

Factors associated with frequent emergency room attendance by asthma patients in Palestine

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SUMMARY

SETTING: The emergency room (ER) of Alia Governmental Hospital in Hebron city, in the southern part of the West Bank.

OBJECTIVE: To investigate the role of asthma severity, health services utilisation and medication use in frequent ER attendance for asthmatics in Palestine.

DESIGN: A cross-sectional study using a previously developed questionnaire.

RESULTS: Of 121 asthma patients, 73.5% were frequent ER attendees during the previous year, with a mean 6.7 visits (standard error 0.75). Moderate/severe asthma and hospital admissions in the previous year due to asthma were the strongest predictors for frequent attendees (adjusted OR [aOR] 6.92, 95%CI 2.44–19.62 and 11.16,

95%CI 4.37–28, respectively). Frequent attendees reported more difficulties in using asthma inhalers compared to one-time ER attendees (aOR 2.49, 95%CI 1.04–5.99). Inhaled short-acting β_2 -agonists were reported to be used regularly, on most days, by frequent attendees (≥ 1 canister/month) compared to one-time attendees (aOR 4.4, 95%CI 1.28–15 and 4.05, 95%CI 1.33–12, respectively).

CONCLUSIONS: Lack of proper use of inhalers and an over-reliance on reliever therapy contributes to asthma morbidity in Palestine. We recommend an intervention programme at the professional and patient levels.

KEY WORDS: asthma; emergency room; frequent ER attendees; health service utilisation; medication use

EMERGENCY ROOM (ER) attendance due to asthma attacks is very common; this represents an important area where specialised health care delivery is needed.¹ ER attendance can be minimised if asthma patients and their health care providers manage the disease according to established guidelines.^{2,3} The reduction in the acute use of health services for asthma is an important goal of asthma management.⁴

Studies have shown that 62% of children and 40% of adults return for ER care within one year,⁵ and that severe chronic asthma has been shown to be associated with ER attendance.^{6,7} Patients with frequent ER visits did not have sufficient knowledge of asthma control criteria.⁸ Lack of access to regular medical care,⁹ absence of health insurance,¹⁰ lack of specialist care,¹¹ and low socio-economic status¹² were all associated with repeated ER attendance. A lack of regular visits from asthma care physicians,¹³ previous hospital admissions and non-adherence to prescribed medications¹⁴ were also identified as factors. Inhaled corticosteroids were the only treatment for asthma that consistently showed a reduction in asthma morbidity and mortality rates.¹⁵ Studies have also reported that undertreatment by inhaled corticosteroids and overuse of inhaled β_2 -agonists could lead to higher risk of ER visits.¹⁶

Asthma studies in ERs have been conducted in in-

dustrialised countries such as Australia,^{5,6,13} England,¹⁷ Western Europe¹⁸ and the USA.^{7,11,19} However, limited studies had been performed in the Middle East. In neighbouring Israel, an intervention study among Muslim Bedouins attending a primary health care clinic (PHC) in the Negev that consisted of improvements in hygiene, use of asthma medications and equipment, allergen avoidance and health fairs exhibiting educational materials about asthma, resulted in a reduction in referrals to the ER from 22.8% (61 patients) to 2.2% (6 patients).²⁰

In Palestine, respiratory diseases are one of the main causes of morbidity and mortality in children.²¹ A series of studies on asthma determinants in childhood carried out in Palestine between 2000 and 2002 showed that 'wheezing in the previous 12 months' and 'physician-diagnosed asthma' occurred in respectively 8.8% and 9.4% of the children studied.²² Paternal asthma, maternal hay fever, damp houses and cockroach allergen positivity proved to be strong predictors for wheezing symptoms among these children.²³ However, no study has been conducted on asthma management.

Effective management and the extent to which an intervention programme should be applied to control asthma and prevent ER attendance will depend primarily on understanding why this occurs.²⁴ In

Palestine, the extent of the problem is not known. To develop a proper intervention study, we carried out a baseline study at the Alia Governmental Hospital ER, which serves the population in the most populated district of the West Bank. This study aimed to investigate asthma severity, health service utilisation and medications used as potential determinants of ER attendance frequency among asthma patients.

MATERIALS AND METHODS

Study setting

The study was carried out in Alia Governmental Hospital in Hebron city, in the southern part of the West Bank. Approximately 70% of the population in Hebron District have medical insurance and usually seek medical care at this hospital.

Study subjects

The study population included all asthma patients ($n = 121$) aged ≥ 5 years who attended the ER of the Alia Governmental Hospital between April and the end of May 2005. Subjects were considered eligible if they were residents of Hebron District, attended the Alia Hospital ER during the study period, had a final physician diagnosis of asthma with or without further complications, and accepted to participate. All study patients were interviewed at the ER, except for 15 patients who were interviewed in their homes.

The study was approved by the Scientific Research Committee and Faculty of Public Health Al Quds University and the Alia Hospital Board. All participants gave informed consent by signing a special consent form.

Study design and sample size

A cross-sectional study with non-random purposive sampling was used. Sample size calculation was used according to Table 1 (Peter Burney, personal communication, 2004). The table shows the approximate 95% confidence intervals (CIs) for an estimate, given a prevalence of 5%, 10%, 20% and 50% and sample sizes of 50, 100, 200 and 300 patients. Based on these data, a sample size of 100 patients was thought to be

sufficient using an estimated prevalence rate of asthma diagnosis of 10% in our community. We interviewed all 121 asthma patients who attended the Alia Hospital ER during the study period. Patients aged < 5 years were not included, as their symptoms could not be interpreted as asthma.²⁵

Methods

Asthma patients were interviewed to complete a questionnaire created on the basis of questionnaires previously developed by the International Union Against Tuberculosis and Lung Disease (The Union) and the European Community Respiratory Health Survey Questionnaire (ECRHSQ).²⁶ The questionnaire included structured open/closed questions that were administered in face-to-face interviews. The questionnaire included socio-demographic characteristics (Table 2), asthma severity, health services utilisation and medication use as variables. Patients were interviewed by the researcher. Nurses trained to fill out the questionnaire interviewed 20 patients when the researcher was absent.

Chronic asthma severity was classified according to self-reported day/night symptoms and physical activity provided by the Global Initiative for Asthma (GINA) 2002 guidelines.³

Statistical analysis

The dependant variable, i.e., frequency of ER attendance in the previous year, was categorised into frequent ER attendees (two or more visits to ER in past year, including the study attendance time) and one-time ER attendees (current visit to the ER the only visit in the past year). Independent variables were socio-demographic characteristics, medication use, health service utilisation and asthma severity.

Mild intermittent and mild persistent asthma were grouped together under 'mild asthma'. Moderate persistent asthma was categorised with severe persistent asthma under 'moderate/severe asthma'. This re-categorisation was done due to the small sample numbers (< 10 patients) in some categories of asthma severity variable. Studies also showed that the classification of chronic asthma severity varies according to the reported history of day/night-time symptoms.²⁷

Table 1 Approximate 95% CIs for an estimate of sample size, given a prevalence of 5%, 10%, 20% and 50% and sample sizes of 50, 100, 200 and 300 patients

True prevalence, %	Sample size											
	50			100*			200			300		
	95%CI	Absolute	Per cent width of interval	95%CI	Absolute	Per cent width of interval	95%CI	Absolute	Per cent width of interval	95%CI	Absolute	Per cent width of interval
5	3.1–6.9	± 1.9	± 38	3.65–6.35	± 1.35	± 27	4.52–5.48	± 0.48	± 10	4.61–5.39	± 0.39	± 8
10	5.8–14.2	± 4.2	± 42	7–13	± 3	± 30	7.88–12.12	± 2.12	± 21	8.3–11.7	± 1.7	± 34
20	14.4–25.6	± 5.6	± 28	16–24	± 4	± 20	17.2–22.8	± 2.28	± 11	17.7–22.3	± 2.23	± 11
50	43–57	± 7	± 14	45–55	± 5	± 10	46.5–53.5	± 3.5	± 7	47.1–52.9	± 2.9	± 6

* Significant, $P < 0.05$.
CI = confidence interval.

Table 2 Frequency distribution of ER attendance by socio-demographic characteristics

Socio-demographic characteristics	One-time ER attendees (<i>n</i> = 32) <i>n</i> (%)	Frequent ER attendees (<i>n</i> = 89) <i>n</i> (%)	χ^2 significant <i>P</i> value	Total sample (<i>N</i> = 121) <i>n</i> (%)
Sex				
Male	19 (59.4)	45 (50.6)	0.39	64 (52.9)
Female	13 (40.6)	44 (49.4)		57 (47.1)
Place of residence				
City and refugee camps	19 (59.4)	59 (66.3)	0.75	78 (64.5)
Village	13 (40.6)	30 (33.7)		43 (35.5)
Age, years				
5–19	3 (9.3)	8 (9)	0.16	11 (9.1)
20–49	19 (59.3)	34 (38.2)		53 (43.8)
50–64	4 (12.5)	25 (28.1)		29 (24)
>64	6 (18.7)	22 (24.7)		28 (23.1)
Level of education, years				
0–6	12 (37.5)	49 (55)	0.27	61 (50.4)
7–9	10 (31.2)	23 (25.8)		33 (27.3)
10–12	5 (15.6)	11 (12.4)		16 (13.2)
>12	5 (15.6)	6 (6.8)		11 (9.1)

ER = emergency room.

Two-tailed Pearson's χ^2 test was used in the univariate analysis to compare the association between the dependent variables with the independent demographic variables. A *P* value of <0.05 was considered significant.

Multivariate logistic regression was used to evaluate variables associated with ER attendance while controlling for possible confounding variables (age, sex, place of residence, education level, marital status and occupation) in calculating the adjusted odds ratio (aOR).²⁸ Variables included in the model were only those with a significant level <0.05 in the univariate analysis. All analyses were conducted using software SPSS Version 12 (SPSS Inc, Chicago, IL, USA).

RESULTS

Socio-demographic characteristics of frequency of ER attendance

The mean age of the participants was 47 years (range 5–83), 47% of whom were females. Half of the patients had had 0–6 years of education compared to 9% with >12 years of education. There was no significant difference in ER frequency attendance between men and women (*P* > 0.05), which was also similar when comparing the various age groups, their educational level and their place of residence (Table 2). Marital status and occupation did not show any significant difference among the various categories (data not shown).

Factors associated with frequent ER attendance

Frequent ER attendees represented 73.5% (*n* = 89) of the participants; 26.4% (*n* = 32) were one-time ER attendees. The mean number of visits for frequent ER attendees was 6.7 in the previous year (standard error 0.75, range 2–41). There were no significant dif-

ferences in age, sex, level of education, marital status or occupation between frequent and one-time ER attendees (Table 2).

Asthma severity

Chronic asthma severity, as measured by self-reported day/night-time symptoms and physical activity, was as follows: 54.5% mild asthma (*n* = 66), 45.5% moderate/severe asthma (*n* = 55). The mean number of ER visits in the previous year among mild and moderate/severe asthmatics was 2.1 and 6.7, respectively. Asthma severity was significantly associated with frequent ER attendance. Moderate/severe asthmatics were 6.9 times more likely to be frequent ER attendees than mild asthmatics (aOR 6.92, 95%CI 2.44–19.62) (Table 3).

Health services utilisation

Table 3 shows a strong association between ER attendance frequency and asthma severity (aOR 6.92, 95%CI 2.44–19). The use of ER services was observed more frequently among people with health insurance (*P* > 0.05). Frequent ER attendees reported seeing a specialist more often than less frequent attendees (*P* < 0.05). Frequent ER attendees were also admitted to the hospital more often (aOR 11), but reported less benefit from their attending physicians in their asthma management at home (i.e., asthma information provided by the physician did not help in asthma management or prevention at home) (aOR 0.30, 95%CI 0.13–0.72). Frequent ER attendees reported greater difficulty in using asthma inhalers/devices than the less frequent ER attendees (aOR 2.49, 95%CI 1.04–5.99).

Medication use and treatment protocols

Table 3 shows that frequent ER attendees were more likely to report regular use of inhaled short-acting

Table 3 Multivariate logistic regression for factors associated with frequent ER attendance

Variables	One-time ER attendance (n = 32) n (%)	Frequent ER attendance (n = 89) n (%)	Total sample (N = 121) n (%)	aOR (95%CI) [†]
Asthma severity				
Moderate/severe	5 (15.6)	50 (56.2)	55 (45.5)	6.92 (2.44–19)*
Mild	27 (84.4)	39 (43.8)	66 (54.5)	1.00
Health services utilisation				
Cost of medication				
Full cost paid by patient	8 (25.0)	7 (7.9)	15 (12.4)	0.26 (0.05–1.22)
Partially covered by insurance	20 (62.5)	69 (77.5)	89 (73.6)	1.06 (0.81–3.61)
No cost: fully covered by insurance	4 (12.5)	13 (14.6)	17 (14.0)	1.00
Number of visits to a health professional in previous year				
0	8 (25)	6 (6.7)	14 (11.6)	1.00
1–2	13 (40.6)	17 (19.1)	30 (24.8)	1.74 (0.48–6.28)
3–4	4 (12.5)	25 (28.1)	29 (24)	8.33 (1.86–37)*
5–6	3 (9.4)	8 (9)	11 (9.1)	3.55 (0.65–19)
>6	4(12.5)	33 (37.1)	37 (30.6)	11.0 (2.49–48)*
Last time seen by a health professional				
<1 week	10 (31.3)	16 (18)	26 (21.5)	1.86 (0.48–7.17)
1 week–1 month	9 (28.1)	42 (47.2)	51 (42.1)	5.44 (1.47–20)*
>1–6 months	3 (9.4)	17 (19.1)	20 (16.5)	6.61 (1.28–34)*
>6 months–1 year	3 (9.4)	8 (9)	11 (9.1)	3.11 (0.55–17)
>1 year	7 (21.9)	6 (6.7)	13 (10.7)	1.00
Admissions to hospital with asthma [‡]	11 (34.4)	76 (85.4)	87 (71.9)	11.16 (4.37–28)*
Benefit from doctor in managing asthma at home [‡]	21 (65.6)	33 (37)	54 (44.6)	0.30 (0.13–0.72)*
Find inhaler/device use				
Difficult	9 (28.1)	44 (49.4)	53 (43.8)	2.49 (1.04–5.99)*
Easy	23 (71.9)	45 (50.6)	68 (56.2)	1.00
Medication				
Inhaled short-acting β_2 -agonist taken				
Occasionally	17 (53.1)	41 (46)	58 (47.9)	1.60 (0.60–4.28)
Most days	5 (15.6)	33 (37)	38 (31.4)	4.40 (1.28–15)*
Never	10 (31.3)	15 (16.9)	25 (20.7)	1.00
Inhaled steroid taken				
Occasionally	8 (25)	25 (28)	33 (27.3)	1.68 (0.64–4.38)
Most days	3 (9.4)	25 (28)	28 (23.1)	4.48 (1.21–16)*
Never	21 (65.6)	39 (43.8)	60 (49.6)	1.00
Beclomethasone inhaler currently used [‡]	9 (28.1)	49 (55.1)	58 (47.9)	3.13 (1.30–7.52)*
Short-acting β_2 -agonist inhaler currently used				
<1 canister/month	15 (46.9)	20 (22.5)	35 (28.9)	0.80 (0.27–2.31)
≥ 1 canister/month	8 (25)	54 (60.7)	62 (51.2)	4.05 (1.33–12)*
Never	9 (28.1)	15 (16.8)	24 (19.9)	1.00

* Significant, $P < 0.05$.[†] aOR for frequent ER attendees as compared with one-time ER attendees.[‡] Reference category (aOR = 1) is no answer.

ER = emergency room; aOR = adjusted odds ratio.

β_2 -agonists most days, to use ≥ 1 canister/month of inhaled short-acting β_2 -agonist and to have regularly used inhaled steroids on most days in the past 3 months compared to one-time ER attendees.

Frequent ER attendees reported more current use of inhaled beclomethasone compared to one-time ER attendees (Table 3); however, 42% of the subjects were currently using 500 $\mu\text{g}/\text{day}$ of inhaled beclomethasone, while only 6% were currently using 1000–2000 $\mu\text{g}/\text{day}$ (Figure 1). By stratifying inhaled beclomethasone doses by persistent asthma severity level, as shown in Table 4, we found (data not shown) that 77% of persistent asthmatics were reported to be under-treated

by inhaled beclomethasone. Moderate/severe persistent asthmatics were significantly more likely to be under-treated by beclomethasone than mild persistent asthmatics ($P < 0.05$).

Figure 1 shows that no significant difference was seen between study groups in the use of oral steroid courses/year. Figure 2 shows that 66.9% of the participants had occasionally used oral antibiotics in the previous 3 months. However, an oral cough mixture was regularly used occasionally by 39%. No significant differences were seen between ER groups for cough mixture, anti-histamine and theophylline use (Figure 2).

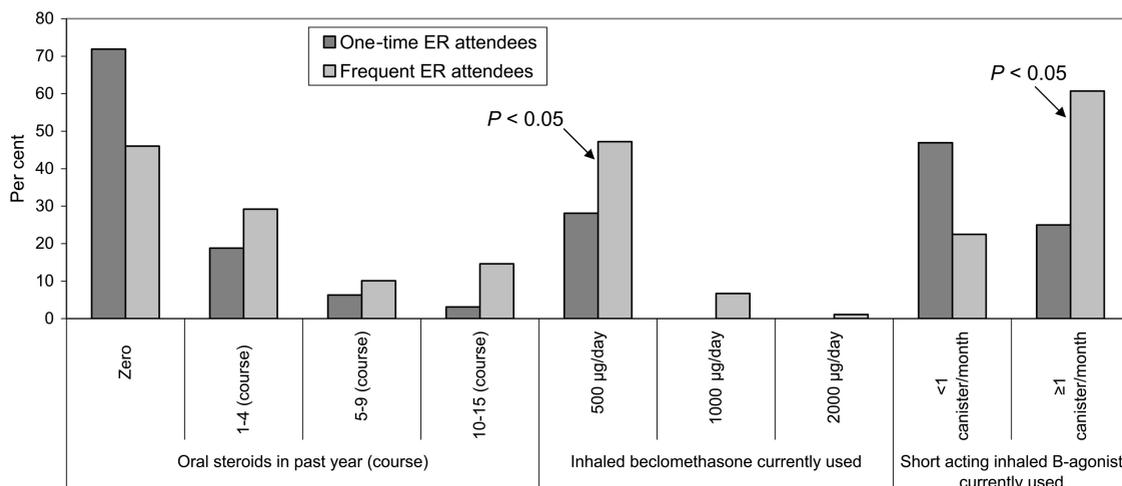


Figure 1 Distribution of ER attendee groups by use of essential asthma medications in the past year. Values given as percentage for each group. ER = emergency room.

Table 4 Distribution of currently inhaled beclomethasone used by asthma severity* in past 3 months

Beclomethasone inhaler currently used	Mild persistent (n = 57) n (%)	Moderate persistent (n = 42) n (%)	Severe persistent (n = 13) n (%)
500 µg/day	20 (35)	22 (52.4)	5 (38.5)
1000 µg/day	1 (1.8)	3 (7.1)	2 (15.4)
2000 µg/day	0	1 (2.4)	0
None	36 (63.2)	16 (38)	6 (46.2)

* Classification according to day/night-time symptoms in GINA 2002 guidelines.³ GINA = Global Initiative for Asthma.

DISCUSSION

The present study is the first in Palestine on ER attendance of asthma patients. The study's main finding was that disease severity and indicators of severity (history of hospital admission for asthma, 3–4 visits or >6 visits to a health care professional in the previous year) are strong predictors for frequent ER attendance. Our results are consistent with other studies that identified asthma severity and indicators of severity as predictors of frequent ER attendance.^{5,13,27,28} Another important finding of this study was that the

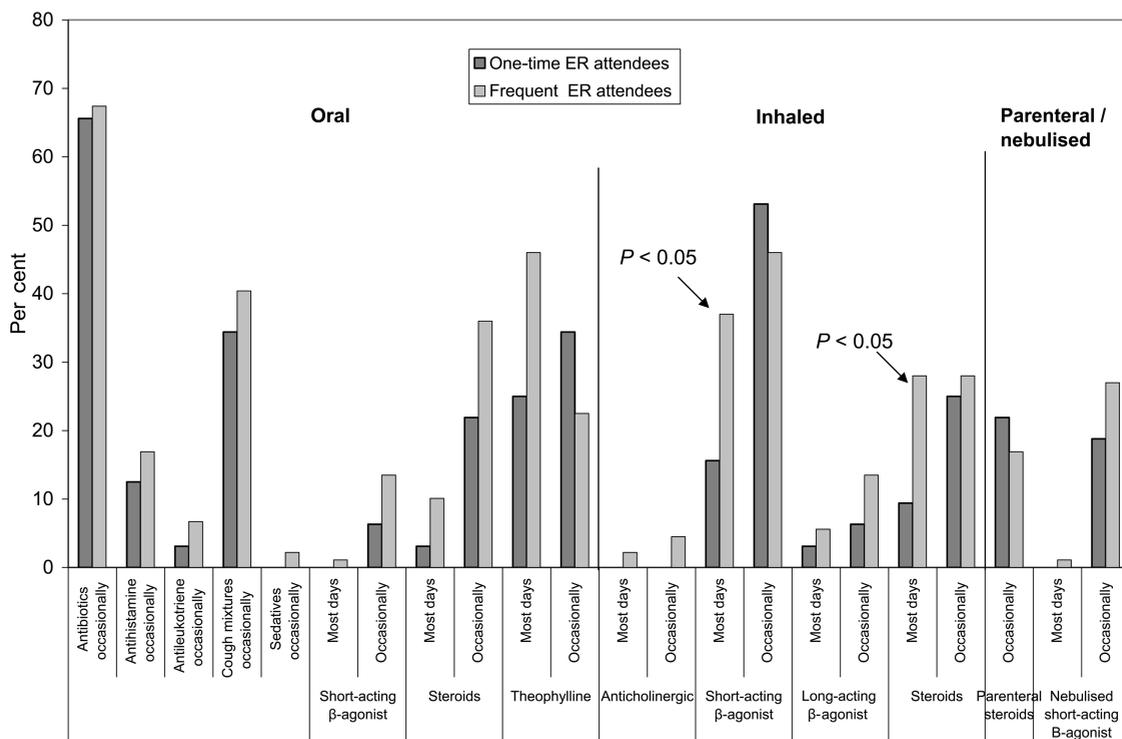


Figure 2 Distribution of ER attendee groups in the past year by medication taken regularly in the past 3 months. Values given as percentage for each group. ER = emergency room.

use of ≥ 1 canister/month and/or the regular use of inhaled short-acting β_2 -agonists most days increased the risk of frequent ER attendance. These findings support other studies that associated inhaled short-acting β_2 -agonists with frequent ER attendance and worsening of asthma control.^{16,19,24}

Health services utilisation

Studies have indicated that regular medical review might lead to a reduced number of ER visits.⁹ Furthermore, it has been observed that patients attending ER for asthma generally have inadequate asthma management knowledge and skills,⁸ and that poor understanding of the disease process or of the action of the medications and lack of disease management are a major problem.^{24,29} Our findings showed that patients who reported having benefited from their doctors in managing their asthma at home were less likely to be frequent attendees, and that frequent attendees were more likely to report difficulty in using inhaler devices. These findings are similar to other studies^{6,20,30} that indicated that inappropriate use of inhalers or inability to use them were significant predictors of frequent ER attendance.

Health insurance varied between countries as a predictor of frequent ER attendance.^{19,31} Studies reported higher rates of ER attendance among uninsured patients because they were less likely to be followed up or enjoy regular medical care.^{10,32,33} However, a study in the US found that most patients attending ERs for asthma were insured.³² Our results showed that utilisation of the ER services was more frequent among insured people. In Palestine, an overload of governmental health services has occurred in the last 5 years. Another explanation might be the study setting, i.e., governmental hospital, where only those who are insured might have attended the ER.

Medication use

The GINA 2002³ guidelines recommended the use of inhaled short-acting β_2 -agonists as needed. However, other studies have reported overuse of inhaled β_2 -agonists that caused a worsening of asthma control.^{16,19,24} Our results revealed that patients who used ≥ 1 canister/month and/or who regularly used inhaled short-acting β_2 -agonists were significantly more likely to be frequent ER attendees.

Earlier studies have reported that under-treatment by inhaled corticosteroids causes worsening of asthma control and can lead to an increased risk of ER visits.^{16,19} Inhaled beclomethasone does not necessarily prevent ER attendance or reduce asthma morbidity unless it is used adequately and is delivered in proper dosages based on asthma severity levels.^{3,4} Our results showed that frequent attendees were more likely to use inhaled steroids on a daily basis compared to one-time attendees. We also found that only 37% of mild persistent asthma cases, 9.5% of moderate per-

sistent cases and no severe persistent asthma cases were adequately treated by inhaled beclomethasone (Table 4). These results may be explained by incorrect prescription of these medications, poor understanding of the action of the medications, fear of the side effects of steroids and/or concerns about the cost of medications. As in our community inhaled short-acting β_2 -agonist are relatively cheaper than inhaled steroids, patients either did not buy their prescriptions or they lowered the doses of their inhaled steroids to prolong their use.

Our study could be limited by its design, i.e., cross-sectional, and its small sample size, but as it was an audit (baseline) study it enables us to develop intervention programmes to control the high ER attendance and to plan an appropriate protocol for asthma management in Palestine. Patients included in this study (most of whom were insured) may not be representative of the entire asthma patient population in the local community or services at private or non-governmental hospitals. We therefore cannot generalise our results. However, those patients represent a highly informative group of treatment failures and are costly in term of economic burden.

In conclusion, improper use of inhalers and an over-reliance on reliever therapy rather than controller therapy, together with under-treatment with inhaled steroids, might add to the risk factors for frequent ER attendance. We strongly recommend an ER-and/or PHC-based asthma educational intervention programme, with integrated activity by all health workers concentrating on proper use of asthma inhalers/devices, the action of medications and the importance of anti-inflammatory therapy, as well as a training programme for health professionals on adequate asthma pharmacotherapy.

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R É S U M É

CADRE DE L'ÉTUDE : Service des urgences de l'hôpital gouvernemental d'Alia dans la ville d'Hébron, au sud de la Cisjordanie.

OBJECTIF : Étudier le rôle de la sévérité de l'asthme, du recours aux services de soins et de l'utilisation de médicaments sur la fréquence des visites des asthmatiques aux services d'urgences en Palestine.

TYPE D'ÉTUDE : Étude transversale utilisant un questionnaire élaboré antérieurement.

RÉSULTATS : Sur 121 patients asthmatiques, 73,5% étaient des « usagers fréquents » du service de soins d'urgence au cours de l'année précédente, avec une moyenne de 6,7 visites (erreur standard 0,75). Un asthme modéré/grave et toute une hospitalisation du fait de l'asthme lors de l'année précédente sont les facteurs prédictifs les plus puissants chez les usagers fréquents (ORaj 6,92 ; IC95%

2,44–19,62 et ORaj 11,16 ; IC95% 4,37–28). Les usagers fréquents ont rapporté plus de difficultés lors de l'utilisation d'inhalateurs contre l'asthme par comparaison avec ceux n'ayant fait qu'une visite (ORaj 2,49 ; IC95% 1,04–5,99). Les β_2 -agonistes inhalés de courte durée sont utilisés régulièrement la plupart des jours par les usagers fréquents plus fréquemment que par ceux n'ayant fait qu'une seule visite (ORaj 4,4 ; IC95% 1,28–15), comme c'est le cas pour l'utilisation de plus d'un inhalateur par mois (ORaj 4,05 ; IC95% 1,33–12).

CONCLUSIONS : En Palestine, une mauvaise manière d'utiliser les inhalateurs et une confiance trop élevée à l'égard d'un traitement symptomatique contribuent à la morbidité associée à l'asthme en Palestine. Nous recommandons un programme d'intervention au niveau professionnel et à celui des patients.

RESUMEN

MARCO DE REFERENCIA: El servicio de urgencias del Hospital Gubernamental Alia de la ciudad de Hebrón, en la zona sur de la Ribera Occidental.

OBJETIVO: Investigar la influencia de la gravedad del asma, la utilización de los servicios de salud y del uso de los medicamentos sobre la frecuencia de consulta a los servicios de urgencias por parte de los pacientes asmáticos en Palestina.

MÉTODO: Estudio transversal realizado mediante la administración de un cuestionario elaborado previamente.

RESULTADOS: De los 121 pacientes con asma, el 73,5% había acudido con frecuencia al servicio de urgencias en el año anterior, con un promedio de 6,7 consultas (error estándar 0,75). Los principales factores de predicción de consultas frecuentes fueron un asma moderada o grave (aOR 6,92 ; IC95% 2,44–19,62) y un antecedente de hospitalización por asma durante el año anterior (aOR

11,16 ; IC95% 4,37–28). Los pacientes que consultaron con frecuencia refirieron más problemas con el uso de los inhaladores de medicamentos antiasmáticos, en comparación con pacientes que habían acudido una sola vez al servicio de urgencias (aOR 2,49 ; IC95% 1,04–5,99). Los pacientes con consultas frecuentes refirieron estar acostumbrados al uso de agonistas- β_2 inhalados de acción corta, casi todos los días (≥ 1 frascos por mes) (aOR 4,4 ; IC95%: 1,28–15) a diferencia de los pacientes que consultaron una vez (aOR 4,05 ; IC95% 1,33–12).

CONCLUSIÓN: El uso inapropiado de los inhaladores y el exceso de confianza en un tratamiento de alivio en lugar del tratamiento de fondo contribuyen a la morbilidad por asma en Palestina. Se recomienda un programa de intervención dirigida a los profesionales de la salud y a los pacientes.