CONTROL LEVELS AMONG ASTHMATIC PATIENTS ATTENDING ASTHMA CLINIC AT ESKAN PHC CENTER, AND GENERAL CLINIC AT KAKIAH PHC CENTER, MAKKAH AL-MUKARRAMAH, SAUDI ARABIA

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ABSTRACT

Background: Bronchial asthma is one of the most common chronic diseases in Saudi Arabia, affecting more than 2 million Saudis. Poor knowledge, fear of use of new drugs, and lack of awareness of the importance of control of the disease are common among primary care physicians caring for asthma patients in the Kingdom of Saudi Arabia.

Aims & Objective: To estimate the difference in control levels (controlled, partially controlled, and uncontrolled) among asthmatic patients in Eskan and Kakiah PHC centers, in Makkah Al-Mukarramah, October, 2011. As well as to determine pertinent factors associated with control of bronchial asthma.

Material and Methods: A Cross-sectional analytic study included all asthmatic patients attended asthma clinic at Eskan PHC center, and equal number of asthmatic patients attended general clinics at Kakiah PHC center, Makkah Al-Mukarramah during the study period (October, 2011). Both groups were asked to fill in a self-administered questionnaire to assess their symptoms and asthma attacks by using the Asthma Control Test (ACT). Data were collected by questionnaire consists of three parts: Demographic data (six items), associated factors (six items) and Asthma Control Test (valid in Arabic version); Adult ACT (five items) and Child ACT (seven items).

Results: The study included 100 asthmatic patients (50 were recruited from Kakiah PHCC and 50 were recruited from Eskan PHCC). Slightly more than half of them were over 12 years old, 28 (56%), and 22 (44%) were 12 years old or less. More than half, 27 (54%), of the asthmatic patients recruited from Eskan PHCC compared to 17 (34%) of those recruited from Kakiah PHCC, were controlled. This difference was statistically significant (P=0.035). The difference between bronchial asthma control between Eskan and Kakiah PHCC was statistically significant among adults, while it was not statistically significant among children. Females were found to have significantly better control compared to males.

Conclusion: Level of control of bronchial asthma was significantly better among patients attended asthma clinic than those attended general clinic, and females were found to have significantly better control compared to males.

Key-Words: Asthma; Control; Primary Health Care Center; Asthma Control Test

Introduction

Asthma is a common chronic disorder of the airways, characterized by variable reversible and recurring symptoms related to airflow obstruction, bronchial hyper-responsiveness, and an underlying inflammation. It is one of the most common chronic diseases in Saudi Arabia, affecting more than 2 million Saudis.[1] Asthma prevalence worldwide varies from 1-30% across nations; the prevalence increases with increased urbanization and affluence.[2]

Its impact is manifested in patients, their families, and the community as a whole in terms of lost work and school days, poor quality of life, frequent ER visits, hospitalizations, and death cases.[3] Therefore, international guidelines have been developed to help the physicians to manage asthma in a better way and deal with different presentations and situations using the best available evidence.[4]

The Saudi Thoracic Society (STS) has taken the lead to create the Saudi Initiative for Asthma (SINA) group with the objective to have easy guidelines to follow, yet simple to understand updated and carefully prepared for use by the non-asthma specialists including primary care and general practice physicians.[5,6]

Poor knowledge, fear of use of new drugs, and lack of awareness of the importance of control of the disease are common among primary care physicians caring for asthma patients in the Kingdom of Saudi Arabia. These are important factors that likely contribute to the magnitude of this burden.[7] Asthma continues to be a substantial cause of morbidity. Various educational programs have shown an increase in knowledge and self-management skills of asthmatic patients and also revealed a reduction of severe attacks, hospitalizations and days lost from work.[8]

The present study aimed at studying the levels of control among asthmatic patients attending PHC centers in Makkah Al-Mukarramah.

Materials and Methods

A cross-sectional analytic study was conducted. It included all asthmatic patients attended asthma clinic at Eskan PHC center, and general clinics at Kakiah PHC center, Makkah Al-Mukarramah, Saudi Arabia during the study period (October, 2011). The total number was 50 patients. The first 50 bronchial asthma patients followed general clinics at Kakiah PHC center, Makkah Al-Mukarramah were also recruited as a comparison group.

Makkah Al-Mukarramah is the holy capital located in Makkah Al-Mukarramah region, in the western region of the Kingdom of Saudi Arabia (KSA). Eskan PHCC is the training center for the researcher. It is one out of 76 PHC centers in Makkah Al-Mukarramah city.[9] Total population covered by this center in 2011 is 15,376 peoples. Kakiah PHCC is the center for comparison to see the difference of asthma control levels among asthmatic patients. Total population covered by this center at 2011 is around 40,000 peoples. We excluded children under 4 years old.

Study population was divided into two groups; under 12 years and 12 or older. Both groups were asked to assess their symptoms and asthma attacks by using the Asthma Control Test (ACT).[10] Parents of children were asked on behalf of their children to fill in the study self-administered questionnaire. It consists of three parts, demographic data, associated factors and Asthma Control Test (valid in Arabic version)[11]: Adult ACT (five items) and Child ACT (seven items), the first four items for the child and the last three items for the parents.

For Eskan PHC centre: the researcher gave the official acceptance papers from health affairs with the questionnaire to the manager of the PHC to start the research. Then the researcher took the list of bronchial asthma patients following at asthma clinic (50 patients) with their phone numbers and personally contacted with them on their phone. For each patient it took from 5 to 10 minutes, for one week duration. The whole sample was 28 adults and 22 children.

For Kakiah PHC center: the researcher gave the official acceptance papers from health affairs with the questionnaire to the manager of the PHC to start the research. Unfortunately there were no files for asthmatic patients. The researcher explained the questionnaire to the males and females doctors and nurses and requested them to ask every patient following at this center about bronchial asthma, and if it was yes, they would explain and asked them personally to answer that questionnaire (from 5 to 10 minutes). It took 2 weeks to complete the sample (28 adults and 22 children asthmatic patients).

ACT was utilized to determine the level of asthma control. General scoring system for both adults and childhood ACT is: ≥ 20 means controlled and ≤ 19 means not controlled. Scoring system for adults ACT is: 25 means completely (totally) controlled. 20 – 24 means well controlled.16 – 19 means partially controlled. ≤ 15 means very poorly controlled.[12] Scoring system for childhood ACT is: 20 – 27 means well controlled. 13 – 19 means partially controlled and ≤ 12 means very poorly controlled.

Approval of JPFCM - (Joint Program of Family and Community Medicine) - Makkah Al-Mukarramah was obtained. Permission of the directors of Eskan and Kakiah PHC centers were obtained. Verbal consent of patients and parents was also obtained.

The data was collected and verified by hand then coded before entry. Statistical Package for Social Sciences (SPSS) software version 16.0 was used for data entry and analysis. Descriptive statistics (e.g. number, percentage) and analytic statistics using Chi Square tests (χ^2) to test for the association and/or the difference between two categorical variables were applied. A p-value of less than 0.05 was adopted for statistical significance.

Results

The study included 100 asthmatic patients (50 were recruited from Kakiah PHCC and 50 were recruited from Eskan PHCC). Their socio-demographic characteristics are presented in table 1. Slightly more than half of them were over 12 years old, 28 (56%), and 22 (44%) were 12 years old or less. Males represented 23 (46%), 30 (60%) and 53 (53%) of the participants from Kakiah PHCC, Eskan PHCC and overall respectively. The difference between both PHC centers regarding gender distribution was not statistically significant.

The majority of the participants from both centers separately and overall were Saudi 90 (90%). Married adults represent 21 (75%), 15 (53.6%), and 36 (64.3%) of the participants from Kakiah PHCC, Eskan PHCC and overall respectively.

More than half of the participants recruited from Kakiah PHCC were at least university graduated 26 (52%) compared to 22 (44%) of those recruited from Eskan PHCC. While those low educated (illiterate or primary level) represent 10 (20%) of patients from Kakiah and only

1 (2%) of patients from Eskan PHCC with statistically significant difference (P<0.05).

Overall, 48 (48%) of the participants were university graduated or above and 11 (11%) were low educated (either illiterate or primary level of education). Patients with low monthly income (<3000 SR) represent 11 (22%), 7 (14%) and 18 (18%) of the participants from Kakiah PHCC, Eskan PHCC and overall respectively. While those with high income (>15000 SR) represent 6 (12%), 0 (0%) and 6 (6%) of the participants from Kakiah PHCC, Eskan PHCC and overall respectively. The difference between Kaikiah and Eskan PHCC regarding income was statistically significant (P<0.05).

As displayed in figure 1, 27 (54%) of the asthmatic patients from Eskan PHCC compared to 17 (34%) of those from Kakiah PHCC, were controlled. This difference was statistically significant (P=0.035). As illustrated in figure 2 and table 2, 3 (10.7%) of asthmatic patients (aged over 12 years) from Kakiah PHCC and 8 (28.6%) of those from Eskan PHCC were totally controlled while 14 (50%) and 5 (17.9%) of patients from Kakiah and Eskan PHC centers respectively were partially controlled. Very poor control was observed among 7 (25%) from both centers. This difference between control of bronchial asthma in both groups of patients was statistically significant, P<0.05.

Among children, 10 (45.5%) of asthmatic patients (≤12 years) from Kakiah PHCC and 11 (50%) of those recruited from Eskan PHCC were well controlled while 8 (36.4%) and 7 (31.8%) of patients from Kakiah and Eskan PHC centers respectively were not well controlled. Very poor control was observed among 4 (18.2%) from both groups. This difference between controls of bronchial asthma in both groups of patients was statistically not significant, as shown in figure 3 and table 3. As shown in table 4, 21 (47.7%) of asthmatic patients aged 12 or less were controlled compared to 23 (41.1%) of those aged over 12 years. However, this difference was not statistically significant (P>0.05). More than half of male asthmatic patients 31 (58.5%) were controlled compared to 13 (27.7%) of female patients. This difference was statistically significant (P=0.002).

More than half of non-Saudi asthmatic patients 6 (60%) compared to 38 (42.2%) of Saudi patients were controlled. However, this difference was not statistically significant. Among asthmatic patients aged over 12 years, 16 (44.4%) of married compared to 7 (35%) of non-married patients were controlled. However, this difference was not statistically significant (P>0.05). Patients' educational

levels as well as income were not significantly associated with bronchial asthma control.

As shown in table 5, 10 (62.5%) of smoker asthmatic patients were controlled compared to 13 (32.5%) of non-smokers. However, this difference was not statistically significant. Less than half of asthmatic patients with positive history of passive smoking 18 (44.4%) were controlled compared to 28 (43.8%) of those with no history of passive smoking. This difference was not statistically significant. Almost one-third of asthmatic patients with family history of bronchial asthma 23 (37.1%) were controlled compared to 21 (55.3%) of those with no family history of bronchial asthma. However, this difference was not statistically significant. Patients' history of contact with domestic animals was not significantly associated with bronchial asthma control.

Table-1: Socio-demographic characteristics of the asthmatic patients attending Kakiah and Eskan PHC centers, Makkah Al-Mokarramah, 2011

Variables		Asthmatic Patients			P-value*
		Kakiah (n=50) No. (%)	Eskan (n=50) No. (%)	Total (n=100) No. (%)	
Age (Years)	≤12	22 (44.0)	22 (44.0)	44 (44.0)	NA
	>12	28 (56)	28 (56)	56 (56.0)	
Gender	Male	23 (46.0)	30 (60.0)	53 (53.0)	0.229
	Female	27 (54.0)	20 (40.0)	47 (47.0)	
Nationality	Saudi	45 (90.0)	45 (90.0)	90 (90.0)	NA
	Non-Saudi	5 (10.0)	5 (10.0)	10 (10.0)	
Marital Status∞	Married	21 (75.0)	15 (53.6)	36 (64.3)	0.162
	Not married	7 (25.0)	13 (46.4)	20 (35.7)	
Educational Level**	Illiterate	6 (12.0)	0 (0.0)	6 (6.0)	0.025
	Primary	4 (8.0)	1 (2.0)	5 (5.0)	
	Intermediate	4 (8.0)	11 (22.0)	15 (15.0)	
	Secondary	10 (20.0)	16 (32.0)	26 (26.0)	
	University	23 (46.0)	19 (38.0)	42 (42.0)	
	Postgraduate	3 (6.0)	3 (6.0)	6 (6.0)	
Income in SR/Month†	<3000	11 (22.0)	7 (14.0)	18 (18.0)	0.040
	3000-9000	21 (42.0)	29 (58.0)	50 (50.0)	
	9001-15000	12 (24.0)	14 (28.0)	26 (26.0)	
	>15000	6 (12.0)	0 (0.0)	6 (6.0)	

* based on chi-square test; ** paternal educational level for children; NA: not applicable; ∞ for adult group only; † for the family

Table-2: Comparison of bronchial asthma control among adults between Kakiah and Eskan PHC centers, Makkah Al-Mokarramah, 2011

Group	Total adult Asthma Control Test				Total
	Totally Controlled No. (%)	Well Controlled No. (%)	Partially Controlled No. (%)	Very Poor Controlled No. (%)	
Kakiah	3 (10.7)	4 (14.3)	14 (50.0)	7 (25.0)	28
Eskan	8 (28.6)	8 (28.6)	5 (17.9)	7 (25.0)	28
Total	11 (19.6)	12 (21.4)	19 (33.9)	14 (25.0)	56

X²=7.87; P=0.049

Table-3: Comparison of bronchial asthma control among children between Kakiah and Eskan PHC centers, Makkah Al-Mokarramah, 2011

Group	Total adult Asthma Control Test			Total
	Well Controlled No. (%)	Not Well Controlled No. (%)	Very Poor Controlled No. (%)	
Kakiah	10 (45.5)	8 (36.4)	4 (18.2)	22
Eskan	11 (50.0)	7 (31.8)	4 (18.2)	22
Total	21 (47.7)	15 (34.1	8 (18.2)	44

X²=0.11; P=0.944

Table-4: Socio-demographic factors & bronchial asthma control

Variables		Asthmatic Patients			P-value*
		Controlled (n=44) No. (%)	Not controlled (n=56) No. (%)	Total (n=100) No. (%)	
Age (Years)	≤12	21 (47.7)	23 (52.3)	44 (44.0)	0.547
	>12	23 (41.1)	33 (58.9)	56 (56.0)	
Gender	Male	31 (58.5)	22 (41.5)	53 (53.0)	**0.002**
	Female	13 (27.7)	34 (72.3)	47 (47.0)	
Nationality	Saudi	38 (42.2)	52 (57.8)	90 (90.0)	0.328
	Non-Saudi	6 (60.0)	4 (40.0)	10 (10.0)	
Marital Status∞	Married	16 (44.4)	20 (55.6)	36 (64.3)	0.577
	Not married	7 (35.0)	13 (65.0)	20 (35.7)	
Educational Level**	Illiterate	0 (0.0)	6 (100.0)	6 (6.0)	0.295
	Primary	3 (60.0)	2 (40.0)	4 (5.0)	
	Intermediate	8 (53.3)	7 (46.7)	15 (15.0)	
	Secondary	12 (46.2)	14 (53.8)	26 (26.0)	
	University	19 (45.2)	23 (54.8)	42 (42.0)	
	Postgraduate	2 (33.3)	4 (66.7)	6 (6.0)	
Income in SR/Month†	<3000	7 (38.9)	11 (61.1)	18 (18.0)	0.331
	3000-9000	26 (52.0)	24 (48.0)	50 (50.0)	
	9001-15000	8 (30.8)	18 (69.2)	26 (26.0)	
	>15000	3 (50.0)	3 (50.0)	6 (6.0)	

* based on chi-square test; ** paternal educational level for children; ∞ for adult group only; † for the family

Table-5: Personal history factors & bronchial asthma control

Variables		Asthmatic Patients			P-value*
		Controlled (n=44) No. (%)	Not controlled (n=56) No. (%)	Total (n=100) No. (%)	
Smoking History∞	Yes	13 (32.5)	27 (67.5)	40 (71.4)	0.070
	No	10 (62.5)	6 (37.5)	16 (28.6)	
Passive Smoking	Yes	28 (43.8)	36 (56.3)	64 (64.0)	0.556
	No	18 (44.4)	20 (55.6)	36 (36.0)	
Family History of Asthma	Yes	21 (55.3)	17 (44.7)	38 (38.0)	0.098
	No	23 (37.1)	39 (62.9)	62 (62.0)	
Contact with Domestic Animals	Yes	38 (44.2)	48 (55.8)	86 (86.0)	0.581
	No	6 (42.9)	8 (57.1)	14 (14.0)	

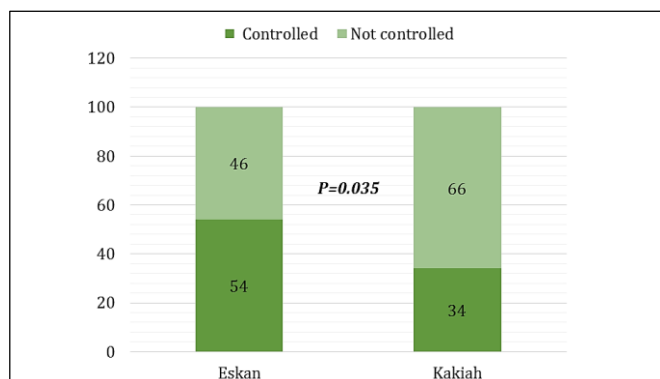* based on chi-square test; ∞ for adult group only; † for the family

Figure-1: Comparison of general bronchial asthma control between Kakiah and Eskan PHC centers
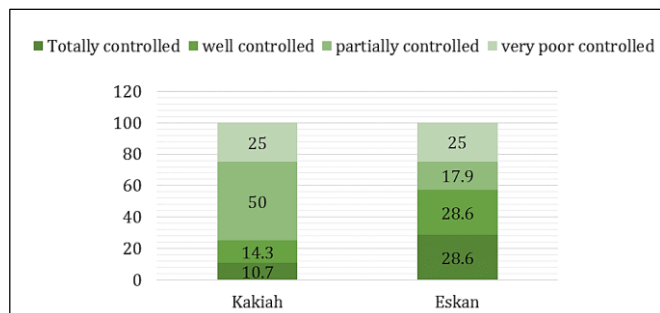

Figure-2: Comparison of bronchial asthma control among adult patients, between Kakiah and Eskan PHC centers
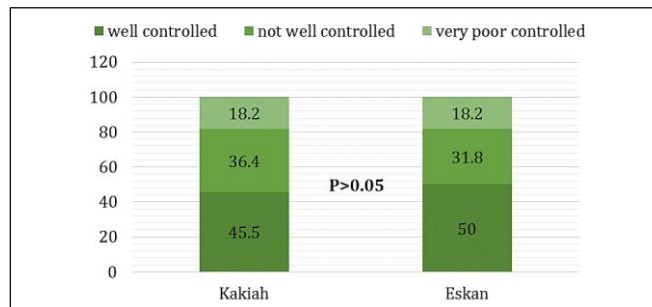

Figure-3: Comparison of bronchial asthma control among children, between Kakiah and Eskan PHC centers

Discussion

Inadequate control of asthma continues to be a serious problem all over the world despite advances in understanding the inflammatory basis of asthma and well established disease management guidelines.[13] Patients with inadequately controlled asthma are at a high risk of serious morbidity and mortality with consequent high economic cost to the population. Primary care physicians are the main care providers for asthma patients and they can achieve complete control of asthma in the majority of their patients. However, this requires knowledge and understanding of asthma and its risk factors as well as adherence to the best practice management guidelines.[13]

Most of clinicians, particularly in general clinics, frequently fail to ask and/or document longitudinally the basic set of clinical information required to assess whether asthma is under control.[14,15] Their failure to do so inevitably leads to inconsistency and variability in clinical decision making and practice. In accordance with this fact, in the present study, the level of control of bronchial asthma is significantly better among patients attended asthma clinic than those attended general clinic.

The results of the present study revealed that almost half of bronchial asthma patients attended asthma clinic and two-thirds of those attended general clinics were not controlled. This finding goes with other large population-based studies, varying in methodology and funding, suggest that a substantial proportion of patients with asthma currently experience suboptimal levels of asthma control.[16,17] The AIRE (Asthma Insights and Reality in Europe) study, involving over 2,800 people with asthma in France, Germany, Italy, Netherlands, Spain, Sweden and UK, found that asthma symptoms are part of everyday life for many patients.[16] More than half (56%) of the respondents (identified by telephone interviews of randomly selected households) suffered daytime symptoms in the last 4 weeks, and around one in three respondents experienced sleep disruption due to asthma at

least once a week. Among the 753 children (<16 years) surveyed, 28% suffered night time symptoms in the previous month, with 61% needing to use their rescue medication.

Findings consistent with the current study have been reported from the INSPIRE (International Asthma Patient Insight Research) study.[17] This study, conducted in eleven countries (Australia, Belgium, Canada, France, Germany, Italy, Netherlands, Spain, Sweden, UK, USA), included 3,415 adults with asthma treated with inhaled corticosteroids, recruited via their physicians and interviewed by telephone. Nearly three-quarters of the patients (74%) used a short-acting bronchodilator every day and half of all patients (51%) had at least one exacerbation requiring medical intervention in the past year. The mean number of asthma worsening was 16 in those patients with uncontrolled asthma, compared with 6 in patients with well-controlled asthma.

In the current study, the level of control of bronchial asthma among male patients was significantly better than female patients. The same finding has been reported by another study, who suggests that women are at increased risk of developing adult-onset asthma and also suffer from more severe disease and consequently poorer control than men.[18] These gender differences appear to be the product of biological sex differences as well as socio-cultural and environmental differences. The biological sex differences include genetic, pulmonary, and immunological factors. There is compelling evidence that sex hormones are major determinants of at least these biological sex differences. Melgert explores the effects of sex hormones on immune function, resident lung cells, and regulation of local processes in the lung to shed light on underlying mechanisms of gender differences in asthma.[18] More research is needed to understand these mechanisms in order to improve treatment of women with asthma.

Cigarette smoke inside the house is an important indoor predisposing factor. A study conducted in the KSA has clearly shown that passive smoking is positively correlated with childhood asthma severity and control.[19] Smokers in the family and number of cigarettes smoked in the house have also been shown to be associated with childhood asthma.[20] It is possible that cigarette smoke may have contributed to an increase in the prevalence of asthma and poor control of asthma by irritating asthmatic children's airways, already inflamed by exposure to various allergens. The current study failed to achieve a significant association between smoking and passive smoking history and bronchial asthma control, most probably due to

relatively small sample size.

Although the factors indicating control may be the same as those indicating severity of bronchial asthma (e.g. persistent symptoms, impaired lung function, high bronchodilator use, oral steroid use, unscheduled consultations, hospitalizations, life-threatening attacks), there is a difference in the two concepts. Patients with severe asthma can be well-controlled, while those with mild underlying disease can show signs of poorly controlled disease. Changing the management plan to one based on control and the goals of patients may show improved outcomes compared to a plan based on severity.[13]

Among limitations of the current study is that many reasons why asthma may be poorly controlled, both clinical and behavioural are not included in it. However, the main objective of the current study was to compare the level of control of asthmatic patients by specialized clinics versus general clinics. Important clinical factors include the genetic characteristics of the individual, type of asthma (e.g. aspirin-sensitivity, neutrophilic activity), co-morbidity (e.g. dysfunctional breathing, allergic rhinitis).[21,22] The behaviour of both clinicians and patients is also an important determinant of the level of asthma control achieved.

The behaviour of clinicians is vital in making an accurate diagnosis and prescribing the best treatment but also in carrying out appropriate review of progress and subsequent control.[23] Healthcare professionals may have limited awareness of symptom prevalence. In the AIR (Asthma in Real life) study, general practitioners substantially underestimated the prevalence of asthma symptoms.[24] Furthermore, healthcare professionals may have difficulties estimating levels of asthma control.[25,26] Clearly, there is a need for healthcare professionals to appreciate the widespread occurrence of poor asthma control. Patient behaviours are also key as the level of asthma control is influenced by adherence to treatment and other self-management behaviours[27] and smoking[28] Patients' may also fail to consult their doctor. A UK survey found that 10% of asthmatic patients had seen no health professional about asthma in the previous 3 years.[29]

Patients may unnecessarily accept symptoms, assuming that frequent symptoms, exacerbations and lifestyle limitations are an inevitable consequence of having asthma.[30] In the (Asthma Insights and Reality in Europe (AIRE study), the majority of patients considered themselves to have controlled asthma, yet symptom levels

showed control failing to reach the levels expected by management guidelines.[15] Patients may not realize that effective treatments are available. This was demonstrated in a study of 517 patients in the UK.[31] While 58% of patients reported that they were very satisfied with the standard of their asthma management, this fell to 33% after being shown the standards that patients can expect, as detailed in international guidelines. Such work implies that there is a need to raise patient expectations by increasing awareness of the quality of life that could be attained.

In many chronic diseases, healthcare professionals have a philosophy of treating to achieve a predefined target level in a surrogate marker that indicates good control However, in asthma, there is currently no simple, clear, accepted target measure that healthcare professionals can aim to achieve, and that patients can use as a reliable indicator of treatment effectiveness.[15]

A simple tool is required to assess asthma control accurately. The tool needs to be quick to use in primary care, where the majority of patients with asthma are managed by a range of healthcare professionals, in brief consultations. There are a number of asthma-specific patient-based measures available that vary in characteristics, technical validity and ease of use. Tools such as the Asthma Control Test™ (ACT),[32] is useful, The ACT is shorter, requires no calculations and includes a question on the patient's view of control so gives a useful insight into the patient perspective. The ACT is validated tools that are reliable and responsive to changes in asthma control over time, and provide a single numerical indication of control that has the potential to provide a target to drive management. It has the potential to influence long-term asthma outcomes, raising expectations for asthma management and facilitating the achievement of asthma control.

Conclusion

Conclusively, The ACT can help to identify patients with very poorly controlled asthma and further support its use as an important assessment tool in facilitating communication among patients, caregivers, and physicians on asthma control and in asthma management. Level of control of bronchial asthma is significantly better among patients attended asthma clinic at Eskan PHCC than those attended general clinic at Kakiah PHCC.

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