

The effects of integrated disease management programs over traditional therapy on outcomes related to exacerbations, activity tolerance, and health-related quality of life in patients with chronic obstructive pulmonary disease: A systematic review

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Abstract

Background: In contrast to traditional therapy, the purpose of this study was to evaluate the effects of integrated disease management programs on patients with chronic obstructive pulmonary disease in terms of health-related quality of life, exercise tolerance, and exacerbation-related outcomes.

Method: We searched extensively for studies published between 2016 and 2020 using electronic databases (PubMed, Cochrane, and Google Scholar). Six papers were incorporated into this systematic review.

Result and conclusion: Six trials totaling 3420 randomized individuals were included in this systematic review; two of the investigations were carried out in the United States, and one each in Italy, Israel, Pakistan, and Denmark. Among the interventions are individual instructional sessions, telemonitoring, self-management, and systematic follow-up. The length of the intervention varied from three to five years. Three investigations were carried out in secondary care settings, two in primary care, and one in both primary and secondary care. According to this research, integrated disease care is expected to result in reduced hospital admissions, fewer hospital days per person, enhanced quality of life related to the condition, and the capacity to exercise.

Keywords: Integrated management; Chronic obstructive pulmonary disease; Respiratory therapist; Management; Exacerbation; Quality of life

1. Introduction

Chronic obstructive pulmonary disease is linked to high rates of morbidity and death, a low quality of life related to health, and a considerable social cost (1). The use of health services, such as primary care consultations, ER visits, and hospital admissions for acute exacerbations, is more common among patients with COPD (2). In the US, 3.5% of hospital hospitalizations among Medicare beneficiaries were related to COPD, and 20% of those patients were readmitted within 30 days (3). About half of the overall COPD healthcare expenses in Norway and Canada are attributable to hospital admissions (4). In terms of directly attributable healthcare expenses, COPD comes in third, after chronic kidney disease and cancer (5).

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Numerous non-pharmacological therapies were evaluated with the goal of improving ambulatory people with COPD's health-related quality of life, lowering hospital admissions, and improving prognosis. Integrated disease management programs were linked to improved disease-related quality of life and functional exercise capacity, as well as a decrease in the number of respiratory-related hospital admissions and in-hospital days for all causes among COPD patients, according to a systematic review of 26 randomized controlled trials (6). However, a recent study revealed that a thorough chronic care program for COPD patients had no effect on the frequency of hospital admissions and was linked to extra disease-related mortality (7).

The majority of clinical trials evaluated the effectiveness of disease management strategies for individuals with ambulatory COPD versus "usual care," which might differ significantly depending on the local healthcare environment (6).

It is advised that individuals with stable COPD receive influenza vaccinations, inhaled long-acting bronchodilators and corticosteroids, help quitting smoking if they are smokers, and pulmonary rehabilitation (8). Even though pulmonary rehabilitation has been shown to be effective in reducing the intensity of symptoms associated with the disease and enhancing quality of life linked to health (9), many COPD patients still do not receive pulmonary rehabilitation as standard therapy.

In this study we aimed to assess the impact of integrated disease management programs on health-related quality of life, exercise tolerance, and exacerbation-related outcomes in patients with chronic obstructive pulmonary disease compared to conventional treatment.

2. Methods

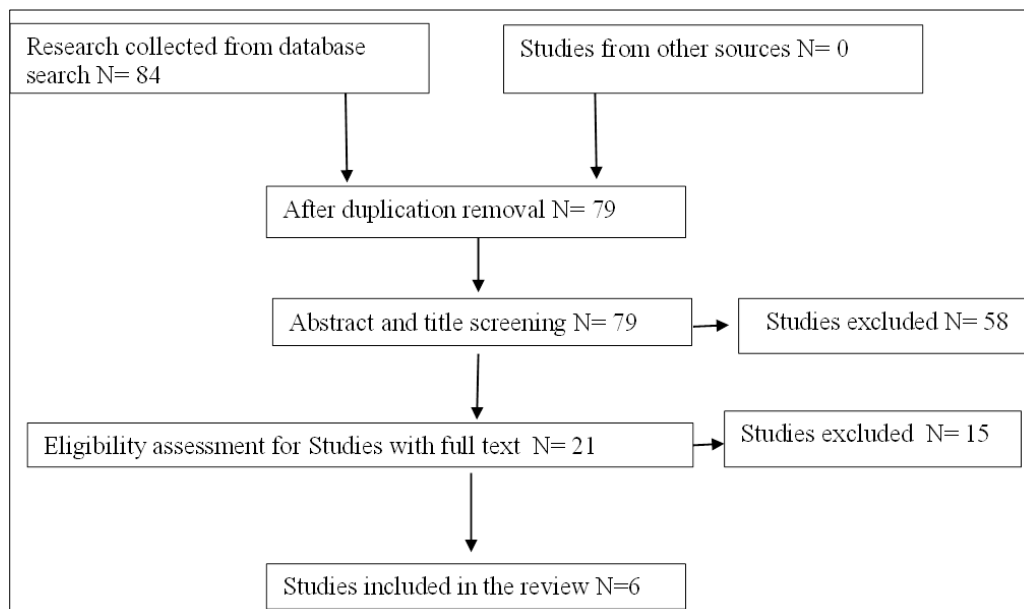


Figure 1 PRISMA consort chart of studies selection

This systematic review study was conducted according to The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement. We considered cluster-randomised and randomised controlled studies where IDM courses or treatments were compared with control group for COPD patients. We considered trials where the IDM intervention incorporated professional, financial, organizational, and patient-directed, measures to enhance treatment for COPD patients. A research needs to have at two of the following IDM intervention components in order to be considered for inclusion (education, exercise, psychosocial component, smoking cessation, medication, nutrition, multi-disciplinary team, financial intervention). We conducted a comprehensive search through electronic databases (PubMed, Cochrane, and Google scholar) for articles published in the period from 2016 to 2020. We included 6 studies in this systematic review (Fig 1).

Four researchers evaluated each study separately for eligibility using the above-mentioned characteristics. Each abstract that satisfied the first set of requirements for inclusion was assessed as a full-text publication. The publications

that both extractors found fulfilled the eligibility criterion for full text review were included in the final data analysis. Any disagreements were settled by consensus, and where necessary, the relevant author was consulted. Data were independently gathered by four writers from the included papers. After completing their first training, the investigators gathered data and entered it into a pre-made data collecting form. The initial author's surname, intervention, intervention duration, number of health care providers, the year the study was published, the design, goal, and outcome of the investigation, as well as the key conclusions, were all mentioned in the abstracts.

3. Results and discussion

In this systematic review we included 6 studies with a total number of 3420 randomized participants, 2 were conducted in USA, one in each of Italy, Israel, Pakistan and Denmark. Interventions include (Self-management, telemonitoring, structured follow-up and individual educational session). Intervention duration ranged from 3 months to 5 years. Two of studies were conducted in Primary care setting, 3 in secondary care and one study in primary and secondary care settings (Table 1). Main findings of the included studies were presented in (Table 2).

In the six months that followed trial enrollment, Silver et al. discovered that a respiratory therapist disease management team considerably decreased the incidence of hospital readmissions for COPD exacerbations, but not ER visits. Furthermore, participants randomized to the intervention had a considerably reduced median stay for a COPD exacerbation as well as a significantly lower overall number of days spent in the hospital and intensive care unit.

Higher intensity disease management programs are more likely to be successful, as evidenced by the Department of Veterans Affairs' study of a simplified education and self-efficacy reporting strategy, which revealed that re-hospitalization and ER visits were decreased (10). Studies conducted on individuals with COPD exacerbations have demonstrated the effectiveness of disease management strategies in lowering their recurrent hospitalization rates (11,12). Nevertheless, not all documented COPD illness management initiatives have been effective. A massive Department of Veterans Affairs research was abruptly discontinued early owing to excess mortality in the illness management group, and contradicting results were obtained (7).

Recently, two comprehensive studies of integrated disease care for COPD patients were released. According to research by Kruis et al. (6), these programs enhanced the individuals' quality of life with COPD, enhanced their ability to exercise, and decreased the number of hospital days and hospital admissions overall. Zwerink et al. (13) found that self-management treatments among individuals with COPD were linked to enhanced health-related quality of life, decreased hospital admissions related to respiratory conditions, and amelioration of dyspnea. Nevertheless, no statistically significant variations were seen in other outcome metrics, such as death and hospitalization for all causes.

Patients with COPD who participated in an intervention study that focused on breathing technique and adherence to maintenance treatment reported much improved medication adherence and inhalation scores (14). In order to help patients manage their condition, several published studies have also emphasized the significance of giving inhalers at every stage of the illness and teaching them how to use them appropriately (15) For assessing the severity of COPD and forecasting the shift in health-related quality of life, the BODE index is thought to be a more accurate metric (16)

Nonetheless, a research made clear that doing spirometry at the basic healthcare level requires specialized training (17). Spirometry performed by specially trained personnel at the individual health institutions was deemed to be an appropriate compromise between technical criteria and practicality factors in the Khan et al. (18) experiment. The choices made and the efficacy assessed are in line with what is currently understood about clinical treatment and its results.

A few research studies (7,19) found detrimental effects when using disease management strategies to treat COPD in ambulatory people. The variable outcomes might be explained by variations in the intervention's components and execution. Exercise, dietary guidance, and smoking cessation interventions—all of which are suggested as standard of care for patients with stable COPD—were offered to patients in the control group but were not included in the disease management intervention in some of the trials that made up the systematic review (6). A portion of this discrepancy may also be explained by differences in the study comparator intervention (6).

The only strategy that decreases the increased pace of loss in pulmonary function in adults with COPD is quitting smoking. The most successful option for these individuals to achieve long-term smoking cessation is medication therapy in conjunction with rigorous behavioral treatment (20). A smoking cessation intervention was a feature of several of the randomized controlled studies evaluating the effectiveness of an integrated disease management program (IDM) in COPD patients (6). Some research (21,22) did not report changes in smoking status throughout follow-up, while other

studies (23,24) did not find any impact on the rate of smoking cessation. According to research by Kalter et al., patients who received the study intervention had a roughly 70% higher chance of reporting stopping smoking at the end of the follow-up period than patients who received the control intervention. This might be the biggest advantage of an integrated disease management strategy for COPD patients receiving prescribed therapy, provided that additional research confirms this finding.

Table 1 Characteristics of the studies included

Study	Country	Intervention	Number of healthcare providers	Number of randomized participants	Intervention duration	Setting
Aboumatar et al. (25)	USA	Self-management	2	240	3 months	Secondary care
Bernocchi et al. (26)	Italy	Telemonitoring	3	112	3 months	Primary and secondary care
Kalter-Leibovici et al. (27)	Israel	structured follow-up		1202	2 to 5 years	Secondary care
Khan et al. (18)	Pakistan	structured follow-up	4	313	6 months	Primary care
Lilholt et al. (28)	Denmark	structured follow-up	2	1125	12 months	Primary care
Silver et al. (29)	USA	individual educational session	2	428	6 months	Secondary care

Table 2 Main findings of studies included

Study	Main findings
Aboumatar et al. (25)	If successful, the BREATHE program could provide a timely solution for hospitals seeking to lower the rate of COPD rehospitalizations. Unlike one-month transitional care programs that concentrate on patients' post-acute care needs, the BREATHE program helps hospitalized COPD patients manage the post-discharge period as well as prepare them for long-term self-management of COPD.
Bernocchi et al. (26)	Age, a high risk of exacerbations, and a high degree of variability in each patient's unique response during the home program can all have a significant impact on the anticipated outcomes.
Kalter-Leibovici et al. (27)	For patients allocated to the study intervention, the median amount of time that passed before a primary endpoint incident was 1.0 years; for patients assigned to the control intervention, it was 1.1 years; the adjusted hazard ratio was 0.92. When it came to postponing an ambulatory patient's first hospital admission or mortality from COPD, disease management coupled to recommended care was not more effective than recommended care alone.
Khan et al. (18)	For 91.6% of control individuals and 92.5% of intervention participants, six-month primary outcomes were obtained. The cluster-level analysis results for the primary outcome were as follows: covariate-adjusted mean intervention-control difference = -0.96, mean intervention outcome = -1.67, and mean control outcome = -0.66. The scalability of this integrated COPD treatment package at primary and secondary level public health institutions in Pakistan and similar contexts is supported by the results of the experiment and a separate process assessment study.
Lilholt et al. (28)	The raw mean difference in physical component summary from baseline to the 12-month follow-up was -2.6 in the telehealthcare group and -2.8 in the usual practice group according to the intention-to-treat analysis. During the same period, the raw mean difference in mental component summary scores for normal practice and telehealthcare were -5.3 and -4.7, respectively. At 12 months, the

	groups' adjusted mean differences in physical component summary and mental component summary were 0.1 and 0.4, respectively. There were no statistically significant changes in health related QoL between telehealthcare and standard practice in the entire population or any of its subgroups.
Silver et al. (29)	The percentage of participants having non-hospitalized emergency department visits for COPD exacerbations was similar across groups when the 2 components of the primary end point were examined separately. The intervention group had a considerably decreased readmission rate for COPD exacerbations. The intervention group's median (interquartile range) length of hospital stay for a COPD exacerbation was lower. The intervention group saw considerably fewer days spent in the intensive care unit and in the hospital owing to exacerbations of COPD. Both groups had equal rates of mortality.

4. Conclusion

This research indicates that improved illness-specific quality of life, ability to exercise, hospital admissions, and hospital days per person are likely outcomes of integrated disease care. Future studies should assess the most effective combination of integrated disease management components and duration of interventions for integrated disease management programs.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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