Family practitioners' perceptions of, knowledge about and use of peak flow meters in the Lenasia, Lenasia South and Soweto Community Health Clinics

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Abstract

Background

The purpose of this paper was to determine the availability of peak flow meters, perceptions about their usefulness and the perceptions of clinical indications for their use.

Methods

A questionnaire was administered to private and public sector practitioners (n=72) working in three urban areas of greater Johannesburg. Data were collected concerning practice profiles, the characteristics of the practitioners, the extent of and indications for use, and the reasons for failure to use these meters.

Results

The results showed that only 21 (29%) of the practitioners advised their asthma patients to use peak flow meters for home monitoring. A scoring system (summary score), which was developed to summarise knowledge of both the indications for the use of the meters and the method of peak flow measurement, showed that only 33.3% of the practitioners attained maximum or close to maximum scores (6 to 8 of an 8-point scale).

Conclusion

Peak flow meters were underutilised by family practitioners. The cost of the peak flow meter was an important reported cause of underutilisation. It is recommended that the importance of the peak flow meter in the management of asthma be emphasised at the undergraduate and continuing medical education level.
The findings of this study could also be used to guide the national campaign coordinators in South Africa in their strategy to improve asthma care among family practitioners. Since asthma may be under-diagnosed in the community, further research is needed to assess the effects of education in assisting people to recognise asthma. Early recognition and diagnosis of asthma, together with appropriate asthma education, may significantly reduce morbidity. The role of illiteracy and cost in limiting the use of peak flow meters warrants investigation, as does the possibility of developing suitable meters for populations with limited formal education. Doctors need to make more conscientious, concerted and informed efforts to monitor their asthma patients and to collaborate, where appropriate, with health educators to optimise the management of asthma. This could include workshops within the community and with fellow healthcare workers (doctors, primary healthcare sisters) on various aspects of asthma care, which will incorporate inhaler techniques and peak flow meter use.

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Introduction

The management of asthma presents an interesting challenge to the family practitioner, who is well placed to offer continuity of care. This is not only of great value for consistent medical care, but also promotes a strong and positive relationship between the practitioner and the patient. Such arrangement can be used to encourage the patient's personal management of the illness. Objective measurements of airflow are required to optimise and inform the practitioner of the patient's asthma status.[1]

Wright and colleagues first introduced a prototype of a portable peak flow meter in 1959.[2] Until that time, instruments to measure airflow were large and cumbersome. Presently, several inexpensive portable devices are available to measure lung function objectively. Stewart has suggested that the peak flow meter, being a relatively robust and inexpensive device, can easily and reliably provide patients and the family practitioner with objective information about changes in pulmonary obstruction. He also believes that an evaluation of peak flow rates can be used to achieve a number of goals in asthma care.[3] These are:

- to assess the severity of asthma and provide a basis for making decisions with regard to therapy;
- to measure the daily variability of peak flow readings as a an indicator of the degree of airway responsiveness;
- to determine the severity of an exacerbation and to detect this early, before the patient perceives symptoms;
- to allow the patient to adjust doses of drugs to maintain normal function with minimal doses of drugs;
- to identify unknown or suspected trigger factors;
- to identify early critical reductions in peak flow readings, which would indicate the necessity for emergency medical care or hospitalisation;
- to assist in the diagnosis of exercise-induced asthma;
- to educate the patient about managing his/her asthma;
- to keep airway function close to normal at all times.

The guidelines for the management of asthma in South Africa, drawn up by the working group of the South African Pulmonology Society, state that family practitioners should use peak flow meters routinely in their practices, as the morbidity and mortality rates associated with asthma in South Africa are unacceptably high.[4]

There are no data in South Africa on the use of peak flow meters in family practice, and this study was undertaken in a defined population of family practitioners in the Gauteng Province.

Methods

Ethical approval for the study was obtained from the University of the Witwatersrand (Protocol no: M930914).

Study sample

The study population included all private and public family practitioners practising at the Lenasia, Lenasia South and Soweto Community Health Centres. Since all the family practitioners in these centres formed part of the study population, no sampling was done.

Survey instrument

A questionnaire was designed and administered by the researcher to collect information about the family practitioners. The first series of questions concerned personal characteristics and education levels. Variables such as age, sex, university where degree was obtained, date qualified and postgraduate qualifications were used to stratify subjects, as these factors might influence the use of peak flow meters.

The aim of the clinical experience section of the questionnaire was to ascertain whether or not the practitioner's usage of peak flow meters was influenced by: the number of years in family practice, by a special interest in asthma or by patient load.

The series of questions related to asthma diagnosis were to assess the family practitioner's knowledge of the use of the peak flow meter in the diagnosis and management of asthma. The questions about the peak flow meters were mostly clinical indications for the use of peak flow meters. Some of the questions focused on whether or not the practitioner prescribed or arranged a peak flow meter for patients so that they could monitor their asthma at home. The final series of questions attempted to identify factors that limited the use of peak flow meters by family practitioners. The subject was also asked to demonstrate the use of the peak flow meter.

Statistical analyses

Summary scores

To analyse the knowledge of indications for the use of meters and the method of measuring peak flow, a scoring system (summary score) was derived. Three experienced family practitioners compiled the summary score using quite lenient criteria to measure knowledge. To obtain a full score, practitioners needed to:

- Report that peak flow meters were used to diagnose asthma and to assess severity;
- Know two out of 10 well-accepted uses of the meter;
- Have a meter in his/her consulting rooms; and
- Be able to demonstrate the correct use of the meter.

Analytical statistics was determined using the chi-square test and linear regression. Bivariate and multivariate analyses were done using the Epi-software program.[5] ANOVA was used for the bivariate analysis of continuous variables, while x^2 tests were done for categorical variables. The relationship between the summary scores and the following variables was investigated: age group, sex, period of qualification, university where degree was obtained (South African or non-South African), sector (private or public), number of years in family practice, a special interest in asthma and patient load.

Linear regression was used for the multivariate analysis, with the summary score as the dependent variable and the independent variables being those that were significantly associated with the summary score in the bivariate analysis.

Results

Response rate

The overall response rate was 92% (n=72). Fifty-seven per cent of the practitioners (n=41) were from the private sector and 43% (n=31) were from the public sector.

Demographic data

Sixty per cent (60%) of the family practitioners were between 30 and 49 years of age and 78% of the practitioners were male.

The greatest proportion of the family practitioners (61%) graduated outside South Africa and 53% of the practitioners qualified before 1980. Twelve of the family practitioners had qualifications in addition to their basic medical degree, of which two had a postgraduate qualification in family practice.

Clinical experience

None of the practitioners had worked in an asthma clinic. Thirty-nine per cent

(39%) had practised for less than six years. Twenty-eight per cent (28%) had practised between seven and 14 years, while 33% were in practice between 15 and 39 years.

Thirty-nine per cent (39%) of the family practitioners in the public sector reported a special interest in asthma, compared to 32% in the private sector.

Family practitioners in the public sector saw between 50 and 500 patients per week (mean: 260±110) and between one and 70 asthmatics per week (mean: 23±18.5). The practitioners in the private sector saw between 40 and 350 patients per week (mean: 169±111) and between one and 30 asthmatics per week (mean: 8±8.2).

The peak flow meter

Eighty per cent (80%) of the practitioners reported that a peak flow meter was available in their rooms, although 15 practitioners who said they had a peak flow meter failed to show it to the researcher. Six of these practitioners were in the private sector and nine were in the public sector. Also notable was that these 15 practitioners were unable to adequately demonstrate the correct use of the meter.

Table I shows the results when practitioners were asked to state the methods used to assess the severity of asthma.

Table I shows that the majority of public and private sector practitioners used symptoms and signs to assess the severity of asthma. Peak flow expiratory rates were reportedly used by 58% of the public sector practitioners and 63% of the private sector practitioners (p=0.64).

Tables II(a) and II(b) demonstrate what the practitioners reported to be clinical indications for the use of peak flow meters.

Surprisingly, 71% of the practitioners thought a peak flow meter would be useful in creating a self-management plan for the patients, but only 29% of them prescribed or arranged a peak flow meter for home monitoring.

Table III indicates the reasons which prevented the use of the peak flow meters in the public and private sectors.

The cost of the peak flow meter, the difficulty in the reading of numbers (on the peak flow meter) and the availability of time to teach its use affected the public sector practitioners more than those in the private sector.

Factors associated with summary scores

To determine which variable (period of qualification, age group, sector and university) were independent predictors of the summary score, multivariate analysis was done using linear regression. The multivariate analysis (statistical modelling) was performed to estimate the strength of the associations, while controlling for a number of confounding variables simultaneously. Sector, university and period of qualification were found to be statistically significant, and hence were compared against age group and period of qualification. Age group and period of qualification would then verify against each other for consistency.

Three models were used. The first (Table IV) had age group, university and sector as independent variables, and the second (Table V) had period of qualification, university and sector as independent variables. The third (Table VI) used all four variables in the model. This approach was adopted as age group and period of qualification were likely to be surrogates of each other.

It can be seen that university was an important variable in all three models, and that, in model one, age group was independently associated with the summary score. In model 2, the period of qualification was associated with summary score (p=0.05).

Table I: Methods used to assess the severity of asthma

Methods of assessing severity	Public sector (n=31)	Private sector (n=41)
Symptoms	90%	85%
Signs	94%	88%
Peak expiratory flow rate	58%	63%
Other		X-ray (2%) Don't know (2%) Response to medication (2%)

Table II(a): Clinical indications to use peak flow meters in the consulting room by practitioner (n=72)

	Frequency	Percentage
Diagnose asthma	39	54
To assess severity of asthma	44	61
To exclude restrictive lung disease	38	53
Acute exacerbations	60	83
To change therapy	56	78
To diagnose exercise induced asthma	48	67

Table II(b): Clinical indications to use peak flow meters by patients according to the practitioner (n=72)

	Frequency	Percentage
To assess severity of asthma	44	61
For home monitoring	21	29
Self management plan	51	71
Acute exacerbations	60	83

Table III: Reasons for limitation of use of the peak flow meter

Reason for the limitation of use of peak flow meter (PFM)	Public sector (n=31)	Private (n=41)
Cost of PFM	68%	61%
Difficulty in reading of numbers on the PFM	58%	34%
Time available to teach the use of PFM	42%	34%
Busy practice	45%	24%
Poor compliance	6%	27%
Limit illness = by using a PFM patients would only focus on the reading and treat accordingly	0%	12%
Laziness (doctor)	3%	10%
Practitioners would not recommend it	6%	12%
Administrative (and therefore availability of the meter	23%	2%

Discussion

A poor knowledge of the use of the

peak flow meter is demonstrated in this study.

There are no previous studies to confirm the findings in this study. However, a study on whether doctors needed training in the use of aerosol pumps was conducted in Bloemfontein.[6] Only 39% of primary care physicians could demonstrate three essential steps of using an aerosol pump. The peak flow meter and aerosol pumps are essential components in asthma care. Having insufficient knowledge of the peak flow meter and aerosol pumps could compromise asthma care.

Asthma is under-diagnosed in the community, and there is abundant evidence that family practitioners under-diagnose asthma. In one study in which a review of bronchitis patients was undertaken, an average of 16 consultations for respiratory symptoms were needed before asthma was diagnosed.[7] This situation can be improved if testing for asthma is done either with an exercise test or inhalation challenge using a peak flow meter. This would allow the general practitioner to make an early and accurate diagnosis of asthma and promote good asthma care.

Undergraduate university training was an important determinant of the usage of the peak flow meter. In general, students are not taught the skills and attitudes required for patient education and to be good managers of resources. Instead, they are asked to do a battery of tests and investigations to rule out 'organic' causes. The unnecessary and inappropriate use of x-rays and blood tests for the diagnosis of asthma can be replaced by the use of a small, robust and inexpensive peak flow meter. The peak flow meter is much cheaper than the other investigations and provides a more objective measure with which to diagnose and assess the severity of asthma. It also supports McWhinney's principle of family medicine, which describes the family physician as the manager of resources.[8] As a generalist and first contact physician, he/she has control over considerable resources and is able, within certain limits, to control admission to hospitals, limit the use of unnecessary investigations, prescribe appropriately and refer to specialists if the need arises. Acquiring additional knowledge of the peak flow meter at undergraduate level will certainly assist practitioners to fulfil their role as managers of asthma resources.

Table IV: Model 1, demonstrating the influence of age group, university and sector on the summary score

Variable	B coefficient	Standard error	p value
Age group	-0.67	0.31	0.05
University (South African/ non-South African)	2.03	0.55	<0.05
Sector (private/public)	-0.47	0.55	<0.05

Table V: Model 2, demonstrating the influence of period of qualification, university and sector on the summary score

Variable	B coefficient	Standard error	p value
Period of qualification	-.067	0.31	0.05
University (South African/ non-South African)	2.03	0.55	<0.05
Sector (private/public)	-0.48	0.54	>0.05

Table VI: Model 3, demonstrating the influence of age group, sector, university and period of qualification on the summary score

Variable	B coefficient	Standard error	p value
Age group	-0.26	0.31	>0.5
Sector	-0.50	0.54	>0.01
University	2.00	0.55	<0.05
Period of qualification	0.86	0.82	>0.1

In 1994, the South African asthma working group introduced guidelines for adults and chidren that encouraged the use of peak flow meters. These guidelines were widely distributed. Despite this, and as is shown by this study, older practitioners and those qualified before 1980 are less likely to use peak flow meters and are less knowledgeable than their 'younger', more recently qualified colleagues, presumably because they had less exposure to the peak flow meter during undergraduate training. This suggests that continuing education programmes, such as those provided by asthma working groups, departments of family medicine and academic associations of family practice, are necessary to encourage practitioners to adopt practices not learnt while at medical school.

The family physician is ideally placed to offer continuity of care. Asthma is a chronic disease that requires appropriate care and education. This would reduce morbidity by decreasing hospitalisations and absenteeism at work and at school. Patients can be given their own peak flow meters to monitor their readings in acute exacerbations. Practitioners should have a peak flow meter readily accessible to monitor their asthmatic patients, thus objectively measuring the severity of asthma.[1]

Conclusion

Practitioners' knowledge of the peak flow meter is not optimal and the use of the peak flow meter to diagnose and treat asthma is underutilised by practitioners at the Lenasia, Lenasia South and Soweto Community Health Centres.

Undergraduate university training is an important determinant of the use of peak flow meters. Furthermore, practitioners who qualified after 1980 had higher summary scores.

Some practitioners, because of their possible greater access to continuing medical education, know more about peak flow meters and use them more frequently.

Recommendations

The underutilisation of peak flow meters emphasises the importance of introducing training in the use of peak flow meters in the management of asthma. This can be done at the university (undergraduate and postgraduate level), as well as at 'grassroots' level (community).

The findings of this study could also be used to guide the national campaign coordinators in South Africa in their strategy to improve asthma care among family practitioners.

Since asthma may be under-diagnosed in the community, further research is needed to assess the effects of education in assisting people to recognise asthma. Early recognition and diagnosis of asthma, together with appropriate asthma education, may significantly reduce morbidity.

The role of illiteracy and cost in limiting the use of peak flow meters warrants investigation, as does the possibility of developing suitable meters for populations with limited formal education.

Doctors need to make more conscientious, concerted and informed efforts to monitor their asthma patients and to collaborate, where appropriate, with health educators to optimise the management of asthma. This could include workshops within the community and with fellow healthcare workers (doctors, primary healthcare sisters) on various aspects of asthma care, which will incorporate inhaler techniques and peak flow meter use.

References

1. Fried FA, Miller RS, Green LA, Sherrod P, Nutting PA. The use of objective measures of asthma severity in primary care: a report from ASPN. J Fam Prac 1995;41:139–43.
2. Bauman A, McKenzie DK, Young L, Yoon R. Asthma education: the perception of family physicians. J Asthma 1990;27(6):385–92.
3. Stewart RI. Practical spirometry. Medical Research Council and Department of Medical Physiology and Biochemistry, University of Stellenbosch Tygerberg, South Africa; 1990.
4. Working Group of the South African Pulmonology Society. Guidelines for the management of asthma in adults in South Africa. S Afr Med J 1992;81(3);319–22.
5. US Department of Health and Human Services/Public Service/Centres for Disease Control – Epi Info Version 5. A word processing, database and statistical system for epidemiology for microcomputers; 1990.
6. Le Roux K. Die asmapomp. Hoe vaar die dokter? S Afr Fam Prac 1991;12: 218–26.
7. Mayo PH, Richmann J, Harris HW. Results of a program to reduce admissions for adult asthma. Ann Intern Med 1990;112:864–71.
8. McWhinney IR. A textbook of family medicine. Oxford University Press, United Kingdom; 1989.