Research Article

Self-management and control of asthma among adult patients in King Faisal medical complex Taif, KSA

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ABSTRACT

Self-management of asthma is crucial for disease control and has a positive impact on patient quality of life. This study was conducted to identify the level of self management and control of asthma among Saudi patients, together with exploring to predictor of level of disease control. A cross- sectional study was conducted during June–August 2016 at the Chest Clinic in King Fasial Medical Complex; Taif; KSA. Adult patients aged > 18 years old diagnosed with asthma at least 6 months before starting data collection were recruited. A convenience method of sampling was adopted. Data was collected through face-to-face interview method using a structured questionnaire.
Self- management was measured by the Asthma self-Management Questionnaire (ASMQ) and disease control by the Asthma Control Test (ACT). Data was processed using the Statistical Package for Social Sciences (SPSS) software (version 21). One way ANOVA was used. P<0.05 was interpreted as significant. Overall, 259 patients were included, of them 158 (61%) were females. One quarter of the patients aged < 60 year old. The mean score for (ASMQ) was 3.5 +1.6 and only 10 (3.9%) attained >50% of the total score. Patients with uncontrolled disease were 111 (42.9%), while 86 (33.2%) were classified with partially control asthma and 62 (23.9%) with controlled disease. The results showed that male gender (P< 0.001) and intermediate educational level and above (P=0.001) were associated with better control. In this setting, the rate of asthma control was low and the patients had wide gaps in knowledge of important items related to asthma preventive strategies and medication use which are crucial to self- management of the disease. Substantial efforts to upgrade patients' knowledge are urgently needed, through intensive patient education.

Key words: Asthma; Self-management; Control, Self-management; Saud

INTRODUCTION

Asthma is a common chronic complex disorder of the airways, which is characterized by variable and recurrent symptoms, obstruction of air flow, bronchial hyper responsiveness associated with underlying inflammation[1]. The prevalence of asthma in Saudi Arabia is increasing, with 2 million Saudis living with the disease.[2]

The ultimate goal of asthma treatment is to control the disease, which can be achieved through proper treatment[3]. Asthma control'' refers to the extent to which the clinical signs and symptoms of asthma have been reduced or removed by treatment.[4] Asthma control involves; controlling both frequency and severity of the symptoms, together with reducing disability occur as a consequence of the disease.[5] This beside minimizing the risk of future exacerbations, preventing deterioration of the lung function and absence of side effects of medication.

Poor control of asthma was documented in several studies, with different factors implicated in the uncontrolled disease. These factors are diverse in nature and can be patients related, disease related or doctor related ones.[6] For example, Nguyen et al found different factors associated with poor control of asthma like; ethnicity, being unemployed, educational level below secondary and smoking.[7] In addition, they noted difficulty to access medical care and the unaffordability of asthma medication as important determinants. In contrast, other researchers identified associations between asthma control and adherence to treatment, level of patient knowledge about the disease, body mass index, gender, and frequency of check-up.[8] The degree of asthma control has a significant impact on health-related quality of life.[9]

Self-management refers to "the ability of the individual, in conjunction with family, community, and healthcare professionals, to manage symptoms, treatments, lifestyle changes, and psychosocial, cultural, and spiritual consequences of health conditions[10].The patient should be provided with a written action plan which guide him/her on strict adherence to treatment, recognition of deterioration and action to be taken[11].

Considering the high level of uncontrolled asthma reported by some researchers among Saudi patients[12-14], underutilization of the asthma education as an important component in the process of care and absence of asthma educators[15]. This study was conducted to identify the levels of self-management and control of asthma among Saudi patients, together with exploring the predictors of level of disease control.

MATERIALS AND METHODS

Study design and setting:

A cross- sectional study was conducted during June –August 2016 at the Chest Clinic in King Fasial Medical Complex; Taif; Saudi Arabia.

Inclusion criteria and Exclusion criteria:

The study included patients aged $\geq$ 18 years old diagnosed with asthma at least 6 month before starting data collection. However**,** patients had major medical morbidity or mobility limiting co-morbidity and those with cognitive impairment and unable to communicate verbally were excluded immediately. In addition, patients who refused to participate in the study, pregnant or lactating women and patients with chronic obstructive pulmonary disease or an illness with symptoms similar to asthma were also excluded.

Sample size and sampling technique:

A convenience method of sampling was adopted and a total of 259 patients were included.

Data collection

Data were collected by final year Pharm D students who received intensive training on how to collect the data and conduct interview with the patients. Data was collected through face-to- face interview method using a structured questionnaire. The data collection tool was divided into the following sections-

1- **Socio-demographic section:-** This part included information on gender, age in years, educational level, marital status, employment status, duration of the disease, and smoking status.

2- **Asthma self-Management Questionnaire (ASMQ):** ASMQ is a previously tested and validated tool, which assess the patients' level of self-care management. The tool is 16-item, multiple choice questions which measure knowledge of preventive strategies, inhaler use, and medications [16]. Two items related to the use of spirometer were omitted. The scores for the tool was calculated as

follows: (1) One point was assigned to each preferred response (2) All the points was summed to generate the raw score (3) The raw score range 0-14 (3) the raw score was transformed to range from 0-100 higher scores indicate more knowledge of asthma self-management.

3- **Asthma Control Test (ACT)**[17]: The Arabic version of ACT translated by the Saudi Initiative of Asthma was used to assess the level of control of the disease . The test composed of 5-items which assess the frequency of occurrence of shortness of breath, frequency of occurrence of asthma symptoms at night or early in the morning, degree of functional limitation, frequency of using rescue medicines, and patient assessment of the level of asthma control. Each item has 5 responses choice and given the score 1-5. Accordingly, the level of asthma control correlated to the score as follows: total control (score 25), control (score 20-24), partial control (score 16-19) and uncontrolled (score < 16).

Instrument Translation Process:

Asthma self-Management Questionnaire (ASMQ) was translated according to WHO process of translation and adaptation of instruments[18]. Implementation of this method involved the following steps: forward translation, expert panel back-translation, pre-testing and cognitive interviewing and the final version.

Pilot study:

A pilot study was conducted to test the questionnaire with a group of 10 patients to verify the feasibility and acceptability of the questionnaire and to establish the time frame for data collection. Minor observations were suggested and finally adopted in the final version.

Data analysis:

Data was processed using the Statistical Package for Social Sciences (SPSS) software (version 21). Descriptive statistics were used to describe all variables. Possible associations between socio-demographic variables and the level of asthma control were explored using one way ANOVA.$P<0.05$wasinterpretedassignificant.

RESULTS

Demographic characteristics:

Overall, 259 patients were included, of them 158 (61%) were females. Patients aged $\leq$ 60 years old constituted nearly three quarters and the majority was residing in the town. One third of the patients admitted attendance of formal health education session/s about asthma. Table (1) showed participants socio-demographic data.

Table (1): Demographic data

Demographic	Frequency	Percent
Gender		
Male	101	39.0
Female	158	61.0
Age in years		
≤60 Years	193	74.5
>60 Years	066	25.5
Residence		
Town	201	77.6
Outside the town	058	22.4
Educational level		
Intermediate & above	155	59.8
Below intermediate	104	40.2
Marital status		
Married	181	69.9
Single	078	30.1
Employment		
Employed	125	48.3
Unemployed	134	51.7
Smoking status		
Smoker	035	13.5
Ex-smoker	045	17.4
Non-smoker	179	69.1
Duration of asthma		
0-10 years	102	39.4
>10 years	157	60.6
Attending formal asthma education		
Yes	087	33.6
No	172	66.4
Total	259	100

Table-2: Correct responses to the item of Asthma self-Management Questionnaire (n=259)

No.	Question	Frequency (%)
1	A main method to prevent asthma flare-ups is to get a flu vaccine	18 (6.9)
2	Taking the prescribed two puffs of your inhaler two times a day is not the same as any other regimen	35 (13.5)
3	If you are not having asthma symptoms you should still avoid triggers	137 (52.9)
4	Maintenance medicines help prevent future symptoms	57 (22.0)
5	Rescue medicines should not be taken three or four times a day	43 (16.6)
6	When using your inhaler you should inhale slowly	108 (41.7)
7	After you have used your inhaler, you should hold your breath for several seconds	169 (65.3)
8	If you having symptoms and don't know why, the first thing you should do is change your immediate environment	36 (13.9)
9	Taking more rescue medicines than prescribed may mean you need more maintenance medicines	17 (6.6)
10	For people with asthma, exercise can help improve breathing capacity	44 (17.0)
11	There is no known cure for asthma	66 (25.5)
12	Asthma flare-ups can occur when several minor triggers come together	61 (23.6)
13	If you are prescribed a seven -day course of steroid pills you should finish the prescription even if you feel better after several dose	57 (22.0)
14	Reducing the stress level, drinking a plenty of water and avoiding food with sulfites, such as dry fruits can help control asthma	70 (27.0)

Responses and total score to Asthma self-Management Questionnaire:

Table (2) showed the correct responses to the items of Asthma self-Management Questionnaire. Overall, The mean score for (ASMQ) was 3.5 ±1.6 and only 10 (3.9%) attained ≥ 50% of the total score, however the rest were below this cutoff point.

Table (3) Response to the Asthma Control Test

During the past 4-weeks, how often have you had shortness of breath				
More than once a day 12.7	Once a day 16.2	3-6 times a week 19.2	Once or twice a week 33.6	Not at all 18.1
During the past 4- weeks how often did your asthma symptoms wake you up at night or earlier than usual in the morning				
4 or more night a week 9.7	2-3 nights a week 21.2	Once a week 29.3	Once or twice a month 23.9	Not at all 15.8
In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, at school, at home				
All of the time 6.6	Most of the time 11.2	Some of the time 25.5	A little of the time 36.3	None of the time 20.5

During the past 4 weeks, how often have you used your rescue inhaler or nebulizer medication				
3 or more times per day 11.2	1-2 times per day 28.6	2-3 times per week 24.3	Once a week or less 24.7	Not at all 11.2
How would you rate your asthma control during the past 4 weeks				
Not controlled at all 3.9	Poorly controlled 18.9	Somewhat controlled 31.3	Well controlled 37.3	Completely controlled 8.5

Table (4): Predictors of asthma control

Demographic variable	Level of asthma control (%)			Total (n=259)	F	P value
	Controlled	Partially controlled	Uncontrolled			
Gender Male Female	29.7 20.3	44.6 25.9	25.7 53.8	101 158	14.364	<0.001
Age in years $\leq$60 Years >60 Years	24.4 22.7	34.7 28.8	40.9 48.5	193 066	0.652	0.422
Residence Town Outside the town	25.4 19.0	33.8 31.0	40.8 50.0	201 058	1.734	0.189
Educational level Intermediate & above Below intermediate	27.1 19.2	40.6 22.1	32.3 58.7	155 104	12.004	0.001
Marital status Married Single	23.8 24.4	31.5 37.2	44.8 38.5	181 078	0.407	0.524
Employment Employed Unemployed	24.8 23.1	36.8 29.9	38.4 47.0	125 134	1.077	0.300
Smoking status Smoker Ex-smoker Non-smoker	25.7 20.0 24.6	51.4 44.4 26.8	22.9 35.6 48.6	035 045 179	1.725	0.180
Duration of asthma $\leq$10 years >10 years	22.5 24.8	32.4 33.8	45.1 41.4	102 157	0.349	0.555

Asthma control:

Responses to the questions of the Asthma Control Test were presented in table no.3. According to the obtained scoring, the patients with uncontrolled disease were 111 (42.9%), while 86 (33.2%) were classified with partially control asthma and 62 (23.9%) with controlled disease.

Predictors of asthma control:

The results showed that male gender (*P*<0.001) and intermediate educational level and above (P=0.001) were highly associated with better control of the disease, as presented in table (4).

DISCUSSION

Analysis of the demographic variables of the patients recruited in this study showed that slightly above 60% were females. Leynaert et al identified female sex as an independent risk factor associated with non-allergic asthma; however, they did not observe gender difference in the case of allergic asthma[19]. One quarter of the recruited patients were elderly aged $\geq$60 year old Occurrence of asthma among this subset of patients is associated with worse outcome in both short –term control by experiencing daytime symptoms and long-term control manifested as functional limitations[20].

Above third quarters of the included patients in this study were town dwellers. Some researchers explored the role of urbanization in the development of asthma and demonstrated a strong evidence with the prevalence of the disease and living in urban areas[21,22]. Slightly more than 30% of the patients were either current smokers or ex-smokers. A recent Saudi study found a decrease in quality of life of asthmatic male patients used daily tobacco smoking and women who had a household member who smoked inside the house[23]. Overall, patients responses to the items of ASMQ revealed wide gaps in knowledge of asthmatic patients about the disease, the role of

different medication and method of prevention of asthma attack. For example, the recruited patients had poor knowledge about the technique of using the inhaler with regard to the steps taken during the use of the device. In the above study the authors linked the improper use of inhaler among asthmatic patients with poor control of the disease with a lack of health education and irregularity of follow up visits as significant predictors of improper use[13].

The results of the study also identified gaps in patients knowledge about the role of different types of asthma medication. The majority of the patients did not recognize the role of maintenance medication in the prevention of future symptoms. In addition, few patients did not know the fact that the increased frequency of using rescue medicines is an indicator for the need of maintenance medicines. Likewise, this was also reported by other researchers, whereby the included patients had poor knowledge about their medication which had a direct impact on their compliance to treatment[24]. Scientific data showed that there is strong evidence that respiratory viral infection is associated with asthma exacerbations[25]. Almost more than 90% the respondents ignored the role flu vaccine in the prevention of asthma flare-up. Nearly one quarter of the patients knew that there is no known cure for asthma. Ignorance of this fact may influence patient compliance to treatment, as the patient may stop maintenance medicines if they do not experience asthma symptoms.

The low level of knowledge about the most important items that help the patient to self-manage asthma can be attributed to the absence of formal health education. As shown, nearly one third of the patients had educational session/s on the disease. The benefit of health education was demonstrated to improve asthma control, quality of life and lung function[26]. The results showed that approximately 43% of the patients were with uncontrolled disease. Asthma control is not difficult to reach target and can be achieved through the design and implementation of a tailored treatment plan that considered the complexity of multiple interrelated factors needed to attain this goal[6]. The level of disease control was found to be significantly higher among males more than females. This finding was in agreement with several researches. For example, in a large national survey in USA females demonstrated poor asthma control compared with males in term of many short-term and long-term measures[27]. In a study conducted in Turkey, among different factors female gender was found to be significantly associated with poor control of asthma[28]. The observed difference should be considered in the provision of care for female patients in order to improve the outcome of treatment. Further future research should focus on identifying the underlying causes of this finding.

The second factor identified in the current research and which was associated with poor control of the disease was the educational level below intermediate. This result can be explained by the fact that less educated patients may not easily understand key messages provided in health education. In addition, they have few chances to come across information about the disease and its management. This finding should be considered in the design of future educational intervention to improve the disease outcome among less educated patients. In the above mentioned study[28] determinants of poor control include education below secondary level.

An interesting finding noted in this study, approximately 23% of the patients considered that their disease was uncontrolled or poorly controlled during the previous 4 weeks. Such a discrepancy was reported by other researchers[29]. Many patients believe that the disease was controlled and lacks the ability to correlate symptoms with poor control.

This study had two limitations. Firstly, it was carried out at one clinic in one hospital in the city, so the obtained findings cannot be generalized to all adult asthmatic patients in the region. Future research should recruit large numbers of patients to in-depth explore the level of self-management and level of asthma control. Secondly, the scarcity of the tools to measure self-management among asthmatic patients allowed us a very few opportunities to select ASMQ. Despite the fact that, the tool was translated, subjected to peer review process and test for applicability and smoothness, but its sensitivity among Saudi patients cannot be totally confirmed.

CONCLUSIONS AND RECOMMENDATIONS

This study identified very wide gaps in patients knowledge of the most essential items about the disease, medications and preventive measurees that decrease asthma exacerbations.
The level of asthma control was low and females and less educated with low level of control, compared with males and highly educated ones, respectively. Substantial efforts are needed in this clinic to improve the situation. Healthcare professionals should institute intensive and comprehensive educational program. The clinic is well-equipped in term of human resources and clinical facilities needed for the provision of health education. All efforts should be made first to focus on the patients who did not participate in health educational sessions. In addition, the components of health education should be tailored and designed in a simplified approach to fit all the patients, specifically the less educated ones. The education should be provided in a continuous manner at every patient visit.

REFERENCES
1. National Asthma Education and Prevention Program, Third Expert Panel on the Diagnosis and Management of Asthma. Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. Bethesda (MD): National Heart, Lung, and Blood Institute (US); 2007. Section 2, Definition,

Pathophysiology and Pathogenesis of Asthma, and Natural History of Asthma. [cited 2017 March 22]. Available from: URL: http://www.ncbi.nlm.nih.gov/books/NBK7223/.

2. Al Frayh AR, Shakoor Z, Gad El Rab MO, Hasnain SM. Increased prevalence of asthma in Saudi Arabia. Ann Allergy Asthma Immunol. 2001; 86: 292-6.

3. Cho S. Pharmacogenomic approaches to asthma treatment. Allergy Asthma Immunol Res. 2010; 2: 177–182.

4. Taylor DR, Bateman ED, Boulet LP, et al. A new perspective on concepts of asthma severity and control. Eur Respir J. 2008; 32:545-54.

5. NAEPP (National Asthma Education and Prevention Program), "Expert Panel report 3.Guidelines for the diagnosis and management of asthma" 2007. Available from: URL: http:// www. nhlbi.nih.gov/ guidelines/ asthma/ asthgdln.pdf

6. BraidoF.Failure in asthma control: reasons and consequences. [online] 2013. [cited 2017March 22]. Available from: URL: http:// dx.doi.org/ 10.1155/ 2013/ 549252.

7. Nguyen K, Zahran H, Iqbal S, Peng J, Boulay E. Factors associated with asthma control among adults in five New England states, 2006-2007.J Asthma. 2011; 48: 581-8.

8. Hermosa JL, Sánchez CB, Rubio MC, Mínguez MM, Walther JL. Factors associated with the control of severe asthma.J Asthma. 2010; 47: 124-30.

9. Pereira ED, Cavalcante AG, Pereira EN, et al. Asthma control and quality of life in patients with moderate or severe asthma. J Bras Pneumol. 2011; 37: 705-11.

10. Richard AA, Shea K. Delineation of self-care and associated concepts. J Nurs Scholarsh. 2011; 43: 255-64.

11. Pinnock H. Supported self-management for asthma. Breathe (Sheff). 2015; 11: 98–109.

12. BinSaeed AA. Asthma control among adults in Saudi Arabia. Study of determinants. Saudi Med J. 2015; 36: 599-604.

13. Al-Jahdali H, Ahmed A, Al-Harbi A, Khan M et al. Improper inhaler technique is associated with poor asthma control and frequent emergency department visits.[online] 2013. Available from: URL: https:// www.ncbi.nlm.nih. gov/pmc/articles/PMC3605255.

14. Ahmed AE, Al-Jahdali H, Al-Harbi A, et al. Factors associated with poor asthma control among asthmatic patient visiting emergency department. Clin Respir J. 2014; 8: 431-6.

15. Alotaibi GA. Asthma control and self-management: The role of asthma education; 2015; 4: 16-22.

16. Mancuso CA, Sayles W, Allegrante JP. Development and testing of the Asthma Self-Management Questionnaire. Ann Allergy Asthma Immunol. 2009; 102: 294-302.

17. The Saudi Initiative for Asthma. (SINA). Asthma control Test. Available from: URL: http:// sinagroup.org/images/ asthma_control_test/ACT%20 Arabic.pdf.

18. WHO. Process of translation and adaptation of instruments. Available from: URL.http://www.who.int/substance_ abuse/research_tools/translation/en/.

19. Leynaert B, Sunyer J, Garcia-Esteban R et al. Gender differences in prevalence, diagnosis and incidence of allergic and non-allergic asthma: a population-based cohort. Thorax. 2012; 67: 625-31.

20. Talreja N, Baptist AP. Effect of age on asthma control: results from the National Asthma Survey. Ann Allergy Asthma Immunol. 2011; 106: 24-9.

21. Robinson CL, Baumann LM, Romero K, et al. Effect of urbanisation on asthma, allergy and airways inflammation in a developing country setting. Thorax 2011; 66: 1051–7.

22. Rodríguez A, Vaca M, Oviedo G, et al. Urbanisation is associated with prevalence of childhood asthma in diverse, small rural communities in Ecuador. Thorax 2011; 66: 1043–50.

23. Torchyan AA, BinSaeed AA, Khashogji SA, et al. Asthma quality of life in Saudi Arabia: Gender differences. J Asthma. 2016; 10: 1-8.

24. Wiecha JM, Adams WG, Rybin D, et al. Evaluation of a web-based asthma self-management system: a randomised controlled pilot trial. BMC Pulm Med. Avaible from: URL.http://bmcpulmmed.Biomedcentral.com/articles/ 10.1186/s12890-015-0007-1.

25. Busse WW, Lemanske RF, Gern JE. The Role of Viral Respiratory Infections in Asthma and Asthma Exacerbations. *Lancet*.2010; 376: 826-834.

26. Rodrigues CD, Pereira RP, DalcinPde T. Effects of an outpatient education program in patients with uncontrolled asthma. J Bras Pneumol. 2013; 39: 272-9.

27. Temprano J, Mannino DM. The effect of sex on asthma control from the National Asthma Survey. J Allergy Clin Immunol. 2009; 123: 854-60.

28. Turktas H, Mungan D, Uysal MA, Oguzulgen K; Turkish Asthma Control Survey Study Group. Determinants of asthma control in tertiary level in Turkey: a cross-sectional multicenter survey. J Asthma. 2010; 47: 557-62.

29. Price D, Fletcher M, van der Molen T. Asthma control and management in 8,000 European patients: the Recognise Asthma and Link to Symptoms and Experience (REALISE) survey. NPJ Prim Care Respir Med. Available from: URL.2014.http://www.nature.com/articles/npjpcrm20149.