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A pilot study of telephone based asthma management

Background
Self management programs have been advocated for adults who have recently been admitted to hospital or have recently attended an emergency department because of asthma. A new telephone based approach has already been trialled for the management of a number of other chronic conditions. This study sought to determine the effect of a telephone based asthma management program for adults with asthma.

Methods
Adults with one or more previous admissions for asthma to either or both of two tertiary hospitals between 1 May 2001 and 30 November 2003 were invited to participate. All participants received one face-to-face session with an asthma educator. Participants were randomised to intervention (six telephone calls over 6 months) or control (usual care) groups. Measures of health care utilisation and morbidity were collected weekly for 12 months.

Results
Seventy-one adults (54 females) with a mean age of 36.2 years were recruited to the study. Twenty hospital re-admissions were recorded for the control group and one for the intervention group at 12 months. Re-admission was significantly associated with allocation to control group (p=0.05). The control group was significantly more likely to report being woken by asthma on more than half the nights of the week (p=0.03).

Discussion
Telephone based self management intervention results in clinically important reductions in hospital re-admission in adults previously hospitalised with asthma.

Asthma self management – including education, regular review, provision of peak expiratory flow meter (PEFM) and preparation of a written asthma action plan (AAP) – is an important element of optimal asthma management.[1] Asthma self management programs that include most of these components result in clinically and statistically significant improvements in asthma health outcomes.[2] Self management programs have been particularly recommended for adults recently admitted to hospital or recently attending emergency departments because of asthma. This group is not only over-represented in mortality and morbidity statistics, but are also more likely to be re-admitted to hospital than any other group of asthmatics,[3] and therefore have most to gain from optimal asthma management.

Telephone based management has been trialled for a number of chronic conditions such as diabetes,[4,5] depression,[6] hyperchloesterolaemia,[7] and general medical problems,[8] with telephone calls used to confirm adherence to medications and management plans, monitoring, and to discuss questions and provide advice.

Self management needs to be time and cost efficient for both the patient and practitioner. Telephone based sessions reduce the time and money spent by the patient travelling to appointments.[6] Calls can be scheduled around family and work commitments and can be delivered more frequently than a consultation at a clinic or hospital.[8]

Care or follow up delivered by telephone achieved comparable if not improved outcomes to medication and self monitoring regimens alone.[7] A recent study[9] in the United Kingdom examined the use of telephone based review compared with face-to-face consultation with a practice nurse and found that telephone based management offered a well accepted and more time efficient way of delivering routine asthma reviews.

To date the authors are unaware of any trials in Australia that examine telephone based intervention for either review or ongoing asthma management.

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Methods

Recruitment

Adults aged 18–55 years admitted to one or both of two metropolitan Melbourne (Victoria) teaching hospitals with a primary diagnosis of asthma during the 30 month period from 1 May 2001 to 30 November 2003 were invited to participate. (The upper age limit was set to exclude participants for whom a diagnosis of chronic obstructive airways disease [COPD] and asthma may have been difficult to separate.)

Adults were excluded if they had a chronic respiratory condition other than asthma, an unstable medical condition, a cognitive or intellectual disability, psychiatric illness (not including depression) or were unable to speak or read English.

Ethics approval was granted by La Trobe University Faculty of Health Sciences and Melbourne Health Directorate Human Ethics Committees. All participants gave written consent.

Procedures at recruitment

Participants' age, gender, smoking history, age at onset of asthma and previous hospital admissions were recorded at recruitment. Participants were asked whether they had ever received any counselling by a psychiatrist, psychologist or trained counsellor, and whether they owned a current written AAP (no longer than 2 years since issue) and/or a PEFM.

All participants received an AirZone PEFM and identical instructions on how to use the PEFM and record their results. This record (kept for up to 1 week) was used by the asthma nurse educator to determine the participant's personal best PEFR.

Face-to-face sessions and follow up

Participants were randomised into control and intervention groups. All participants attended a face-to-face session with an asthma nurse educator and received asthma management advice based on their existing knowledge of the pathophysiology of asthma, medications, known triggers and asthma self management. Participants were provided with a written AAP[10] or advised to obtain one from their general practitioner if they did not already have a current or appropriate AAP. All participants' GPs were informed about their patient's involvement in the study.

Control group participants were encouraged to continue with asthma self management and usual GP care following the face-to-face session. The asthma educators made six follow up telephone calls to all intervention participants: one call each week for the first 4 weeks, another at 3 months, and one more at 6 months. During these calls, participants were asked about and given advice regarding their current asthma symptoms and management.

All participants (both control and intervention) were telephoned weekly by a researcher (blinded to participant allocation) for the 12 month study period and were asked about the frequency of nocturnal waking, days lost from work or study, unplanned visits to the GP or emergency department, hospital admissions and use of oral corticosteroids due to asthma in the week before the call. No advice regarding asthma management was given during these calls. Questionnaires at 6 and 12 months asked participants if they owned and used a written AAP.

Data analysis

It was calculated that a sample of 100 participants (50 intervention and 50 control) would provide an 80% chance of correctly identifying a moderate effect size at α=0.05. SPSS version 11.5 was used for all analyses. Statistical significance was set at $p<0.05$.

Pearson's chi-square test and independent sample t-test were used to test for differences between the intervention and control groups in the number of participants reporting and the mean number of hospital admissions, unplanned GP visits and emergency department attendance, occasions of oral steroid initiation or increase, days lost and nights woken in a week. Fischer's exact test was used to determine the effect of group allocation on those participants re-admitted to hospital.

Results

Six hundred and sixty patients were assessed for eligibility: 385 were not contactable, 154 declined to participate, 31 were excluded and 19 failed to attend the baseline meeting.

Seventy-one participants (54 or 76.1% females) were recruited with a mean age 36.2 years. Random allocation resulted in a group of 36 intervention (with 31 remaining for final analysis) and 35 controls (29 in final analysis) that were not significantly different from each other in terms of baseline measures.

Hospital admissions at recruitment

A total of 101 admissions to hospital were recorded for the 30 month pre-intervention period. Seventy-six percent of participants had a single admission, and although a greater proportion of the control group reported more than one admission, the difference was not significant. Eighty percent of all admissions occurred within 1 year of the patient being invited to participate.

Written plan and PEFM ownership

Twenty-eight (39%) of participants owned a current AAP at recruitment; 40 (56%) owned a PEFM. Results from the questionnaires showed that written AAP ownership had increased to 77% at 6 months (44 replies) and 82% at 12 months (49 replies). In addition, 89 and 95% reported using their plan at 6 and 12 months respectively.

Delivery of management sessions

A mean of 66 minutes (total range 60–140 minutes) was spent in the face-to-face session with all participants. The total mean time spent delivering six telephone calls to each intervention participant was 62 minutes, with each call time ranging from 3–22 minutes (mean 10.33 minutes).

Health care utilisation

At 12 months, one intervention participant reported one hospital re-admission; six controls reported a total of 20 re-admissions. Allocation to control group was significantly associated with hospital re-admission (p=0.05).

There were no significant differences in the number of participants reporting or the mean number of occasions of hospital re-admissions, unplanned GP visits or emergency department attendance (*Table 1, 2*).

Morbidity

Neither the difference in the number of participants reporting nor the mean number of days lost or occasions when oral steroids were initiated or increased reached statistical significance at 12 months (*Table 1, 2*). Control participants were significantly more likely to report being woken on more than half (4–6) of week nights. There were no significant differences in the mean occurrences of 0 nights woken, 1–3 nights woken, or all nights woken at 12 months.

Discussion

Clinically important reductions were noted in both the number of participants re-admitted and the number of hospital re-admissions in the intervention compared to control group; this difference almost reached statistical significance. There were a significantly greater number of reports of waking on 4–6 nights of the week in the control compared to the intervention group.

The telephone based intervention took an average of 10 minutes per call and required few resources. Neither the participants nor the clinicians had to travel to hospital or to a clinic, and clinicians were able to service many participants from one location.

The initial face-to-face asthma educator session for both the intervention and control groups resulted in a doubling of written AAP ownership with almost all participants reporting using their plan. This is an important outcome of the asthma educator session: lack of (or failure to use) a written AAP is associated with increased risk of hospital admission and emergency department attendance.[11,12]

Limitations of the study

The lack of statistically significant differences seen in the primary outcome was most likely due to a smaller than anticipated sample size and therefore a high probability of a type 2 statistical error.

The face-to-face session may have 'pre-optimised' asthma management in all participants, reducing the differences between intervention and control groups. Equally, the weekly calls to collect morbidity data likely had a treatment effect, which again may have diminished the differences between the groups.

The recruitment rate and small sample size may limit the generalisabilty of the results. Only 20% of potential participants expressed an interest in taking part. As nearly 55% of potential participants could not be contacted, their reasons for not taking part cannot be established nor can their characteristics be compared to the study group to determine the extent of selection bias. However, the age and gender mix of the recruited group is representative of adults admitted to hospital with asthma in Australia.[13]

Implications for general practice

Telephone based asthma management provides an effective alternative to usual care, and is time efficient for both the practitioner and the patient. It can be used by a nurse practitioner operating from a particular site to provide asthma management and regular review to many patients across many locations, or for a number of general practices.

Table 1. Number of participants reporting and total occasions reported for unplanned GP visits, emergency department attendance, hospital admissions, starting or increasing steroids and days lost at 12 months in intervention (n=31) and control (n=29) groups

	Participants (total occasions) at 12 months		
	Intervention group	Control group	Chi-squared (2) test
Unplanned GP visits	22 (65)	16 (62)	χ^2=3.03, df=3, p=0.39
Emergency department attendance	7 (13)	5 (11)	χ^2=0.93, df=3, p=0.82
Hospital admissions	1 (1)	6 (20)	χ^2=5.20, df=3, p=0.16
Started/increased oral steroids	21 (46)	21 (76)	χ^2=4.25, df=4, p=0.37
Days lost	10* (67.5)	11** (130.5)	χ^2=2.85, df=4, p=0.58

* 24 intervention group participants worked or studied at 12 months ** 25 control group participants worked or studied at 12 months

Table 2. Difference in mean number of unplanned GP visits, ED attendances, hospital re-admissions, nights woken, occasions starting/increasing in oral steroid use and days lost from work or study because of asthma between intervention (n=31) and control (n=29) groups at 12 months

Variable		Group	Mean	SD	SEM	t	df	S-2-tailed	MD	SED	95% CI
Unplanned GP visits		Intervention	2.10	2.33	0.42	–0.07	58.00	0.95	–0.04	0.62	–1.29, 1.21
		Control	2.14	2.50	0.46						
ED attendance		Intervention	0.42	0.92	0.17	0.15	48.00	0.88	–0.04	0.27	–0.50, 0.58
		Control	0.38	1.18	0.22						
Hospital re-admission*		Intervention	0.03	0.18	0.03	–1.85	28.46	0.07	–0.66	0.36	–1.39, 0.07
		Control	0.69	0.19	1.35						
Weeks per year with:	0 nights woken	Intervention	44.29	7.78	1.40	1.41	58.00	0.16	3.26	2.60	–1.35, 7.86
		Control	41.03	9.96	1.85						
	1–3 nights woken	Intervention	4.48	4.87	0.87	–1.07	58.00	0.29	–1.76	1.64	–1.88, 1.52
		Control	6.24	7.59	1.41						
	4–6 nights woken	Intervention	0.48	0.93	0.16	–2.30	37.39	0.03	–0.10	0.44	–1.91, –0.12
		Control	1.49	2.16	0.40						
	All nights woken	Intervention	1.68	2.96	0.53	–0.36	58.00	0.72	–0.29	0.81	–5.03, 1.34
		Control	1.9	3.33	0.61						
Oral steroids		Intervention	1.97	2.34	0.42	–0.80	58.00	0.43	–0.65	0.86	–2.29, 0.98
		Control	2.62	3.84	0.71						
Days lost from work or study*		Intervention**	2.81	6.26	1.28	–1.14	44.37	0.26	–2.40	2.11	–6.65, 1.84
		Control†	5.22	8.38	1.68						

* Statistics adjusted when Levene's test for equality of variance was significant ($p<0.05$)

** 24 intervention group participants worked or studied at 12 months

† 25 control group participants worked or studied at 12 months

SD = standard deviation, SEM = standard error mean, S-2-tailed = significance 2 tailed, MD = mean difference, SED = standard error difference

Conflict of interest: none declared.

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