness about the use of asthma medications and to identify problems in the advice provided by health-care providers for patients with asthma in the Hail region, data were collected online from 120 participants and 30 doctors and pharmacists. Two types of online questionnaires were administered as described above, one to assess patients’ awareness about the use of asthma medications and the other to assess the challenges faced by health-care providers when advising patients how to use asthma medications. Data analysis was performed using SPSS V23 and Excel-2013. The results were as follows.

Table 1 showed that participants were 62.5% more likely to refer to a male than female 37.5%. Moreover, 37.5% of the sample was aged between 15 and 30 years, 29% of the sample was aged between 40 and 50 years, 26% between > 50 to 60 years and 7.5% more than 60 years. In the same table, we found that 45% of the patients had a case history of asthma from 5 to 10 years, 45% from 20 to 30 years, 7.5% more than 30 to 40 years and only 2.5% of the sample had case history of asthma over more than 40 years. Based on comorbidity, the most frequent associated diseases with the asthmatic patients were hypertension (27.5%), diabetes (22.5%) and cardiac disease (12.5%). Concerning patients’ occupations the result was showed that 45% of the patient participants were not working, 20% was students and 30% were employed and 5% were self-employed.

Figure 1 explained that 80% of the patients had used a sprayer, 12.5% steaming and 7.5% a mist inhaler during an asthma attack.

Table 2. Patient awareness level about using asthma medications with challenges faced by health-care providers when giving information to a patient

| No. Of Participants | Question                                                                 | Mean  | SD     | Relative weight % | Degree | Rank |
|---------------------|---------------------------------------------------------------------------|-------|--------|-------------------|--------|------|
| 120                 | Did the heath-care provider give you instructions about your drug and/or device? | 1.25  | 0.439  | 62.50             | Medium | 6    |
|                     | Did you understand the instruction given by your health-care provider?     | 1.25  | 0.439  | 62.50             | Medium | 7    |
|                     | Did they give you enough time for your questions?                          | 1.40  | 0.496  | 70.00             | Medium | 4    |
|                     | Did they ask you to repeat the information?                                | 1.68  | 0.474  | 84.00             | High   | 1    |
|                     | Do you ever forget to take your medication?                                | 1.43  | 0.501  | 71.50             | Medium | 3    |
|                     | Are you careless about the time you take your medication?                  | 1.55  | 0.504  | 77.50             | Medium | 2    |
|                     | When you feel better, do you sometimes stop taking your medication?        | 1.12  | 0.335  | 56.00             | Weak   | 8    |
|                     | Do you sometimes feel worse when you take the medicine?                   | 1.28  | 0.452  | 64.00             | Weak   | 5    |
|                     |                                                                           | 1.37  | 0.45  | 68.50             | Medium |      |
A reliable eight-item questionnaire was designed to establish patient awareness levels about using asthma medications and devices. The results set out in Table 2 showed that patients’ awareness of asthma management was of medium level and have a relative weight 68.50%. This indicates the need to improve patients’ level of awareness about the use of asthma medications in general in order to achieve a higher level of awareness in the future. In addition, the same table was exhibited the responses given by the health-care providers to the five questions about the challenges, which they had encountered when giving information to patients: 50% of the health-care providers said that time was a problem and the other 50% said that the lack of interest by the patients was a problem. Finally the same table measures the challenges that health care providers faced when advising patients on how to use asthma medications and devices that were at an average level and had a relative weight of 69.70%.

4. Discussion

There are various drug delivery systems and special devices used for asthma management, such as MDIs, dry powder inhalers and nebulizers. Asthma medications need to be given with important instructions on how to use them and health-care providers therefore have a duty to educate patients on how to use asthma medications. The findings from this study show that the patients’ awareness of asthma management was at a medium level and that the level of challenges faced by health-care providers when advising patients how to use asthma medications was at a medium level, as well. This suggests a need to improve the level of patients’ awareness of the use of asthma medications in general in order to achieve a higher level in the future. These results are consistent with those of previous published reports on asthma education. One purpose of this current study was to assess knowledge of asthma self-management among adult asthma patients. Their knowledge of asthma self-management was found to be low. Patients with a better knowledge of asthma self-management had better asthma control. In addition, a higher education level was associated with greater knowledge of asthma self-management. Regarding the challenges which the health-care providers had faced while giving information to patients, half of the health-care respondents stated that time was a problem and the
other half reported a lack of interest in this problem among patients; which is similar to the findings reported in many previous studies\(^9\). There was often a communication gap between the health-care providers and the patients, which could lead to a lack of interest by the patient. The findings also suggest that educating patients about asthma and about self-management education programs would lead to significant improvements in the control of asthma\(^10\). We therefore suggest that a patient education program should be developed to optimize asthma management and thereby improve the quality of life\(^11,12\) for asthma sufferers.

5. Conclusion

Asthma management and control needs action from both health-care providers and patients. Asthma medications and devices need to be given with important instructions on how to use them, so health-care providers have a responsibility to educate patients on how to use asthma medications in order to improve patients’ awareness about their own disease control. The patient may have a different view of things and may have doubts about the technology to monitor the use of the inhaler. They can be considered as a means of punishment rather than giving them power. Therefore, innovation should not only measure results, but also support self-management processes\(^13-15\). The patients’ awareness of asthma management techniques was found to be at medium level, showing that there is a need to improve patients’ level of awareness about the use of asthma medications and devices in general in order to achieve a higher degree of awareness in the future.

6. Conflict of Interest

The authors declare that there is no any conflict of interest.

7. References

1. Usmani OS. New developments in inhaled drugs: Within and beyond the lungs. Respiration. 2014 Jun 1; 88(1):1. PMid: 24801444. https://doi.org/10.1159/00036258
2. Young LY, Koda-Kimble MA, Kradjan WA, Guglielmo BJ, editors. Applied therapeutics: The clinical use of drugs. Vancouver: Applied therapeutics; 1995.
3. Yoon R, McKenzie DK, Miles DA, Bauman A. Characteristics of attenders and non-attenders at an asthma education program. Thorax. 1991 Dec 1; 46(12):886–90. PMid: 1792635. PMCid: PMC463493. https://doi.org/10.1136/thx.46.12.886
4. Hilton S, Anderson HR, Sibbald B, Freeling P. Controlled evaluation of the effects of patient education on asthma morbidity in general practice. The Lancet. 1986 Jun 1; 327(8471):26–9. https://doi.org/10.1016/S0140-6736(86)91904-5
5. Wilson SR, Scamagas P, German DF, Hughes GW, Lulla S, Coss S, Chardon L, Thomas RG, Starr-Schneidkraut N, Stancavage FB, Arsham GM. A controlled trial of two forms of self-management education for adults with asthma. The American Journal of Medicine. 1993 Jun 1; 94(6):564–76. https://doi.org/10.1016/0002-9343(93)90206-5
6. Altman DG. Why we need confidence intervals. World Journal of Surgery. 2005 May; 29(5):554–6. PMid: 15827844. https://doi.org/10.1007/s00268-005-7911-0
7. Al-Moamary MS, Alhaider SA, Alangari AA, Al Ghabain MO, Zeitouni MO, Idrees MM, Alanazi AF, Al-Harbi AS, Youssef AA, Alorainy HS, Al-Hajjaj MS. The Saudi Initiative for Asthma - 2019 Update: Guidelines for the diagnosis and management of asthma in adults and children. Annals of Thoracic Medicine. 2019 Jan; 14(1):3. PMid: 30745934. PMCid: PMC6341863. https://doi.org/10.4103/atm.ATM_327_18
8. Nguyen VN, Huynh TT, Chavannes NH. Knowledge on self-management and levels of asthma control among adult patients in Ho Chi Minh City, Vietnam. International Journal of General Medicine. 2018; 11:81. PMid: 29520161. PMCid: PMC5833772. https://doi.org/10.2147/IJGM.S157050
9. Prabhakaran L, Lim G, Abisheganaden J, Chee CB, Choo YM. Impact of an asthma education program on patients’ knowledge, inhaler technique and compliance to treatment. Singapore Medical Journal. 2006 Mar 1; 47(3):225.
10. Wilson SR, Scamagas P, German DF, Hughes GW, Lulla S, Coss S, Chardon L, Thomas RG, Starr-Schneidkraut N, Stancavage FB, Arsham GM. A controlled trial of two forms of self-management education for adults with asthma. The American Journal of Medicine. 1993 Jun 1; 94(6):564–76. https://doi.org/10.1016/0002-9343(93)90206-5
11. Onyedum CC, Ukwaja KN, Desalu OO, Ezeudo C. Challenges in the management of bronchial asthma among adults in Nigeria: A systematic review. Annals of Medical and Health Sciences Research. 2013 Sep 18; 3(3):324–9. PMid: 24116307. PMCid: PMC3793433. https://doi.org/10.4103/2141-9248.117927
12. Rance KS. Helping patients attain and maintain asthma control: Reviewing the role of the nurse practitioner. Journal of Multidisciplinary Healthcare. 2011; 4:299. PMid: 21847352. PMCid: PMC3155860. https://doi.org/10.2147/JMDH.S22966
13. Axelsson M, Bjork B, Berg U, Persson K. Effect of an educational program on healthcare professionals’ readiness to support patients with asthma, allergies and Chronic Obstructive Lung Disease for improved medication adherence. Nursing Research and Practice. 2020 Oct 27; 2020. PMid: 33194229 PMCid: PMC7641675. https://doi.org/10.1155/2020/1585067

14. Van Beest W, Boon WP, Andriessen D, Moors EH, van der Veen G, Pol H. Successful implementation of self-management health innovations. Journal of Public Health. 2020 Jul 1: 1–5. https://doi.org/10.1007/s10389-020-01330-y

15. McCleary N, Andrews A, Buelo A, Captieux M, Morrow S, Wiener-Ogilvie S, Fletcher M, Steed L, Taylor SJ, Pinnock H. IMP 2 ART systematic review of education for healthcare professionals implementing supported self-management for asthma. NPJ Primary Care Respiratory Medicine. 2018 Nov 6; 28(1):1–2. PMid: 30401831 PMCid: PMC6219611. https://doi.org/10.1038/s41533-018-0108-4