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Telephone based asthma management

Financial and individual benefits

Background

Telephone based asthma management has a clinically important effect on reducing hospital readmissions. The cost and benefits to the individual have yet to be reported. The authors sought to determine the effect of a telephone based asthma self management program in terms of quality of life, self efficacy, patient acceptance and cost effectiveness.

Methods

The authors calculated the cost of delivering telephone based asthma management compared to usual care. Self efficacy and quality of life were measured at recruitment, 6 months and 12 months. Participants were invited to comment on their experience of the telephone based intervention.

Results

The intervention was well accepted. At 12 months there was a clinically important improvement in mean quality of life in the intervention group not seen in the control group. Telephone based management costs were offset by reductions in the number of readmissions in the intervention group.

Discussion

Telephone based asthma management offers a well accepted, low cost yet potentially effective means of delivering asthma care.

■ **The telephone has been used successfully to deliver management advice and support to patients in their own homes for a number of chronic diseases including diabetes,¹ heart disease,² depression³ and asthma.⁴ Telephone based management can be delivered without the time or financial cost to patients of travelling to appointments,³ may occur more regularly than similar care at a clinic or hospital,⁵ and has reported outcomes equivalent to standard care.²**

The authors previously reported the results of a randomised controlled study of telephone based management in adults previously admitted to hospital with asthma.⁶ Telephone based management resulted in a clinically important reduction in hospital readmissions and significant reductions in nights disturbed by asthma.⁶

Methods

The study involved adults aged between 18 and 55 years admitted to either one or both of two metropolitan Melbourne teaching hospitals between May 2001 and November 2003 with a primary diagnosis of asthma. Adults were excluded if they had chronic respiratory conditions in addition to asthma, any other unstable medical condition, a cognitive or intellectual disability, psychiatric illness (not including past or current depression) or were unable to speak or read English. General practitioners were advised of their patients' involvement in the study.⁶

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

Baseline procedures

A history of each patient's age, gender and hospital admissions for asthma for the 30 month period between May 2001 and November

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2003 were retrieved from the medical records department at each hospital.

Questionnaires

Participants were asked about age of onset of asthma, smoking history, any previous counselling by psychiatrist, psychologist or trained counsellor, and whether they owned a current written asthma action plan and/or a peak expiratory flow meter (PEFM). Four questionnaires were administered: the Panic-Fear Personality Scale, the Respiratory Illness Opinion Survey, the Self Efficacy Scale (SES)⁷ and the Modified Marks Asthma Quality of Life Questionnaire (MAQLQ-M).⁸ Only the results of the latter two questionnaires are reported here.

The SES was designed to measure a participant's belief in their own ability to manage their asthma in various situations, with a higher mean score signifying greater self efficacy. The MAQLQ-M asked participants to score 22 questions about the impact of asthma on various aspects of daily life and about the frequency of asthma symptoms in the past 4 weeks. A high score indicated a less detrimental effect of asthma on quality of life.

Allocation to control and intervention groups

Participants were allocated to control and intervention groups. All participants were given a PEFM and were asked to keep a record of daily morning and evening peak expiratory flow rates for a minimum of 1 week, before meeting with an asthma nurse educator for a face-to-face asthma education session.

Control group participants were advised to continue with usual asthma care. Participants in the intervention group received six follow up telephone calls; during each call they were asked about their asthma symptoms and management, and were offered advice and encouragement. The asthma educators logged the time spent on the face-to-face meetings and intervention calls.

Repeat measures

The principal author telephoned all participants each week for the 12 month study period and asked five questions relating to frequency of nocturnal waking due to asthma, days lost from work or study, use of oral corticosteroids, unplanned visits to the GP, emergency department attendance and hospital readmissions.

The MAQLQ-M and SES questionnaires were re-sent to participants at 6 and 12 months. At 12 months, participants who had received the telephone intervention were invited to provide comments.

Data analysis

The cost of the face-to-face sessions was calculated using the educators' hourly rate (\$36.50 including on costs), printing, call and postage costs and the cost of PEFM (\$12 each). The cost of the telephone intervention was based on the educators' hourly rate, time spent and cost of the calls (at a standard local call rate of \$0.22 per call).

Pearson's chi-squared test and independent samples t-test were used to test for differences in the number of participants who were readmitted to hospital and the mean number of hospital readmissions respectively.

The cost of hospital readmissions was calculated using the average cost of a 1 day hospital stay in a tertiary metropolitan hospital in Melbourne (Victoria) (\$938) and the current average length of stay for an adult admitted with asthma (2.2 days)¹⁰ resulting in an admission cost of \$2063.60.

Repeated measures analysis was used to investigate if differences in mean self efficacy scores between the intervention and control groups and across three time points (recruitment, 6 and 12 months following recruitment) were statistically significant. Statistical significance was set at $p < 0.05$. The minimal clinically important difference for MAQLQ-M is 0.5.¹¹

Results

Seventy-one adults were recruited. Random allocation resulted in 36 intervention and 35 control participants who were not significantly different from each other.⁶

In the first 6 months following recruitment to the study, eight participants (four intervention and four control) discontinued participation, and a further three (one intervention and two control) had discontinued by 12 months. These participants gave no reason for discontinuing, and attempts to re-establish contact were unsuccessful.

Cost of face-to-face session

The time spent on the face-to-face sessions ranged from 60–140 minutes (mean 66 minutes) (Table 1). Educators required an additional hour per participant to arrange the session and to write to participants' GPs.

Cost of telephone based management

Educators required 5 minutes to complete their records following each call. The total mean intervention cost of \$57.29 per participant is based on the mean time spent by the educators on all calls (92 minutes) and the cost of 6 calls (\$1.32) (Table 2).

Readmissions to hospital at 12 months

At 12 months there was a clinically important difference in the number

Table 1. Cost of face-to-face sessions for all participants (n=71)

	Face-to-face session (mean 66 minutes)	Administration (60 minutes)	Postage, printing and call costs	PEFM	Total
Mean cost per participant	\$40.15	\$36.50	\$1.00	\$12.00	\$89.65

Table 2. Time spent (mean and range in minutes) on each telephone based session with the asthma educator and number of intervention participants who completed each telephone session

		Telephone sessions					
		First	Second	Third	Fourth	At 3 months	At 6 months
Participants completed		34	34	34	33	34	31
Time spent	Mean (minutes)	11	9	9	9	11	13
	Range (minutes)	3–22	4–15	4–17	4–20	4–21	5–26

Table 3. Comparison of the number of participants readmitted, number of readmissions and cost of hospital readmissions at 12 months

	Total at 12 months		Comparison of control and intervention
	Intervention (n=31)	Control (n=29)	
Participants readmitted	1	6	2=5.20, df=3, p=0.16
Number of readmissions (mean)	1 (0.03)	20 (0.69)	t= -1.85, df= 28.46, p=0.07
Total cost of hospital readmissions	\$2063.60	\$41 272.00	

of hospital readmissions reported in the intervention compared to the control; this difference did not reach statistical significance (Table 3). The cost of readmissions for the intervention compared to the control group is based on hospital readmission data and readmission costs (\$2063.60 per admission).

Quality of life and self efficacy

Only 43 (24 intervention, 19 control) and 42 (23 intervention, 19 control) participants who completed and returned the quality of life and self efficacy questionnaires respectively at recruitment, 6 and 12 months were included in the analysis.

The difference (0.67) in the mean MAQLQ-M scores in the intervention group from recruitment (mean 4.96) to 12 months (mean 5.63) is clinically important (Figure 1). There was no clinically important difference seen in the control group between recruitment and 12 months (df=0.06).

Repeated measures analysis showed no significant difference (df=1, F=0.00, p>0.9) in mean self efficacy scores between the intervention and control groups or within groups across the three time points (df=2, F=0.66, p=0.52) (Figure 2).

Experiences of telephone based management

Nine intervention participants volunteered comments about their experiences of the telephone based management. The most common theme related to benefits associated with having a second person with whom to discuss asthma and who encouraged optimal management.

Discussion

All participants attended a face-to-face session with an asthma educator

to ensure that each had the tools to manage their asthma. The asthma nurse educators were not blinded to participant allocation and this may have introduced some bias, however several steps were taken (including proforma assessment and managements sheets) to ensure that asthma educators assessed similar factors and provided similar education and tools.

The telephone based intervention was designed to promote more time for and increased frequency of asthma review than might have been afforded in a busy general practice. The average time spent on each call was only 10.3 minutes, roughly the time a GP might spend on this portion of a consultation. However, at around \$57 per participant for 6 reviews over 6 months, the intervention represents a low cost alternative to usual GP care.

Weekly telephone calls by the blind assessor to all participants ensured accurate tracking – without bias – of all hospital readmissions for the year the participants remained in the trial. Compared to the control, those in the intervention group were admitted to hospital less frequently (20 vs. one readmission respectively) and therefore cost less (\$41 272 vs. \$2063.60 respectively), a saving that more than outweighs the cost of delivering the intervention (\$1947.86).

Figure 1. Mean quality of life scores for intervention (n=24) and control groups group (n=19) at recruitment, 6 months and 12 months

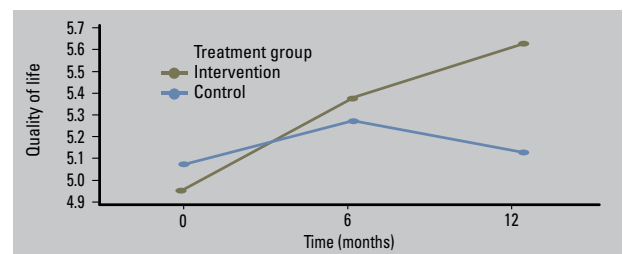
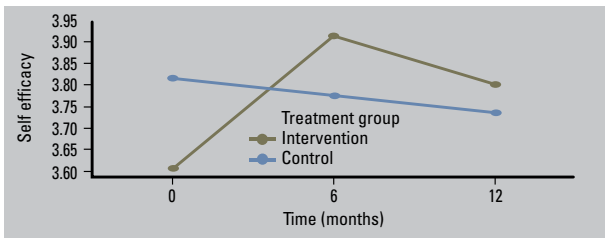


Figure 2. Mean self efficacy scores for intervention (n=23) and control groups group (n=19) at recruitment, 6 months and 12 months



There is a need for further studies with larger cohorts of adults recruited from both hospital and ambulatory care settings. However, clinical gains in terms of reductions in hospital readmissions show that telephone based asthma management may represent a low cost alternative to usual care, is well accepted by patients and may result in clinically important improvements in quality of life, and that the costs involved are significantly outweighed by the savings made in reductions of the number of hospital readmissions.

Conflict of interest: none declared.

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