The Link between Practice Nurse Training and Outcome of Asthma.

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ABSTRACT

Is there a link between level of practice nurse training and clinical outcomes of asthma care? To investigate, practices within one health district voluntarily "opted in" to an asthma management initiative comprising a clinical audit of 30 asthma patients linked to feedback, Post Graduate Educational Allowance(PGEA), and Chronic Disease Management(CDM) accreditation.

Thirty Two(41%) practices submitted details on 954 asthma patients. Positive patient outcomes were associated with practices operating a clinic organised by a specially trained asthma nurse(n=11). This group had fewer patients with symptoms($p<0.01$), fewer acute attacks($p<0.01$), more aggressive use of short course systemic steroids($p<0.001$) and fewer patients with days lost due to asthma($p<0.05$), compared to practices with clinics run by nurses not in possession of a diploma(n=14).

These associations are likely to be clinically important. To improve patient management there is a strong case for recommending that all general practices employ a nurse with special training in asthma.

INTRODUCTION

The role of the specialist nurse in secondary care has long been recognised as a positive move in the treatment and education of patients. In critical care areas their experience and the skills necessary for transferring knowledge of practice to patient care are considered essential for patient safety and important when handling sensitive situations [Westcott E & Dunn V, 1998; Randhawa G, 1998]. A randomised controlled trial of the benefits of a nurse specialist anticoagulant service found that the nurse specialist service was as good as a consultant anticoagulant service in maintaining control, better at documenting relevant clinical details which may adversely affect the patient, and more effective in improving patient education [Taylor FC et al. 1997]. Specialist training empowers the nurse to expand the care given to patients and encourages optimal management. The lack of confidence many general nurses experience when dealing with specialised problems highlights the need for such training [Brown C et al. 1997].

Asthma is a major healthcare problem. Improving asthma care takes time and commitment and is a complex process. The development of a treatment strategy for asthma in the form of published guidelines was an important step forward. Considered achievable and practical they allowed for a planned order of action [Jones K, 1991]. Nevertheless, while definite diagnosis, identification of 'at risk' patients and prescribing effective treatment are all essential they do not necessarily lead to a decrease in morbidity [Hilton S et al. 1986; White PT et al. 1989; Turner-Warwick M, 1989]. Educational strategies, while they may improve knowledge, do not necessarily change behaviour [Bernard-Bonian AC et al. 1995; White P et al. 1995]. Tettersell found that level of patient knowledge had no significant effect on compliance to drug

therapy. Those with a good understanding were as likely as others to be non-compliant (38.8%:42.1%) [Tettersell MV, 1993].

For asthma management to be successful emphasis should be placed not only on the correct medication but on systematic follow up and improvement in patient education and self management. Studies from the USA, Britain and New Zealand have shown that **appropriate** education can reduce morbidity and that self management plans are a productive way to improve the effectiveness of treatment [Hilton S et al. 1986; Maiman LA et al. 1979; Carswell F et al. 1989; Mitchell EA et al. 1986; Charlton I et al. 1990; Beasley R et al. 1989; Fireman P et al. 1981; Jenkinson et al. 1988]. To achieve this a more organised system of care is required, one that exchanges crisis management for organised care and creates a partnership between the health professional and the patient. Better communication skills and frequent long term contact between patient and specially trained educator allows concentration on actually changing behaviour and gives the patient confidence to learn and develop the skills of self management [Harding JM & Modell M, 1985; Snaddon D & Brown JB, 1992].

As far back as 1989 (pre guidelines) Carswell et al highlighted the benefits and costs of an asthma nurse visiting the homes of asthmatic children in obtaining and sustaining higher peak flow rates than the controls with minimal financial outlay [Carswell F et al. 1989]. More recently Madge et al reported on a secondary care managed nurse-led asthma home management training programme for children which reduced subsequent re-admissions to hospital for asthma and post discharge morbidity [Madge P et al. 1997]. Similarly, in a randomised controlled trial of a formal education programme delivered by an asthma nurse specialist in an outpatient

respiratory clinic patient understanding of their condition and management improved as did their inhaler technique and symptom score [Mulloy et al. 1996].

General practice is well placed to provide the continuity of care essential for good asthma management. Combining effective drug usage with a long term preventative approach requires a logical approach to treatment. Thorough assessment and diagnosis involves a detailed history and performance of a measure of lung function such as peak flow. Regular follow up to monitor response and adjust treatment requires a register of asthma patients. Effective individualised patient education begins with assessment of the patients present level of understanding and is gradually built up and continually reinforced. All of these require time and effort and the proper facilities and equipment within the practice. The provision of a nurse run asthma clinic within general practice would seem to be a sensible starting point for co-ordinating asthma management and education.

Consideration of the patient perspective of 'illness' in place of the medical model of disease is consistent with the holistic approach for which, traditionally, the nursing profession is considered naturally adept [King 1984]. Current educational input to patients is frequently supplied by nurses. Dependent on his or her skills and knowledge a nurse can undertake a lot of the routine asthma care and as many patients perceive that nurses are more accessible and approachable than doctors it would seem desirable to utilise this advantage. Dickinson et al. studying the effect of a targeted nurse run asthma clinic in an English general practice demonstrated reduced morbidity from 71.1% to 8.1% after 12 months [Dickinson et al. 1997].

However, although true that nurses can have a big impact on the actions and beliefs of patients we should not assume that it happens naturally. Tettersell showed that only 25% of patients who reported having had an explanation about asthma initially from a nurse claimed to have understood all they were told [Tettersell 1993]. In a review of research literature Jarrett and Payne complained that patients' views had been ignored and quality and quantity of nurse communication was brief and superficial [Jarrett & Payne, 1995]. The National Asthma and Respiratory Training Centre (NARTC) and others throughout the United Kingdom (UK), run nurse training programmes (UK) [Barnes G, 1985; Barnes G, Partridge MR, 1994]. Traditional practice nurse asthma duties such as teaching inhaler technique and supervising nebuliser usage have been developed and extended. Nurses who possess the NARTC diploma (or similar) are deemed competent to administer an asthma register, run a clinic, assess patients unsupervised, share therapeutic decisions with doctors and play a lead role in audit [Levy M et al. 1996].

Circumstantial evidence from studies on self management plans [Charlton I et al. 1990] and nurse facilitators [Bryce FP et al. 1995] suggest that employment of nurses within primary care will improve patient outcomes but there have been no randomised controlled clinical trials to test this. With so many practices now employing a nurse such a trial is now unlikely, and thus general practitioners and healthcare planners have to decide whether or not nurses do improve asthma care and whether or not nurses with an asthma diploma improve care more than untrained nurses.

A postal survey of all general practices in one Scottish region was carried out to investigate how asthma care was organised and the nurses perception of their role and

the training they had received. They found that nurses who were carrying out asthma assessments without adequate training felt ill equipped for the role, were less likely to provide self management plans, review PEF, make the initial diagnosis, or discuss patient worries. Without training nurses are more likely to do only the routine monitoring while nurses with asthma training are more likely to actively develop patient self management skills [Robertson R et al. 1997]. Tettersell in a survey to determine asthma patients knowledge of their condition and treatment found that the level of knowledge determined how well they managed an attack but less than half had understood the initial explanation of their condition, with the explanations from the nurse being particularly poorly understood [Tettersell MJ, 1993]. There is a need for good quality education if nurses are to fulfil this role.

The new GP contract (1990) and Chronic Disease Management (CDM) programme (1993) gave an impetus to practices to run structured asthma clinics and to produce an annual report of activity. The CDM accreditation system is based around measures of structure and process of care rather than clinical outcome. A previous national study showed that this system is not associated with favourable outcome [Neville RG et al, 1996]. Aveyard showed that well organised practices appeared to have better prophylactic/reliever prescribing ratios [Aveyard P, 1997]. The National Asthma Task Force reported that most practices now employ a nurse to help with asthma care, but that there is an unmet training need within practices [Barnes G, Partridge MR, 1994]. In this era of cost effective patient management and evidence based medicine a continuing assessment of the effect on outcomes of the cost of training is essential.

The existence of a Tayside Regional service for the study and audit of asthma gave the opportunity to examine the process and outcome of asthma care in relation to the availability of specially trained asthma nurses in general practice.

METHOD

An integrated Tayside Asthma Management Initiative was developed with input from a general practitioner, practice nurse, respiratory physician and the local Health Board (the Scottish equivalent of a Health Authority) [Hoskins G et al. 1998].

Practice recruitment and sample size

An invitation was sent to all 80 general practices in Tayside region offering them the chance to participate in an audit programme which involved selecting 30 patients from their practice asthma register. Previous work showed that 30 patients is a manageable size for general practices to assess and audit [Neville RG et al. 1996]. There were no direct financial incentives to participate but the audit was linked to a distance learning package accredited for Post Graduate Educational Allowance (PGEA) for general practitioners and a similar educational package for Post Registration Education and Practice (PREP) for practice nurses [Neville RG et al. 1994]. Satisfactory completion of the audit was accepted by the health board as evidence of chronic disease management (CDM) activity in asthma.

Practices who wished to participate were sent a data recording booklet and a patient assessment stamp [Bryce FP et al. 1995].

Patient Recruitment

Each participating practice was given instruction in how to select a representative sample of 30 patients with asthma from their practice i.e. list in alphabetical order

patients of all ages receiving bronchodilator therapy for asthma within the last year divide this list into bands of 10 names and number each name within each band 1-10; apply a predetermined random number sequence issued by the research unit to each band to select one name from each band; and then scroll on to the beginning of the register and continue to apply the random numbers sequence until 30 patients are selected.

Audit Process

Practices were asked to supply the research unit with details about practice size, locality, and structures in place for asthma care, e.g. health authority/board recognised clinics, employment and qualifications of practice nurses, and experience of audit.

A questionnaire was then completed for each patient using their medical records for the 12 month period prior to commencement of the audit. The patient questionnaire sought details of age, sex, anti asthma therapy, consultations in primary care and hospital contacts due to asthma for all 30 patients enrolled by each practice.

On completion of the practice and patient questionnaires the practices invited (by letter or telephone) all 30 patients on this list to attend for a structured clinical review. The clinical review used the Tayside Asthma Stamp to quantify symptoms within the past month. The presence of night-time, morning and exercise induced symptoms were scored from 0 to 3 (3 being more severe), peak flow was measured; compliance with medication and inhaler technique assessed; and days lost from work or school and follow up arrangements were recorded [Neville RG, 1995].

Measures of process and clinical outcome

There is continued debate as to what variables constitute measures of process or clinical outcome in asthma and so a broad range of measures of clinical activity and healthcare utilisation by patients were studied. Measures of process of care, collected from the patient notes by the GP or practice nurse, included patient and practice initiated consultations within the past year, whether or not inhaler technique and peak flow had been assessed in the past year, patient possession of a self management plan (SMP) and peak flow meter (PFM). At the study clinical review the adequacy of inhaler technique and compliance with prescribed therapy was assessed.

Adverse clinical outcome was defined as an acute asthma attack ("an episode of respiratory symptoms which prompts an urgent consultation with a doctor, is of sufficient severity to prevent the patient working or attending school or performing domestic duties or playing, and results in increased use of anti-asthma medication" GPIAG definition [Neville RG, 1993], a short course of systemic steroids and emergency nebulisation in the 12 months prior to routine clinical assessment; the presence of asthma symptoms, night , am or exercise on routine clinical assessment; and days lost from work, school or play in the month previous to the routine clinical assessment.

Hospital admissions, accident and emergency (A&E) and outpatient attendance's were recorded over the past year.

Feedback

Completed booklets were returned to the research unit for analysis. Practices were then sent an audit critique of their management. A detailed series of non-judgmental comments and suggestions on management, based on the British Thoracic Society

Guidelines [British Thoracic Society et al. 1997], were prepared and sent on every patient.

Practices were asked to insert these comments directly into each set of patient records. When each patient was reviewed again, individual feedback based on guidelines was thus available. Returned with the patient feedback was the second part of the education package for both doctors and nurses as well as the CDM accreditation certificate to be returned to the health board.

Participation in this initiative allowed GPs and practice nurses to review their register of asthma patients, learn about care selection procedures using a random numbers sample frame, clinically assess patients according to an established protocol, receive personalised feedback on each patient, receive a copy of current guidelines on asthma management, and formulate their views of their practices' strengths and weaknesses in asthma care and compile an "action plan" for change.

Quality Control

Full instruction was given on all aspects of the audit process. Practices who required clarification of any aspect of the protocol had access to a telephone helpline. and the author (GH) visited each practice to ensure correct and reliable recording and commonality of assessment. Patients who did not attend (DNA) their assessment appointment were included in the patient sample and in analysis. The project was approved by the Tayside Medical Ethics Committee.

Analysis

As with any audit the programme was designed to be repeated one year on from the first audit. The results reported here are from the first year and are thus independent

of the feedback and educational input of the programme. Returned booklets were analysed by patient on an "intention to treat" basis. Participating practices and their patients were classified into three groups:

A - practices who employed a nurse in possession of a recognised asthma diploma to run a clinic;

B - practices who employed a nurse with no asthma qualification to run a clinic;

C - practices which did not have a nurse run asthma clinic.

Analysis was conducted cross sectionally between patient variables from each group, compared using the x^2 test, and presented as p values. To add clarity in interpreting tables, Chi Squared results of $p<0.01$ or less are shown in bold type. Only those results with $p<0.01$ are reported.

RESULTS

All 80 practices in Tayside were invited to participate. Forty practices expressed an interest and 32 (41%) satisfactorily completed the project and returned usable data leading to CDM accreditation. Two of the participating practices were single handed, 4 were 2 partner, 10 were 3 partner, 4 were 4 partner and 12 were 5 or more partner practices. All practices owned a nebuliser and 24 (75%) had previous Health Board CDM accreditation.

Participating practices contributed a total of 954 patients of whom 474 (50%) were male, 45(5%) were aged 0-4, 255 (27%) were aged 5-15, 365 (38%) were aged 16-44, 289 (30%) were 45 and over. Comparison of results between groups A, B and C identified favourable process and outcome measures (Table 1).

Twenty five practices, contributing 744(78%) patients, had a nurse run asthma clinic and were associated with more assessment of inhaler technique ($p<0.01$), PEF recording ($p<0.001$) and attendance for review ($p<0.01$), and better inhaler technique ($p<0.001$) and compliance ($p<0.01$) than the 7 practices, 210(22%) patients, who did not have a nurse run asthma clinic (group C).

Comparison of the clinics run by diploma nurses (group A), 11 practices 330(35%) patients, to those run by nurses not in possession of a diploma (group B), 14 practices 414(43%) patients (6 patients in this group were excluded from the study due to incomplete data), showed that although fewer had a practice initiated review ($p<0.001$), more patients were in possession of a self management plan ($p<0.001$). Favourable associations with clinical outcome included fewer patients who lost days

from work or school due to asthma ($p<0.05$). Patients from the "nurse with diploma" practices also experienced fewer acute attacks ($p<0.01$), and were given more short courses of systemic steroids ($p<0.001$).

The 414(43%) patients from non-diploma nurse clinics received more asthma review consultations ($p<0.001$) and had more evidence of recording of PEF ($p<0.001$) and assessment of inhaler technique ($p<0.01$) than the 210 (22%) patients from the 7 practices with no nurse run asthma clinic (group C). Better compliance ($p<0.01$) and inhaler technique ($p<0.01$) was also observed in these patients. However, fewer were treated aggressively with short courses of systemic steroids ($p<0.05$) or were in possession of a self management plan ($p<0.001$).

More patients from group C had symptoms at clinical assessment ($p<0.01$), were considered poor compliers with medication ($p<0.05$), and had inadequate inhaler technique ($p<0.001$) than patients in group A. These patients also suffered more acute attacks ($p<0.01$) and had a poorer record in their notes of PEF ($p<0.05$).

Hospital attendance's were similar in all 3 groups.

DISCUSSION

All 32 practices involved in the study employed a nurse. Seven had chosen not to provide the services of a nurse run asthma clinic. Of the 25 practices who did have a nurse run asthma clinic, 11 had a specially trained asthma nurse. Patients from practices with a nurse run asthma clinic had better process of care than other patients. Patients from practices with a specially trained asthma nurse also appeared to have better clinical outcome.

To achieve a diploma in asthma care requires both practical and academic achievement. The NARTC asthma diploma consists of 6 months distance learning and practical experience, and two intensive study days assessed by a rigorous exam. It is encouraging that effort invested by individual nurses and their employers appears to have a reward in terms of benefit to patients. In the absence of a definitive randomised controlled trial this paper provides strong indirect evidence in support of nurse run asthma clinics and nurse asthma training. Sceptics can legitimately claim that practices motivated to provide good asthma care will employ trained nurses. Whether trained nurses are responsible for good clinical care or merely associated with it is irrelevant. In light of the evidence, practices which do not employ an asthma trained nurse will have difficulty justifying their position. A modest investment in staff training is associated with improved outcome.

Some may criticise the study for being single region with a low "response rate". The characteristics of participating practices are not dissimilar from national studies (Barnes G, 1985, Neville RG, 1996). The study consisted of an audit, clinical review and distance learning package which required a major commitment from practices. Viewed in the context of previous audit packages, a completion rate of 41% was

considered very satisfactory (Neville RG, 1993, Neville RG, 1996). Interest in the project, which is an alternative to the existing CDM collection of data, is expanding.

An important limitation in the study may have been the potential variation in the quality of data in clinical notes and subsequent retrieval between the groups of practices. However, there is no evidence to suggest that clinical recording and retrieval is any better in practices who employ a nurse and as all practices were visited prior to the start of the study we are confident that there are no major differences in the quality of the data recording. One must be cautious when interpreting multiple statistical tests on the same sample. The results presented are nearly all significant at the $p<0.01$. The magnitude of difference in outcome measures between groups is likely to be clinically important.

This study was not a clinical trial but a pragmatic attempt to explore any potential link between nurse training and clinical outcome. The results are consistent with the interpretation that practices with nurses actively involved in asthma care are usually better at implementing the guidelines. Evidence from secondary care has shown that specially trained nurses can make a difference to patient care [Taylor FC et al. 1997; Mulloy et al. 1996; Madge P et al. 1997]. The results from this study in primary care support the findings of the Grampian primary care postal survey [Robertson et al. 1997] that specially trained nurses are more confident in their ability to develop and encourage patient self management skills. Nurse run clinics lead to more rigorous clinical assessment and checking of medication use than asthma care by the general practitioner alone. The addition of special training in asthma to the nurse's role

appears to translate activity into action perhaps influencing the prescribing habits of others in the practice.

There is debate as to what constitutes measurable outcome measures in primary care management of asthma. Few would argue that it is desirable for patients to experience fewer symptoms, less days lost from work or school and fewer acute asthma attacks. The findings of this study suggest that trained nurses are linked with favourable clinical outcome. Practices should consider employing nurses with special training in asthma care. Specialist training for GPs and nurses must be a consideration if asthma management is to be improved.

KEY POINTS

- The majority of asthmatics are cared for by practices who run asthma clinics supported by nurses.
- Many of these nurses have had no specialised asthma training.
- Improvement in the process of patient management can be recorded where there is a nurse run clinic.
- Employing a nurse with specialist asthma training is associated with improved outcome.
- A modest investment in staff training. has reward in terms of benefit to patients.

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TABLE 1

	Practice Group			Group Comparison Statistical significance		
	A Nurse with Diploma n=11	B Nurse without Diploma n=14	C No Nurse Clinic n=7	A/B	B/C	A/C
Process of Care						
Patient initiated asthma review	165(50%)	205(50%)	111(53%)	-	-	-
Practice initiated review	192(58%)	312(75%)	117(56%)	p<0.001	p<0.001	-
SMP Issued	124(38%)	74(18%)	70(33%)	p<0.001	p<0.001	-
PFM Issued	131(40%)	147(36%)	90(43%)	-	-	-
Assessment of Inhaler technique	191(58%)	257(62%)	104(50%)	-	p<0.01	-
PEF Measurement	220(67%)	290(70%)	117(56%)	-	p<0.001	p<0.05
Poor compliance	32(13%)*	41(14%)*	35(25%)*	-	p<0.01	p<0.05
Poor inhaler technique	12(5%)*	24(8%)*	25(18%)*	-	p<0.01	p<0.001
Clinical Outcomes						
Symptoms	125(54%)*	181(62%)*	99(70%)*	-	-	p<0.01
Days Lost	10(4%)*	27(9%)*	12(8%)*	p<0.05	-	-
Acute Attacks	34(10%)	74(18%)	40(19%)	p<0.01	-	p<0.01
Systemic Steroids	62(19%)	41(10%)	35(17%)	p<0.001	p<0.05	-
Hospital Attendance**						
Admission	7(2%)	15(4%)	9(4%)	-	-	-
A&E	7(2%)	11(3%)	6(3%)	-	-	-
Outpatients	21(6%)	18(4%)	13(6%)	-	-	-

*% of those who attended for clinical assessment
**Actual number of attendance's
-no statistical significance