A community model of group therapy for the older patients with chronic obstructive pulmonary disease: a pilot study

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Abstract
Objective A community-based programme for chronic obstructive pulmonary disease (COPD) patients in group sessions is designed, and the feasibility, acceptability and physical and psychosocial outcomes evaluated. Methods Patients with COPD discharged from hospital, or those attending specialist outpatient clinic, with a history of hospital admission owing to COPD in the preceding 12 months were recruited. Those who had malignancy or were housebound were excluded. Group sessions were arranged once a week in a Community Centre, and consisted of two hourly sessions. The components of each session consist of education regarding the disease, breathing techniques, use of oxygen and other medication, smoking cessation, nutrition, dyspnoea management skills, relaxation and energy conservation techniques, introduction of social and community support, and strengthening as well as aerobic exercises. Assessments before and after intervention include lung function, 6 minutes walk test (6MWT), general Health Questionnaire (GHQ), the St. George’s Respiratory Questionnaire (SGRQ), and a COPD knowledge Questionnaire. A programme evaluation was carried out using questionnaire and group discussions. Results Forty-four subjects were recruited, with 75% completing the programme, and 20% with drawing for unavoidable reasons. Statistically significant improvement was noted in all domains of the GHQ, SGRQ, and knowledge test, while the mean 6MWT improved, although statistical significance was not reached. Subjects were enthusiastic about the provision of this service in helping them cope with the disease through empowerment and mutual support. Conclusion A group community intervention programme for COPD patients is feasible and acceptable, with positive psychosocial outcomes. Such a model could be further developed and cost-effectiveness evaluated as a model of chronic disease management in the community.

Introduction
Chronic obstructive pulmonary disease (COPD) is characterized by airflow obstruction with related symptoms such as chronic cough, exertional dyspnoea, expectoration, and wheeze (Rennard 1998). Apart from the high mortality rate, patients with COPD suffer from recurrent exacerbations, with a
worsening of symptoms and decline in lung function (Seemungal et al. 2000), causing frequent hospitalization. The latter is associated with limitations in physical functioning (Garcia-Aymerich et al. 2003), impaired quality of life (Seemungal et al. 1998), reduced survival (Connors et al. 1996), and high health care expenditure (Siafakas et al. 1995). It is a chronic irreversible disease which has implications on an individual’s physical, functional, psychological, social, and ultimately, palliative care needs. Most studies have addressed the physical and functional needs of such patients. Thus, pulmonary rehabilitation has been shown to be effective in improving exercise capacity and reducing symptoms even in the absence of any improvement in lung function (Troosters et al. 2000; Salman et al. 2003; Ferrari et al. 2004), and quality of life (Troosters et al. 2000; Ferrari et al. 2004). Such programmes are usually hospital based, but recently nurse led home-based programmes have been developed (Ferrari et al. 2004; Ram et al. 2004; Johannes & Connolly 2004), although they have not been shown to reduce hospital readmissions, but provide a cheaper alternative to hospital care (Ram et al. 2004). Yet considerable unmet needs exist for COPD patients in the community, as primary care based services are poorly developed (Elkington & White 2002). There is lack of information regarding the patients’ perspective of their disease. Moreover, apart from symptom control, reduction and treatment of exacerbations and improving quality of life, it has been shown that social isolation, anxiety, depression, lack of information regarding their disease, prognosis, future management and palliative care were not addressed (Skilbeck et al. 1998; Gore et al. 2000). Current services tend to be largely reactive and hospital based, focusing on acute exacerbations. It is possible that a community model of care for such patients, being easily accessible and developed to target these unmet needs, may have an impact on hospital readmissions or the need for hospital rehabilitation services, in addition to improving exercise tolerance and quality of life (Cambbach et al. 1997).

In Hong Kong, COPD is the fifth leading cause of death, and one of the top three causes of hospitalization, with 92% being aged 65 or over (Hospital Authority Statistical Report 2001–2002, Hospital Authority, Hong Kong). Pulmonary rehabilitation programmes are largely hospital based, although such programmes have been demonstrated to improve exercise tolerance in the long-term residential care setting (Yeung 2000), while visits by community nurse to such patients in long-term residential care improved quality of life (Lee et al. 2002). Home-based programmes, consisting of patients being taught rehabilitation exercises and use of medication, reinforced by regular community nurse visits, have not been shown to reduce hospital readmissions (Kwok et al. 2004). In this study, we designed a community-based programme for groups of COPD patients in a community health centre. We hypothesize that group sessions have the advantage of providing social interaction and mutual support for patients to cope with their chronic illness, improving compliance with rehabilitation exercises, and reinforcing knowledge about the disease. The programme was evaluated by documenting changes in symptoms, exercise tolerance, quality of life, and patients perception of their illness and the benefit of the programme were also explored in focus groups at the end of the programme.

Method

Potential subjects were recruited from the direct referral of discharged COPD patients from an extend rehabilitation hospital (Shatin Hospital) by doctors and the medical outpatient clinic located in an acute hospital (Prince of Wales Hospital). Subjects who were aged over 60, living at home and had been admitted to hospitals with a medical diagnosis of COPD within the past 12 months, were enrolled in this study. All subjects were free of significant communication problems, such as a severe deafness, poor eyesight, and cognitive impairment (Mini Mental State Examination (MMSE) score less than 19 for illiterates, less than 21 for subjects with 1–2 years school education, and less than 23 for subjects with over 2 years school education) (Chiu et al. 1998). Subjects with malignancy, severe cardiopulmonary and neurological dysfunction without proper intervention were excluded. This ensured that exercise training prescribed by the programme was not limited by their comorbidity and was safe to practice at home without professional supervision. Home-bound subjects who could not go to the commu-
Community group programme for COPD

Subject assessment

Baseline assessment was carried out before the programme started and included demographic information (age, sex, marital status, educational level), smoking history, exercise habit, body mass index, MMSE, resting heart rate and blood pressure. Lung function test was carried out by the research assistant using portable spirometry and the forced expiratory volume in 1 second (FEV1), percentage of FEV1 predicted, forced vital capacity (FVC), percentage of FVC predicted and FEV1/FVC ratio were recorded. The distance walked in 6 minutes was recorded (6MWT). Other outcome measures, the Chinese version of 28-item General Health Questionnaire (GHQ-28), St. George Respiratory Questionnaire (SGRQ) and COPD knowledge test, were also administered. Assessments were repeated at the end of the programme. Details of these assessments are provided below:

Physical function assessment

6-minute walking test

This test reflects the ability of subjects in dealing with physical activities in daily life (Solway et al. 2001), and records the distance that subjects can walk in 6 minutes (Butland et al. 1982). Subjects were instructed to walk back and forth along a 27-m corridor. Heart rate and pulse oxygen saturation were monitored and the readings recorded before and after.

Psychological assessment

St. George Respiratory Questionnaire (SGRQ)

The SGRQ is a disease-specific measurement of health status of patients with COPD (Jones et al. 1992; Engstrom et al. 1998). It consists of 50 items divided into three domains: symptom, activity, and impact on everyday life. Different items have different weighting, and the domain and total scores are transformed into percentage (0–100%). Zero mark indicates no limitation in quality of life and 100% indicates maximal limitation Subjects completed the questionnaire by themselves with interviewer help if necessary. The Hong Kong Chinese version has been shown to have high sensitivity, repeatability and validity (Chan et al. 2002).

General Health Questionnaire 28 items (GHQ-28)

The GHQ, commonly used in community and psychiatric settings (Goldberg & Hillier 1979), consists of 4 components: somatic symptoms, anxiety and insomnia, social dysfunction and severe depression, each consisting of 4 different options, scored as: 0-1-2-3. The categorical results are summed up to generate a total score ranging from 0 to 84, with a high score indicating a worse-off state. The Chinese version of GHQ-28 has been shown to be valid and reliable in indicating psychological well-being (Shek 1989).

COPD knowledge test

The knowledge test consists of 10 questions covering the basic understanding of COPD. It includes several aspects: (1) recognition of the disease in subjects; (2) signs and symptoms; (3) risk factor; (4) prognosis; (5) breathing technique; (6) treatment of COPD; (7) dyspnea management; and (8) nutrition. A simple scoring method is used for each item (0 = incorrect, 1 = correct) and the score of 10 items is summed up to produce a total score (0–10). A higher total score indicates better understanding of the disease.

Intervention

After the baseline assessment, 8–10 subjects were grouped together and participated in a 12-week pulmonary rehabilitation programme held in a community centre located in a public housing estate. The program was held once per week and was divided into three components: (1) educational talk; (2) peer group support; and (3) exercise training. Each session lasted for about 2 hour, beginning with 1 hour of educational talk. The talk was delivered by a research assistant with medical background knowledge and a registered physiotherapist. The educational talk included basic anatomy and physiology of respiratory system, pathophysiology of COPD, exercise benefits and strategies, breathing and sputum removal technique, long-term oxygen therapy, smoking cessation, medication, dyspnoea management,
nutrition, self-management and exacerbation-reduction skills, coping with psychological distress and relaxation technique, social and community support and energy conservation technique. Copies of the contents of the talk were distributed to the candidates after each session for their reference. In the last session of the 12-week programme, the education session was replaced by a peer group sharing and discussion. This session allowed participants to share their experience when coping with the disease in daily living. Appropriate guidelines and solutions were provided by the programme team members in response to the questions and problems raised by the candidates.

The second part of the session was a 1-hour exercise training conducted by the physiotherapist. The programme consisted of warm up, strengthening and aerobic exercises. For the strengthening exercises, candidates were required to raise their arms close to their ears keeping the elbow straight. Lower limb exercise involved repeatedly standing from the sitting position without arm support. Aerobic exercise was conducted as a dance, where subjects were required to do a series of rhythmic limb movements continuously, which included stepping and free upper limb movements, to dance music. They were instructed to do exercises at home using the same protocol at least 3 times per week. Exercise logbooks were given out to record their exercise sessions and perceived exertion in the rest of the week after each lesson. Home exercise compliance was reviewed and exercise level was increased according to individual perceived exertion. As dyspnea was often reported by patients with COPD as the most limiting symptom of exertion in ordinary daily tasks (American Thoracic Society 1999), dyspnea was monitored using the Borg scale. The scale ranges from 6 (no breathlessness) to 20 (maximal breathlessness). By setting the target level, subjects were encouraged to exercise in the appropriate range of maximum oxygen consumption (VO\textsubscript{2max}) (Mahler 2003). The scale is valid and reliable in measuring the rate of perceived exertion in COPD patients (Gearhart \textit{et al}. 2001) and is responsive to treatment effects from exercises (O’Donnell \textit{et al}. 1995). Subjects maintained their target exertion level in the ‘moderately hard’ grade (n = 13) of the Borg scale when they were doing strengthening and aerobic exercises. The exercise intensity was increased if the Borg rating decreased to ‘very light’ grade (n = 9).

Strengthening exercises started with 10 repetitions and the repetitions increased as the exercise proceeded. For the upper limb strengthening exercise, the intensity was increased by holding light weight (1 kg) after reaching 15 repetitions. In aerobic exercise, the difficulty was increased by asking subjects to do faster movements. The intensity was further progressed by increasing the dancing time by 1–2 minutes, and finally asking subjects to hold 1 kg light weight.

In addition, proper breathing technique during exercise was taught in the first lesson. Subjects were instructed to breathe in and out with pursed lip breathing instead of holding their breath when they were doing exercises. To ensure that exercises were safe for candidates, vital signs (heart rate, blood pressure and arterial oxygen saturation) were monitored before and after exercise.

Program evaluation

A questionnaire was used to gather feedback and opinion about the rehabilitation programme. The questionnaire comprises of six items and subjects are required to choose one of the five categories, ranging from ‘1’ (strongly disagree) to ‘5’ (strongly agree). The items include the willingness in joining other community rehabilitation programme, the completeness of exercises taught in this programme, the preference in exercise (group or home), the self-perceived improvement in health status after the programme, the benefit of sharing the experience in treating the disease with other candidates and the simplicity of travelling to the health centre.

Semi-structured interviews were also carried out to explore the subjects’ view of their disease, why they joined the programme, the benefits if any, and preference for future management. The interviews were tape recorded, and the conversation transcribed. Common themes were then identified.

Statistics

The demographic data were analysed and the frequency, mean and standard deviation of items were presented. The outcome measures collected at base-
line and post-programme assessment were compared and analysed using paired \( t \)-test to determine any difference in 6MWT, SGRQ, GHQ-28 and COPD knowledge test before and after rehabilitation. The significant level was set at \( P = 0.05 \). SPSS version 11.0 was used.

**Results**

Based on the recruitment criteria, 44 subjects with COPD participated in the Community Pulmonary Rehabilitation Programme (CPRP) (Table 1). After 12 weeks of CPRP, 33 subjects finished, while 11 subjects dropped out (Fig. 1). The majority of discontinuation were unavoidable, including frequent readmission to hospital, moving to Old Aged Home or moving out of the Shatin district, transport problem, and co-morbidity. Only two subjects refused exercise. Among subjects who completed the programme, the attendance rate was 78% (40–100%). The compliance with home exercises, calculated as the number of sessions recorded in the diary divided by the prescribed number of sessions, was 77%.

**Outcome evaluation**

There was a statistically significant improvement in symptoms and all psychological domains (Table 2), as well as disease knowledge (Table 3). Mean exercise tolerance improved by 18 m (6.3%) in the 6-

**Table 1 Characteristics of subjects**

<table>
<thead>
<tr>
<th>COAD ((n = 44))</th>
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<tbody>
<tr>
<td>Sex (M/F)</td>
</tr>
<tr>
<td>Age (year)*</td>
</tr>
<tr>
<td>MMSE (/30)*</td>
</tr>
<tr>
<td>LTOT (%)</td>
</tr>
<tr>
<td>FEV1 (% pred)*</td>
</tr>
<tr>
<td>FVC (% pred)*</td>
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<tr>
<td>FEV1/FVC (%)</td>
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<tr>
<td>Moderate to severe COPD (%)</td>
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*Data presented as mean (standard deviation) unless stated otherwise.

MMSE, Mini Mental State Examination; LTOT, long-term oxygen therapy.

Moderate to severe COPD-FEV1 <70% of prediction.

**Table 2 Comparison of psychological status at baseline and 12-week follow-up**

<table>
<thead>
<tr>
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<th>Baseline ((n = 33))</th>
<th>12 weeks ((n = 33))</th>
<th>(P)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHQ-somatic symptoms domain</td>
<td>4.15 (2.54)</td>
<td>2.36 (1.82)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>GHQ-anxiety &amp; insomnia domain</td>
<td>4.00 (2.96)</td>
<td>1.82 (1.93)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>GHQ-social dysfunction domain</td>
<td>8.85 (3.36)</td>
<td>6.48 (1.94)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>GHQ-depression domain</td>
<td>3.61 (3.57)</td>
<td>1.55 (2.22)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>GHQ-total score (/28)</td>
<td>20.61 (10.09)</td>
<td>12.21 (5.97)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SGRQ-symptom domain (/99.99)</td>
<td>60.52 (24.10)</td>
<td>38.91 (19.27)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SGRQ-activity domain (/99.99)</td>
<td>62.76 (29.52)</td>
<td>52.13 (25.90)</td>
<td>0.044</td>
</tr>
<tr>
<td>SGRQ-impact domain (/99.99)</td>
<td>46.36 (23.36)</td>
<td>26.34 (13.21)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SGRQ-total score (/99.99)</td>
<td>53.69 (19.61)</td>
<td>34.72 (14.12)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Data presented as mean (standard deviation).

GHQ, General Health Questionnaire; SGRQ, St. George Respiratory Questionnaire.

Lower scores represent better quality of life.
minute walking test, although this was not statistically significant.

Programme evaluation

A total of 96.6% of the subjects could follow the exercise and noted a general improvement in physical status (Table 4). Of all, 86.2% of them did not have problems travelling from home to the community centre; 75.9% felt that the group setting was supportive in enabling continuing coping with the disease and they would attend the similar course next time; and 51.7% of them preferred group exercise to home exercise.

In the focus group interviews regarding the disease, a major preoccupation was to find ways to minimize the problem of shortness of breath interfering with normal daily activities and the consequent social isolation. Other comments regarding the disease include lack of control, a desire to live longer in the event that newer, more effective treatment may become available, and the expectation that the programme could improve symptoms.

Regarding the intervention programme, seven major themes emerged, relating to gaining knowledge, increasing exercise tolerance, encouragement to stop smoking, fewer visits to doctors or hospitals, making life happier and more meaningful, sense of accomplishment and improvement in self-confidence and psychological support. The following comments illustrates these themes:

‘Am I a suitable candidate for lung volume reduction surgery of lung disease?’ ‘I used to feel short of breath after hanging the clothes, but now I use the breathing technique when doing housework, and I haven’t experienced chest tightness any more. The exercise is helpful as it increases my daily activities tolerance… Exercise has become a habit and doing exercise is like going to work at a routine schedule… Breathing exercises changed everything in my life!’

‘When you just think of smoking and the disease, the benefit outweighs the risk. Smoking is a very voluntary thing.’ ‘In the past, I used to go to hospital whenever I felt breathless which at least happens one or twice a year, but now I can somehow manage the crisis. I only attend the general practitioner for cough or flu.’ ‘I live alone. I have nowhere to go. I like to come here and be with other people’. ‘What made me appreciate the programme the most was that you care for us more than our son. You are nice people… In the past, I hate gatherings with strangers. I seldom went to senior centres or join the activities of my old friends as it’s really sad because one died after another. I was a prisoner of myself.’ ‘Elderly people do not need much, only need to chat with others and feel happy. This group is enjoyable’. ‘Group learning can facilitate the exchange of ideas. It creates happiness and concern for others’.

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<tr>
<th>Table 3 Comparison of the exercise endurance, and COPD related knowledge at baseline and 12-week follow-up*</th>
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<tr>
<td><strong>Baseline</strong></td>
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<tr>
<td><em>(n = 33)</em></td>
</tr>
<tr>
<td>6-minute walking distance (meter)</td>
</tr>
<tr>
<td>COPD knowledge test (/10)</td>
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</table>

*Data presented as mean (standard deviation).
Other general comments regarding the programme show that subjects perceive this as filling a service gap. ‘This programme has sufficient information for respiratory health. It’s very detailed indeed. I particularly appreciate the handout given after every session. I can reread them any time to refresh my memory, as my memory is not good. I kept them all in this file, you see, neat and tidy! It’s my treasure!’ However, participants think that the group leader should demonstrate exercises by doing the moves simultaneously with the subjects at the same pace, so that they can follow all the steps. The group leader have also made the observations that in the group setting, participants comment on each other’s health behaviours (e.g. smoking), and also discuss the impact of their disease on family relationships.

Discussion

This study shows that a group programme for COPD patients is feasible in the setting of a community centre, and is able to achieve improvement in symptoms and quality of life, with good compliance. It caters for current unmet needs, in the area of patient education, rehabilitation group support, in an easily accessible setting. The emphasis on patient empowerment follows the Wagner model of management of chronic illness, in mobilizing community resources, to enable patients to be the principal caregivers (Bodenheimer et al. 2002). Such models have also been widely promoted in the UK (Royal College of Physicians of London et al. 2004), and the USA (http://www.evercare.com).

The advantages of a group setting is that one group leader can cater for more than one patient at the same time, with similar results to the more labour intensive one to one setting. Other advantages are demonstrated in the feedback from patients, that the exercise programme can become part of a daily social routine, knowledge can be reinforced in a group setting, and behaviour modification such as smoking cessation may be facilitated. The group environment could also reduce social isolation, and may reduce anxiety depression possibly by improving self-efficacy or self-esteem, or by mutual support. Potentially, a palliative care component may be built on this framework in future. Such a service in the setting of a community centre attached to a primary care clinic, would be easily accessible and referrals to doctors can be easily arranged. With the development of the nurse practitioner or nurse consultant, the programme can be nurse-led, or led by trained volunteers under the supervision of the nurse, or by a patient leader.

Currently, patients with COPD form the largest group of patients readmitted within 28 days of discharge in Hong Kong, but it is unclear what percentage of these is avoidable. This study shows a considerable amount of improvement could be made in the care of these patients in the community. It is possible that addressing these unmet needs, in particularly in the psychosocial category, may help reduce the use of hospital services. However, improvement in quality of care of chronic diseases may not always translate into cost savings, as demonstrated for diabetes mellitus (Fireman et al. 2004). In the case of COPD, as the intervention is largely exercises, education and mutual support rather than involvement of investigations and multiple drug therapies, such a community model may result in cost savings as well as improvement in the quality of care.

There are limitations to the study. This was essentially a pilot study where a group community intervention programme was designed and tested for feasibility and acceptability. It was not a randomized controlled trial comparing intervention vs. usual management. As there are many components in the programme, it is uncertain whether one or more than one component is responsible for good outcomes. Moreover, some of the benefits highlighted in the focus group will be difficult to quantify. The number of subjects is small, and there is no information on what percentage of eligible patients would agree to join. It could be argued that those who participated were a selective group who were motivated already. No costings were carried out, and the impact on hospital readmissions was not measured owing to the small number of subjects and the short duration of observation. It is uncertain whether a programme of 3-month duration will have a long lasting impact, as suggested by a previous study (Troosters et al. 2000). From the exercise and psychological view point, the intervention should ideally form part of the regular activity of community centres, in place of the predominantly social nature of activities in many current centres. In spite of these limitations, this pilot study...
shows that a group community intervention programme for COPD patients is feasible and acceptable, achieving improvement in disease knowledge, symptoms and quality of life. Such a model could be further developed as an initiative in the management of chronic diseases in the community.

Clinical messages

- Patients with COPD have unmet needs in the community, pulmonary rehabilitation programmes being predominantly hospital based and of limited duration.
- A group community intervention programme has the advantage of being incorporated as a regular programme in the primary care setting, helping patients to cope with the disease through empowerment and mutual support, apart from achieving symptom improvement and other positive psychosocial outcome measure.
- This model could be incorporated as part of chronic disease management programmes in the community.

Acknowledgements

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