Original Article

Planned Health Care non-Attendance and Asthma Control among Asthma Patients in Real Life Setting in an African Country: A Prospective Cohort Study

Planned health care non-attendance and asthma control among asthma patients in real life setting in an African country: a prospective cohort study

Eric Walter Pefura-Yone[1,2*], André Pascal Kengne[3], Adamou Dodo Balkissou[1,2]

[1] Department of Internal Medicine and Subspecialties, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Yaounde, Cameroon
[2] Pneumology service, Yaounde Jamot Hospital, Yaounde, Cameroon
[3] South African Medical Research Council & University of Cape Town, Cape Town, South Africa
Email addresses: EWPY: pefura2002@yahoo.fr; APK: apkengne@yahoo.com, ADB: dodobalkissou@gmail.com
[*] ***Corresponding author***: Dr Eric Walter Pefura-Yone, Yaounde Jamot's Hospital,
P.O Box: 4021-Yaounde, Cameroun; Tel: (237)96539726 Fax: (237)22203165

ABSTRACT
***BACKGROUND*:** Compliance with scheduled medical visit is an indirect indicator of the adherence to treatment. The aim of this study was to determine the incidence of non-compliance with scheduled medical visits and investigate the predictors and relationship with disease control among patient with asthma in the sub-Saharan African setting.
METHODS: We conducted a prospective study between January 2012 and August 2013. All patients with asthma receiving care at the Yaounde Jamot Hospital and CEDIMER medical practice were included. Planned medical visit occurred at month one, three, six and twelve following baseline evaluation. Regression models were employed to investigate the predictors of non-compliance.
RESULTS: 186 patients [121 (65.1%) being female] were included. Their median age (25^{th}-75^{th} percentiles) was 35.5 (20.0-52.3) years. A total of 67 (36%) failed to attend at least one of the scheduled visits. The proportion of patients who failed to comply with scheduled visits was 48.4%, 68.8%, 73.5% and 79.5% at month one, three, six and twelve respectively. The accompanying rates of unacceptable asthma control were 17.2%, 24.4% and 20.8% respectively at three, six and twelve months of follow-up. Inadequate asthma control at baseline was the main predictor of non-compliance with medical visits, with adjusted odds ratio ranging from 2.00 to 4.67. Furthermore, non-sensitisation to non-pollinic aeroallergens was associated with 2.79 (95%CI 1.58-6.07) risk of non-compliance at one month of follow-up.
***CONCLUSION*:** Targeting education of patients with poorly controlled disease at baseline can potentially improve adherence to medical visit and anti-asthmatic treatments and outcomes of care.
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RESULTS: In all, 186 patients [121 (65.1%) being female] were included. Their median age (25^{th}-75^{th} percentiles) was 35.5 (20.0-52.3) years. A total of 67 (36%) failed to attend at least one of the scheduled visits. The proportion of patients who failed to comply with scheduled visits was 48.4%, 68.8%, 73.5% and 79.5% at month one, three, six and twelve respectively. The accompanying rates of unacceptable asthma control were 17.2%, 24.4% and 20.8% respectively at three, six and twelve months of follow-up. Inadequate asthma control at baseline was the main predictor of non-compliance with medical visits, with adjusted odds ratio ranging from 2.00 to 4.67. Furthermore, non-sensitisation to non-pollinic aeroallergens was associated with 2.79 (95%CI 1.58-6.07) risk of non-compliance at one month of follow-up.
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INTRODUCTION

Asthma is one of the commonest chronic diseases and an important public health challenge worldwide. Currently, about 300 million people suffer from asthma around the world [1]. In spite of the improved understanding of the pathophysiology of asthma and the more structured approach to treatment, about 40 to 60% of people with the disease fail to achieve an optimal control of their condition [2-5].

Adherence to treatment is essential to achieve optimal control of asthma [6]. Adherence to anti-asthmatic treatment comprises taking prescribed medications and inhaled corticosteroid in particular as per schedule, and observing the therapeutic education measures. The assessment of the adherence to treatment is based on a strict respect of all medical prescriptions including compliance with planned medical visits. Complying with scheduled medical visits provides an opportunity of assessing the disease control, identifying possible barriers to adherence and adjusting treatments as appropriate [6]. Most of the available studies on asthma control and adherence to treatment have been cross-sectional and do not allow the determination of the incidence of non-control of asthma as well as the predictive factors for non-adherence. Furthermore, we are not aware of studies on non-compliance with scheduled medical visits in patients with asthma.

The aim of this study was to determine the incidence of non-compliance with planned medical visits and non-control of asthma in the one hand, and to investigate the predictors of non-compliance with scheduled medical visits among patients with asthma in the other hand.

MATERIALS AND METHODS

Study settings and population

The study was conducted in the outpatient section of the service of pneumology A of the Yaounde Jamot Hospital (YJH), and the CEDIMER private medical practice in the capital city of Cameroon, Yaounde. Both institutions have been described in details previously [7, 8]. YJH is the referral chest medicine hospital for the capital city and surrounding areas, while CEDIMER private practice offers ambulatory care for chest conditions in the same city. All adolescents (≥10 years) and adults consecutively followed for asthma between January 2012 and May 2013 in the two institutions were invited to take part in the study.

Methods

This was a prospective observational study including all asthmatic patients followed-up for a minimum of three months. Participants were included in the study after a formal confirmation of the diagnosis of asthma by a specialist physician. This diagnosis was based on the clinical and functional criteria of the Global Initiative for Asthma (GINA) [1]. Baseline data collection included: age, sex, modalities of consultation at the enrolment visit (first consultation, planned consultations, exacerbation of the disease), known duration of asthma, family history of asthma, annual variation in symptoms, co-occurring allergic conditions (rhinitis, atopic dermatitis), status for smoking, level of control of asthma, forced expiratory volume in the first second (FEV1) recorded within the past six months and status for sensitisation to non-pollinic aeroallergens.

Diagnosis of rhinitis was based on the existence of the following nasal symptoms: colorless rhinorrhoea, nasal obstruction, sneezing and itching. A patient was considered as having persisting rhinitis if he(she) had symptoms for more than four days each week and or at least four weeks; otherwise rhinitis was considered to be intermittent [9]. Diagnosis of atopic dermatitis was based on the clinical criteria of the United Kingdom Working Party [10].

Asthma control was assessed with the used of the Asthma Control Questionnaire (ACQ) [11, 12]. Asthma was considered to be insufficiently controlled during the preceding week in the presence of an ACQ score greater than one [11, 12]. Predicted FEV1 was derived from the 2012 equations of the Global Lung Initiative applicable to Black people [13]. Cutaneous tests were performed via prick-test with standardised allergenic extracts of Stallergènes Laboratories (Anthony, France). The following perennial inhalant allergens were tested: mites (*Dermatophagoïdes pteronyssinus*, *Dermatophagoïdes farinae* and *Blomia tropicalis*), moist (*Alternaria alternata*), *Blattella germanica*, cat and dog's dander.

All patients were treated according to the GINA's recommendations [1] and based on the level of control of asthma at the initial visit, with inhaled corticosteroids (beclomethasone or budesonide, or fluticasone) with or without a long acting β2-mimetic (salmeterol or formoterol), and a short acting β2-mimetic (salbutamol) upon request. None of the patients received specific immunotherapy. Up-titration or down-titration of inhaled corticosteroid was based on the level of asthma control using the GINA criteria every three months [1]. Follow-up visits were scheduled for each patient at one, three, six and twelve months following the inclusion visit. A margin of +/- two weeks around the scheduled visit date was deemed acceptable. At each scheduled visit, the following data were recorded: adherence to background treatment (good adherence being based on taking at least 75% of the doses of prescribed background treatment during the time-period preceding the visit [14]) and the level of asthma control based on the GINA criteria [1]. The main outcomes of this study were the compliance with scheduled medical visit and the level of asthma control among patients at follow-up visits.

Ethics Statement

The study was approved by the institutional review boards of the Yaounde Jamot Hospital and CEDIMER private centre, Yaounde. The written informed consent to participate was obtained from all included patients aged 21 years and above or from their parents/tutors for those aged 10 to 20 years.

Statistical analysis

Data were analysed with the use of SPSS® v.17 for Windows (SPSS Inc., Chicago, USA). We have reported results as count and percentages, and median and 25th-75th percentiles. Logistic regression models were used to

investigate the predictive factors of non-compliance with scheduled medical visits during follow-up. Significant predictors in univariable analyses (based on a threshold of p<0.10) were all entered in a multivariable model to select the final independent predictors. A p-value<0.05 was used to characterise statistically significant results.

RESULTS

General characteristics of the study population

Of the 192 patients received in consultation during the study period, 6 (3.1%) did not report to the inclusion visit. Of the 186 patients included, 121 (65.1%) were female and 65 (34.9%) were male. Only two patients were not started on inhaled corticosteroid at the inclusion visit, and among those who reported for follow-up visits two had poor adherence to background treatment. The median age (25^{th}-75^{th} percentiles) of participants was 35.5 (20.0-52.3) years and the known duration of asthma was 7.0 (2.5-17.0) years. Sixty-nine (37.1%) patients had seasonal exacerbation of symptoms and 8 (4.3%) had only seasonal symptoms. Intermittent and persistent rhinitis were present in respectively 14.0% and 37.6% of the patients. FEV1 was less than 80% in 59 (31.7%) patients and asthma was well controlled in 58.8% (104/177) patients (Table 1).

Table 1: Baseline characteristics of patients

Characteristics	n=186 (%)
Sex	
Female	121 (65.1)
Male	65 (34.9)
Age, years, median (25^{th}-75^{th})	35.5 (20-52.3)
Modality of the consultation at inclusion	
Planned	115 (60.8)
First consultation	68 (36.6)
Aggravation	5 (2.7)
Age at asthma onset, years, median (25^{th}-75^{th})	21 (11.0-38.0)
Duration of asthma, median (25^{th}-75^{th})	7 (2.5-17.0)
Variation of symptoms	
Perennial without seasonal increase	94 (50.5)
Perennial with seasonal increase	69 (37.1)
Only seasonal	8 (4.3)
No answer	15 (8.1)
Family history of asthma	
Yes	35 (18.8)
No	151 (81.2)
Smoking	
Non-smokers	179 (96.2)
Current/former smokers	3 (1.6)
Second-hand smoker	4 (2.2)
Rhinitis	
None	90 (48.4)
Intermittent	26 (14.0)
Persistent	70 (37.6)
Atopic dermatitis	
Yes	4 (2.2)
No	182 (97.8)
Sensitization to perennial aeroallergens	
Yes	133 (71.5)
No	53 (28.5)
FEV1,L, median (25^{th}-75^{th})	88.1 (75.8-100.0)
FEV1< 80%	59 (31.7)
Asthma control at inclusion	
Well controlled	104/177 (58.8)
Not well controlled	73/177 (41.2)

FEV1: forced expiratory volume in the first second

Incidence of compliance with planned visits and asthma control

Sixty-seven (36.0%) patients did not honour a single follow-up visit. The frequencies of compliance with scheduled medical visits and asthma control at different time-points are shown in Table 2. Of the 186 patients forming the cohort, 96 (51.6%) reported for the one month visit and 58 (31.2%) for the 3-month visit. Of the 170 patients with a follow-up duration of six months or more, 46 (26.5%) reported for the 6-month visit. At twelve months of follow-up only 20.5% (24/117) of the patients reported for the planned visit.

Table 2: Planned attendance (appointment) of health care and asthma control at month 1, 3, 6 and 12

Period of follow-up	Frequency (%)
At 1-month (n=186)	
Respect of the appointment	
Yes	96 (51.6)
No	90 (48.4)
Asthma control	
Controlled	49 (51.0)
Partly controlled	24 (25.0)
Uncontrolled	23 (24.0)
At 3-month (n=186)	
Respect of the appointment	
Yes	58 (31.2)
No	128 (68.8)
Asthma control	
Controlled	42 (72.4)
Partly controlled	6 (10.3)
Uncontrolled	10 (17.2)
At 6-month (n=170)	
Respect of the appointment	
Yes	45 (26.5)
No	125 (73.5)
Asthma control	
Controlled	24 (53.3)
Partly controlled	10 (22.2)
Uncontrolled	11 (24.4)
At 12-month (n=117)	
Respect of the appointment	
Yes	24 (20.5)
No	93 (79.5)
Asthma control	
Controlled	17 (70.8)
Partly controlled	2 (8.3)
Uncontrolled	5 (20.8)

The rates of poor asthma control at three, six and twelve months were respectively 17.2%, 24.4% and 20.8% among patients who reported for the visit. At three, six and twelve months of follow-up, asthma was partially controlled respectively in 10.3%, 22.2% and 8.3% of the patients who reported for the visit. Only five patients (2.7%) honoured the entire four scheduled follow-up visits.

Predictors of non-compliance with scheduled visits

Predictive factors of non-compliance with scheduled medical visits are shown in Table 3. The sole independent predictor of non-compliance was

insufficient asthma control at baseline with the odds ratio ranging from 2.00 to 4.67. Moreover, non-sensitisation to a non-pollinic aeroallergen was associated with non-compliance with the one-month follow-up visit, with an adjusted odds ratio of 2.79 (95% confidence interval: 1.39-5.60) (Data not shown).

DISCUSSION

The key messages from this study conducted in a resource-poor setting are the following: 1) about a third of patients with asthma do not attend a single planned follow-up visit per year; 2) the frequency of non-compliance with scheduled follow-up visits increased with extended follow-up, with over four in five patients not reporting to the clinic at twelve months of follow-up; 3) among those who attend the follow-up visits, about one in five has uncontrolled asthma; 4) uncontrolled asthma at the initial visit appears to be the main driver of non-compliance with planned follow-up visits.

Non-compliance with scheduled medical visit was almost universal in our study where less than three percent of the participants attended the entire cycle of scheduled visit during a one-year period. Furthermore, compliance decreased with increasing follow-up duration from 50% in the first month to just about 20% at twelve months. Uncontrolled asthma was also very frequent in this population. High prevalence of uncontrolled asthma has also been reported in studies conducted elsewhere, ranging between 40 and 50% [2-5]. Poor adherence to treatment has been credited to be a powerful determinant of uncontrolled asthma [6]. In our cohort, only two of the patients who reported to scheduled follow-up visits had poor adherence to treatment. This would at least in part explain the relatively low rate of uncontrolled asthma among those patients in our cohort who complied with all the planned visits.

The main and consistent predictor of non-compliance with scheduled follow-up visits in our study was uncontrolled asthma at the inclusion visit. This likely reflects those patients who also adhere poorly to prescribed medications and would tend to report in consultation only with symptoms or during the exacerbation of their disease. However, some cautions are needed in the interpretation of this finding while considering the complexity of patients' perception of asthma control and the uneven natural course of the disease. Indeed, a study by Kang et al [15] found that about 77% of patients lost-to-follow-up (no follow-up visit for seven consecutive months) have improved symptoms with an asthma control score greater than that of patients regularly followed-up. Therapeutic education including the principles of asthma treatment and when to seek care should be particularly aggressive in patients with uncontrolled asthma at each follow-up visit.

Our inability to trace in the community those patients who did not report for the follow-up visits is the main limitation of this study. Such an active pursuit would have allowed us to accurately investigate the reasons for non-compliance.

Conclusion

In conclusion, non-compliance with scheduled medical visits is usual in patients with asthma in our setting. Patients with uncontrolled asthma at the index visit are more likely to be those who will not report for future follow-up. Targeting this group of patients through aggressive therapeutic education can potentially improve the overall adherence to treatments and medical visits, improve the disease control rate and quality of life of patients, and ultimately reduce the risk of complications and case-fatality.

AUTHOR'S CONTRIBUTION:

EWPY conceived the study, supervised data collection, co-analysed the data and drafted of the manuscript; APK contributed to data analysis, drafting and critical revision of the manuscript. All authors approved the final version of the manuscript.

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Table 3: Predictive factors of non-adherence to health care appointment

Predictors	At 1-month		At 3-month		At 6-month		At 12-month	
	Crude OR (95%CI)	p	Crude OR (95%CI)	p	Crude OR (95%CI)	p	Crude OR (95%CI)	p
Female sex	1.05 (0.58-1.93)	0.866	1.29 (0.66-2.50)	0.452	0.92 (0.45-1.87)	0.812	0.82 (0.31-2.15)	0.682
Age, per 1 year increment	1.00 (0.99-1.02)	0.878	1.01 (0.99-1.03)	0.215	1.01 (0.99-1.02)	0.585	0.98 (0.96-1.01)	0.209
Duration of asthma, per 1 year increment	1.00 (0.98-1.02)	0.736	0.99 (0.97-1.02)	0.553	1.01 (0.98-1.03)	0.673	0.99 (0.96-1.03)	0.705
Planned consultation at inclusion	0.76 (0.42-1.36)	0.367	1.02 (0.53-1.95)	0.945	0.61 (0.28-1.29)	0.195	0.70 (0.24-2.09)	0.525
Seasonal increase of symptoms	4.17 (0.66-26.29)	0.129	0.82 (0.11-6.34)	0.848	6.00 (0.22-162.5)	0.287	/	/
Family history of asthma	0.49 (0.23-1.05)	0.067	0.62 (0.29-1.32)	0.214	0.95 (0.41-2.22)	0.909	1.64 (0.51-5.31)	0.407
Presence of rhinitis	1.60 (0.90-2.86)	0.112	0.78 (0.42-1.46)	0.439	0.62 (0.31-1.24)	0.175	0.80 (0.31-2.00)	0.626
Non-sensitization to perennial aeroallergens	3.10 (1.58-6.07)	0.001	1.57 (0.76-3.24)	0.218	1.47 (0.66-3.28)	0.344	2.05 (0.64-6.55)	0.228
Abnormal baseline FEV1 (<80%)	1.28 (0.69-2.37)	0.440	0.85 (0.43-1.67)	0.635	0.91 (0.43-1.88)	0.792	0.74 (0.27-2.05)	0.556
Uncontrolled asthma at inclusion	2.00 (1.09-3.67)	0.025	2.41 (1.22-4.76)	0.011	2.65 (1.23-5.73)	0.013	4.67 (1.30-16.80)	0.018

OR, odds ratio; FEV1, forced expiratory volume in the first second