



Effective smoking cessation interventions for COPD patients: a review of the evidence

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DECLARATIONS

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SCC and MR designed the study; SCC conducted the searches and with MR undertook the preliminary screening; the full papers were appraised by SCC; SCC drafted the paper; CH and MR provided editorial guidance and support; all authors approved the final version

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Summary

Objectives To review the effectiveness of smoking cessation interventions offered to chronic obstructive pulmonary disease (COPD) patients, and identify barriers to quitting experienced by them, so that a more effective service can be developed for this group.

Design A rapid systematic literature review comprising computerized searches of electronic databases, hand searches and snowballing were used to identify both published and grey literature.

Setting A review of studies undertaken in north-western Europe (defined as: United Kingdom, Ireland, France, Germany, Benelux and Nordic countries).

Participants COPD patients participating in studies looking at the effectiveness of smoking cessation interventions in this patient group, or exploring the barriers to quitting experienced by these patients.

Method Quantitative and qualitative papers were selected according to pre-specified inclusion and exclusion criteria, critically appraised, and quantitative papers scored against the NICE Levels of Evidence standardized hierarchy.

Main outcome measure Percentages of successful quitters and length of quit, assessed by self-report or biochemical analysis. Among qualitative studies, identified barriers to smoking cessation had to be explored.

Results Three qualitative and 13 quantitative papers were finally selected. Effective interventions and barriers to smoking cessation were identified. Pharmacological support with Bupropion combined with counselling was significantly more efficacious in achieving prolonged abstinence than a placebo by 18.9% (95% CI 3.6–26.4%). Annual spirometry with a brief smoking cessation intervention, followed by a personal letter from a doctor, had a significantly higher ≥ 1 year abstinence

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rate at three years among COPD patient smokers, compared to smokers with normal lung function ($P < 0.001$; $z = 3.93$). Identified barriers to cessation included: patient misinformation, levels of motivation, health beliefs, and poor communication with health professionals.

Conclusion Despite the public health significance of COPD, there is a lack of high-quality evidence showing which smoking cessation support methods work for these patients. This review describes three effective interventions, as well as predictors of quitting success that service providers could use to improve quit rates in this group. Areas that would benefit from urgent further research are also identified.

Introduction

The global prevalence of chronic obstructive pulmonary disease (COPD) is estimated to be between 4–10% in adults.¹ The World Health Organization (WHO) estimates it is the fifth leading cause of mortality in high-income countries, accounting for 3.5% of deaths, and predicted to be the third leading cause of death globally by 2030.² COPD patients are prone to acute exacerbations, often requiring hospitalization. These episodes significantly reduce quality of life for patients with severe COPD, estimated to be four times worse than for severe asthmatics.³

The societal costs of the disease are high. In 2003, there were 41,300 per 100,000 population lost work days in the European Union due to COPD, resulting in an annual productivity loss of €28.5 billion.⁴ Interventions that contribute to delaying disease progression, reduce co-morbidities or prevent acute exacerbations are likely to be cost-effective from all perspectives.⁵ Although incurable, COPD progression can be slowed by not smoking and disease management guidance recommends smoking cessation be offered to all patients.^{6–8} However, recommended brief interventions are based on evidence from smokers in general, not COPD patients, and quit rates remain poor among this group.^{9,10}

An evidence review from 2003, found COPD patients could achieve long-term cessation using a combination of pharmacological and psychosocial interventions, though what kind of psychosocial intervention was not described.^{11,12} The purpose of this paper is to build on this review by assessing new evidence in order to develop a more effective smoking cessation service that demonstrates improved quit rates in this patient group.

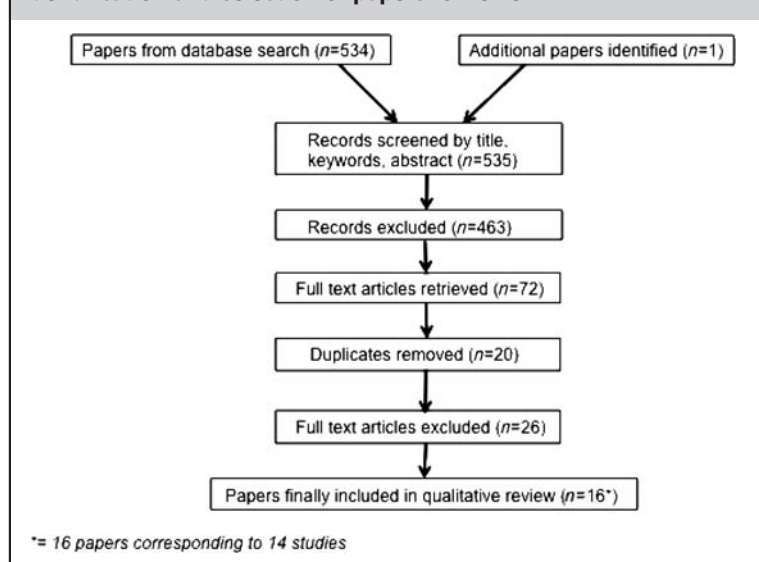
Method

The primary research question sought to ascertain which smoking cessation interventions are effective, and to identify any factors that COPD patients perceive as barriers to quitting. Studies were identified through computerized searches (undertaken February 2010) of the following databases: MEDLINE, CINAL, PsychInfo, EMBASE, and The Cochrane Collaboration. Search restrictions included: English language publications, year 2003 onwards and research undertaken on human subjects and adults only. The following search terms were used: Chronic Obstructive Pulmonary Disease; COPD; Chronic Obstructive Airways Disease; Emphysema; Chronic Bronchitis; Chronic Obstructive Bronchitis; Chronic Airflow Limitation; Chronic Airflow Obstruction; Chronic Airways Obstruction; Non-reversible Obstructive Airways Disease; Alpha-1 trypsin; smoking cessation; quit/give-up/stop smoking; (and combinations). Snowballing, hand searches and consulting local expert stakeholders were also used to locate unpublished studies or other 'grey literature'. This identified 534 papers (Figure 1).

Selection of papers for detailed review was based on titles, keywords and abstracts: studies had either to describe a smoking cessation intervention (intervention studies), or to explore attitudes towards smoking cessation or predictors of smoking success (descriptive studies).

Shortlisted papers were read in full. Study participants had to have a medical or suspected diagnosis of COPD (according to American or British Thoracic Societies, European Respiratory Society Guidelines, GOLD criteria, or physician diagnosed). Outcomes had to include percentages of

Figure 1
Identification and selection of papers for review



successful quitters and length of quit, assessed by self-report or biochemical analysis. Among qualitative studies, identified barriers to smoking cessation were of interest. To promote applicability of findings to a UK population, only studies undertaken in north-western Europe (defined as: United Kingdom and Ireland, France, Germany, the Benelux, and Nordic countries) were included, as these health systems tend to be similar. Case reports, case series without qualitative findings, and studies which did not exclusively look at COPD or related respiratory conditions (e.g. emphysema) were excluded.

Abstracts were then reviewed, and full-text papers were analysed using the Critical Appraisal Skills Programme framework. Intervention studies were assigned a rank using the National Institute for Health and Clinical Excellence (NICE) Levels of Evidence hierarchy.¹³ Intervention categories were determined once papers had been found and reviewed.

Results

A total of 16 eligible papers describing 14 studies finally contributed to this review (Tables 1 and 2). These described three types of intervention and four barriers to smoking cessation.

Pharmacological interventions

A randomized trial found Bupropion combined with smoking cessation counselling was significantly more efficacious in achieving prolonged smoking abstinence than a placebo by 18.9% (95% CI 3.6–26.4%).¹⁴ The difference between the Nortriptyline and placebo groups was insignificant, but the former was significantly more likely to discontinue medication due to adverse events (24% vs. 9%; $P < 0.01$). A separate, underpowered study found no significant difference of efficacy between a placebo and either Nortriptyline (RR = 1.5; 95% CI 0.8–2.9) or Bupropion (RR = 1.6; 95% CI 0.8–3.0), respectively, though Nortriptyline was associated with higher costs due to increased healthcare visits and absenteeism from work.¹⁵ From a societal perspective, Bupropion seems more cost-effective of the three options at €1368 (95% CI €193–5260).

A randomized study investigating the effect of nurse-conducted smoking cessation interventions coupled with nicotine replacement therapy (NRT) found sustained abstinence from week two to 12 was significantly higher in those receiving NRT (OR = 2.88; 95% CI 1.34–6.16) compared to those receiving the placebo treatment.¹⁶ The study found no statistically significant difference between those receiving low or high support, though this could be a Type II error as each trial arm failed to achieve the minimum sample size. Also, many patients who did not attend their final appointment were followed up by phone, meaning a biochemical verification of their smoking status was not possible.

Confrontation with spirometry

Spirometry interventions were assessed in two studies. Low- and high-intensity confrontational counselling including spirometry was significantly more effective than usual care at five weeks follow-up. At six months there was only a significant difference between the high-intensity and usual care groups (OR = 3.24; 95% CI 1.40–7.49), and at 52 weeks there was no difference between any of the groups.^{17,18} Annual spirometry and brief smoking cessation advice followed by a personal letter from the physician had a significantly higher self-reported ≥ 1 -year abstinence rate at three years among COPD smokers,

Table 1
Included intervention studies

Rank setting	Participants	1	Type of support	Follow-up	Outcome (including length of quit)	Quits, n (%)	Author
1 ⁻ Nested in multicentre SMOKE RCT, The Netherlands	Moderate to severe COPD patients aged 40–75 years	Intervention I	Existing Minimal Intervention Strategy for lung patients (LMIS) smoking cessation programme: individual counselling and telephone contacts (180 min total) + use of paid-for pharmacological intervention if patient-requested	1 year	Continuous abstinence by < 20 ng/mL saliva cotinine levels	% (9 and 19) stated in abstract but not verifiable from body of paper	Christenhusz <i>et al.</i> ²⁶
2 ⁻ Primary healthcare centre, Sweden	COPD patients, 40–70 years	Intervention II	Stop smoking strategy (SST): counselling and telephone contacts (595 min total) + use of free Bupropion	1 year	CO verified (≤ 6 ppm) at 1 year	9 (47.4)	Fässberg Norrhall <i>et al.</i> ³²
1 ⁻ 43 GP practices, Nijmegen, The Netherlands	Healthy smokers, 40–70 years COPD patients >35 years, recorded ICPD code R95/96 medication, ≥2 scripts for inhaled anti-inflammatories in past year	Control Intervention	Smoking cessation programme only Patients invited for control visit, where given booklet and video plus allocated to groups: 1 – ‘Preparers’: info on coping with quitting barriers + NRT info (acc. nicotine dependence severity); 2 – ‘Contemplators’: invited again 2 weeks later and when defined ‘preparers’, quit date meeting set + follow-up visits planned; 3 – Not willing to quit: received info regarding advantages of quitting	6 months	Self-reported point prevalence at 6 months of abstinence in last 7 days	3 (18.0) 39 (16.0)	Hilberink <i>et al.</i> ²⁵
1 ⁻ Primary care, near Maastricht, The Netherlands	Smokers ≥10 pack years, 30–75 years, with COPD previously undetected	Control Intervention	Usual care by 22 GP practices using the Minimal Intervention Strategy (MIS), a stage-based smoking cessation intervention for GPs Medium-intensity individual counselling by RN with confrontation of abnormal spirometry + Norriptyline health education and promotion by RN with no confrontation + Norriptyline	5 weeks after TQD	Self-reported abstinence and urine cotinine level < 50 mg/mL	13 (8.8) 50 (43.1) 35 (31.3)	Kotz <i>et al.</i> ¹⁷

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Table 1
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Rank setting	Participants	1	Type of support	Follow-up Outcome (including length of quit)	Quits, n (%)	Author
1 ⁻ Primary care, near Maastricht, The Netherlands	Smokers, 30–70 years, with previously undetected mild–moderate COPD	Intervention	Medium-intensity individual counselling by RN with confrontation of abnormal spirometry + Nortriptyline health education and promotion by RN with no confrontation + Nortriptyline	5–52 weeks after TOD	Prolonged abstinence measured by urine cotinine (< 50 mg/mL) at 5, 26 and 52 weeks	Kotz <i>et al.</i> ¹⁸
2 ⁺ Nested in RCT of COPD self-management education, The Netherlands	Pulmonary Medicine Department outpatients with stable COPD, 40–75 years and current smokers	Control I	Individual counselling (conventional)	9 months	Self-report + saliva cotinine \leq 20 ng/mL	Monnikhof <i>et al.</i> ²³
1 ⁻ 6 primary care centres, Sweden	Patients with mild COPD Smokers with normal lung function	Control II	Care as usual, i.e. stage-based smoking cessation by GP Three 15–30-min home-based counselling sessions delivered by pharmacy assistant/RN + NRT or buprion if requested	3 years	Self-reported abstinence prevalence > 1 year at 3 year follow-up	Stratelis <i>et al.</i> ¹⁹
1 ⁻ Smoking cessation by hospitalization, Sweden	Patients aged 40–60 years, > 8 cigs/day with mild, moderate or severe COPD	Intervention	Initial spirometry, brief advice (<10 mins) by RN, followed up by doctor's letter inc. spirometry results and standard stop smoking advice + NRT/Bupropion if client so-wished	3 years	CO-verified (<8 ppm) abstinence >6 months in self-reported quitters at 1 and 3 years	Sundblad <i>et al.</i> ²¹
		Control	Usual care (not specified)		15 (7) at 1 year; 20 (10) at 3 years	

(Continued)

Table 1
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Rank setting	Participants	1	Type of support	Follow-up	Outcome (including length of quit)	Quits, n (%)	Author
1 ⁻ 7 pulmonary outpatient clinics, Denmark	COPD patients ≥ 18 years and smoking ≥ 1 cig/day	Intervention I Intervention II Control I Control II	95 Nicotine sublingual tablet (dosage acc. smoking levels) for 12 weeks + low support (4 visits plus 6 phone calls) 90 Nicotine sublingual tablet (dosage acc. smoking levels) for 12 weeks + high support (7 visits plus 5 phone calls) 88 Placebo + low support (4 visits plus 6 phone calls) 97 Placebo + high support (7 visits plus 5 phone calls)	1 year	Self-reported and CO-verified (<10 ppm) point prevalence and sustained abstinence rates at 6 and 12 months	13 (13.7) 13 (14.4) 4 (4.5) 6 (6.2)	Tønnesen <i>et al.</i> ¹⁶
1 ⁺ Research setting, The Netherlands	At risk for or with mild COPD, 30–70 years, ≥ 10 cigs/day, motivated to quit	Intervention I Intervention II Control	86 Individual face-to-face smoking cessation counselling (3 × 20 min) and phone calls (6 × 5 min) + Bupropion-SR 80 Individual face-to-face smoking cessation counselling (3 × 20 min) and phone calls (6 × 5 min) + Nortriptyline 89 Individual face-to-face smoking cessation counselling (3 × 20 min) and phone calls (6 × 5 min) + placebo	1 year	Self-reported and urine cotinine-validated prolonged abstinence measured at 4, 12, 26 and 52 weeks	18 (20.9) 16 (20.0) 12 (13.5)	Van Schayck <i>et al.</i> ¹⁵
1 ⁺ The Netherlands	At risk of/with COPD, 30–70 yrs, ≥ 10 cigs/day last yr, min. 5-yr smoker history	Intervention I Intervention II Control	86 Bupropion SR for 12 weeks + smoking cessation counselling 80 Nortriptyline for 12 weeks + smoking cessation counselling 89 Placebo + smoking cessation counselling	6 mths	Prolonged abstinence week 4–26 after TOD, assessed by self-report + urine cotinine values ≤ 60 ng/mL	12 (27.3) 11 (21.2) 4 (8.3)	Wagena <i>et al.</i> ²⁰⁰⁵
2 ⁺ Research setting, The Netherlands	Smokers with COPD or chronic bronchitis Asymptomatic smokers	38 25	Non-pharmacologic smoking cessation programme consisting of 9 group meetings (average duration 2 h) of 8–10 smokers over 6 weeks run by COPD nurse specialist and researcher, plus access to personal/phone support between sessions	1 year	Prolonged abstinence by urine cotinine levels (<25 ng/mL) at 2, 6 and 12 months after cessation	16 (42) 17 (68)	Willemse <i>et al.</i> ²⁰

(Continued)

Table 1
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Rank setting	Participants	1	Type of support	Follow-up Outcome (including length of quit)	Quits, n (%)	Author
1 ⁻ Regional Respiratory Centre outpatients, Northern Ireland	Adults with COPD needing secondary care	29	Group support: 5–10 min physician smoking cessation advice + 5 weekly nurse-led group sessions (1 h max) + NRT offered Individual support: 5–10 min physician smoking cessation advice + 5 weekly nurse-led individual sessions (1 h max) + NRT offered	2, 3, 6, 9 and 12 months Self-report, CO ≤10 ppm and saliva cotinine ≤10 ng/mL	0 (0.0)	Wilson <i>et al.</i> ²⁴
		27	Intervention II physician smoking cessation advice + 5 weekly nurse-led individual sessions (1 h max) + NRT offered		0 (0.0)	
		35	Control Usual care i.e. 5–10 min smoking cessation advice from physician		0 (0.0)	

RN = Respiratory Nurse, TOD = target quit date, f = percentages given in abstract, but not verifiable from results section, CO = carbon monoxide

compared to smokers with normal lung function ($P < 0.001$; $z = 3.93$).¹⁹

Behavioural interventions

The included Cochrane Review found that when combined with pharmacological support, intensive one-to-one counselling was better than no treatment, or behavioural interventions on their own, though the latter displayed a trend that seemed to support the intervention.¹¹

Another small study reported high cessation rates among COPD patients that participated in an intensive programme based on cognitive behavioural therapy, compared to asymptomatic participants.²⁰ One hundred percent follow-up was achieved and biochemically-validated prolonged abstinence after one year was 42%.

A statistically significant difference was found in quit rates at three year follow-ups (38% vs. 10%, respectively; $\chi^2 = 44.0$; $P < 0.0001$) between a group participating an intensive 1-year stop-smoking programme which included a two week period of hospitalization, compared to a group receiving usual treatment in primary care.²¹ However, the analysis was not undertaken on an intention-to-treat basis, and smoking prevalence was based on self-reports with a random sample of quitters' status subsequently biochemically-verified.

A study that compared an intensified smoking cessation programme in predominantly less severe COPD patients to usual care, found use of the more intense protocol doubled the quit rate from 8.8% to 16.0% ($\chi^2 = 4.0$; $df = 1$; $P = 0.046$), though the odds ratio was not found to be statistically significant.²² However, a nested pre- and post-test study of home-based counselling sessions found 12.5% participants were classified as abstinent at nine months, and even this is likely to be an over-estimation since despite drop-outs, an intention-to-treat analysis was not done and abstinence was self-reported.²³

Similarly, a study that evaluated the effect of providing additional nurse support (either in one-to-one or group sessions) compared to usual care found there was no difference in outcomes at 12 months follow-up.²⁴ The lack of association may be due to the below-power sample size, and/or the particularly stringent outcome measures.

Table 2
Included observational studies

Setting	Participants	Barriers to quitting	Data collection method	Analysis Framework	Researcher's perspective	Author
Users of inner-city hospital outreach service, Scotland	22 current and former smokers (15 women, 7 men; median age 68 years) with COPD who had experienced acute exacerbation in previous year and majority of whom (almost 90%) lived in areas of highest socioeconomic deprivation	60% of COPD patients continued to smoke; misinformation about smoking risks led some to continue; lack of family support	Semi-structured interview at participants' homes	Health Belief Model	Health service provider	Schofield <i>et al.</i> ²⁷
7 primary healthcare clinics in rural and urban areas in central and southern Sweden	7 specialist COPD nurses with at least 2 years of experience conducting first consultations with patients with suspected or confirmed COPD and who were current or former smokers	Consultation rarely tailored to patient needs; lack of motivational dialogue and open-ended questions when discussion stopping smoking; despite known smoker status, sometimes smoking not discussed	Videotaped consultations	Consultation Map method	Health service provider	Österlund <i>et al.</i> ²⁹
GP practices in 9 districts in The Netherlands	633 diagnosed COPD patients >35 years who smoked at least weekly plus ≥ 1 of the following: use of medication with ICPC code for COPD or asthma; prescription of $\geq 3 \times$ bronchodilators in preceding year; prescription of $\geq 2 \times$ anti-inflammatory medication in preceding year	Those with more severe symptoms tend to want to quit more; those intending to quit in near future cited more family support; 'pre-contemplators' vs. 'contemplators' had different attitudes to quitting and should be targeted with different interventions	Cross-sectional survey	I-change model	n/a	Hilberink <i>et al.</i> ²²

Markers predicting quitting success

Four studies highlighted that disease severity and smoking levels may influence patient motivation to quit. Patients wanting to stop smoking within one month had experienced more severe symptoms than those wishing to quit within six months.²⁵ Nicotine dependence does not seem to be a reliable predictor of quitting success. One study found more nicotine-dependent quitters were less likely to maintain abstinence to 12 months (OR = 0.83; 95% CI 0.72–0.97), as were participants that had used NRT previously (OR = 0.48; 95% CI 0.25–0.94), another study found no correlation between baseline nicotine dependence score and successful smoking cessation.^{13,16} By contrast, a positive attitude towards smoking cessation (OR = 11.8; 95% CI 1.7–81.5) and high salivary cotinine values (OR = 2.1; 95% CI 1.08–3.93) were found to be positively-correlated, significant predictors of continuous abstinence after one year.²⁶

Smoking-related health beliefs

A qualitative study that investigated the smoking-related health beliefs among 22 current and ex-smokers that had experienced an acute exacerbation in the previous year, found that although most perceived smoking as a health threat, almost 60% persisted.²⁷ It also found misinformation among patients: some felt a certain tobacco consumption level was safe, or that quitting was pointless as they had seen friends give up and then die.

The study also found perceived barriers to quitting included the feeling that smoking helped breathing, and that it had a calming effect. Cues to action were varied, ranging from disease severity to events external to the individual: for example, one participant stated the realization that she may not see her grandchildren grow up motivated her to quit. A number of participants reported struggling to quit or maintain their non-smoking status.

Smokers' motivation

One qualitative study highlighted that health professionals should focus on the motivational level among smokers wishing to quit.²⁵ This study

classified 633 COPD patients into groups using the 'Stages of Change' model, on which the UK's National Health Service (NHS) smoking cessation services are based, with those intending to quit within: the next month ('preparers'), the next six but not one month ('contemplators'); those not intending to quit within the next six months ('pre-contemplators').²⁸ However preparers and contemplators differed significantly from pre-contemplators in a number of ways, suggesting smoking cessation counselling should be tailored to these two distinct groups. Pre-contemplators were less likely to have a positive attitude to smoking cessation than either preparers or contemplators (e.g. improved airways complaints or engagement in activities of daily living as advantages associated with quitting). The paper concludes pre-contemplators should be targeted with messages around the expected benefits giving up.

Overall, preparers and contemplators reported greater feelings of self-efficacy than others, though contemplators were less likely to think they would be able to resist smoking in stressful situations, such as feeling angry, than preparers though they still reported significantly greater self-efficacy than pre-contemplators. Those motivated to quit had considered more coping strategies (e.g. asking guests not to smoke or making non-smoking agreements with housemates and colleagues). The authors recommend this group is targeted with strategies to increase self-efficacy, and also to help develop action planning skills.

Communication with health professionals

A qualitative study of seven COPD nurses undertaking first counselling sessions with 30 suspected/confirmed COPD patients that were current or former smokers, found the nurses rarely tailored the consultation to the patient's individual needs.²⁹ In addition, the majority of the self-management education and support for stopping smoking was given through information, generally not with motivational dialogue and open-ended questions that focus on a patient's abilities to self-manage their situation. Four smokers were not given any smoking cessation support and only two consultations were concluded with the development of a treatment plan.

Discussion

Principal findings

The findings from this review suggest smoking cessation services should include: a universal early intervention to reach all smokers; encouragement to report smoking status honestly; combined psychosocial and pharmacological support; confrontation with spirometry; targeted health messaging, segmented by patient health beliefs and motivations; support for struggling and recent quitters; regular appraisal and monitoring of staff delivering services.

Guidelines state smoking status should be queried at every patient contact.³⁰ Since tobacco use is under-reported, smoking cessation should initially address all COPD patients, to ensure information about the benefits of quitting reaches all smokers.²³ Early 'myth-busting' around erroneous beliefs (e.g. smoking makes breathing easier should also be included).²⁷ Participants should then be encouraged to admit their smoking status, so the possibility of giving up can be explored.

Confrontation with regular spirometry tests may help demonstrate to persistent smokers (including those who do not admit their status) that their lung function is declining and help motivate patients to quit.¹⁷⁻¹⁹

For those who want to quit, a combined approach using behavioural with pharmacological support should be offered.¹¹ Unlike its general smoking cessation guidelines, where NICE recommends the doctor and patient should together decide the most appropriate medication support, NICE specifically recommends the use of Bupropion for COPD patients.^{9,10} The evidence reviewed here suggests this may have fewer side-effects than Nortriptyline, though its efficacy compared to a placebo is not undisputed.^{10,14} Bupropion also seems to be more cost-effective.¹⁵ Behavioural support that helps quitters to develop self-help strategies such as breathing techniques, may have a role to play in supporting quitters to take control of their anxiety and stress.²⁷

A smoking cessation programme should include appropriately targeted health messages, segmented by patient motivations and health beliefs. Some beliefs (e.g. denying the link between smoking and disease progression) could be addressed both at campaign and individual counselling levels. By contrast, categorizing

patients according to Stage of Change would allow interventions to be tailored more closely to each individual's readiness to quit.²⁵ For example, pre-contemplators are less likely to have a positive attitude to giving up and should be targeted with messages around the benefits of quitting. Messaging could also tap into social cues relevant to a particular patient.²⁷

All staff delivering smoking cessation advice should be adequately trained and routinely appraised and monitored to ensure service quality and standards.²⁹ Health professionals need to provide accurate, understandable information and delivery of stop-smoking messages should use open questions, and focus on motivational dialogue to assess and support a patient's ability to self-manage their situation.^{27,29}

Support for recent and/or struggling quitters who may not be able to maintain their smoke-free status, for example by scheduling regular checks at, for example, three, six and 12 months post quit date. In addition, focusing on strategies for promoting self-efficacy, dealing with anxiety and self-management of the disease may be helpful.²⁷

Although a literature review of the family's role in supporting COPD patients to quit was inconclusive about the effectiveness of family-oriented stop smoking interventions, participants in studies reviewed here have cited lack of support from relatives as a barrier to smoking cessation, with those intending to quit within six months receiving more social support.^{25,27,31} One study placed smoking cessation sessions in patients' homes to allow counsellors could get a better understanding of the social barriers to quitting their clients were facing, though the study did not go on to assess the impact of this measure.²³ Similarly, COPD patients participating in residential smoking cessation programme were hospitalized with their spouses, though again the authors do not comment or explore this further.²¹

Strengths and weaknesses of this study

Strengths of this study include the: precision of the search strategy; selection of abstracts was undertaken by MR and SCC; systematic appraisal of papers using established frameworks and scoring methods; inclusion of qualitative research to understand patient barriers to smoking cessation.

Ideally, appraising the full-text papers should have been done by at least two independent scorers. A lack of time and financial resources did not allow for this. Possible bias was kept to a minimum by rigorously following a defined critical appraisal checklist and by using a well-known, independent scoring system.

The search criteria were set to only include studies from north-western Europe as these countries have primary care systems most similar to the UK. Only three studies from the UK were identified that met the inclusion criteria, suggesting there is a gap in the literature, and more research is needed.

Strengths and weaknesses in relation to other studies

Study heterogeneity made it difficult to draw comparisons. Differing end-points, both in terms of type (carbon monoxide vs. urinary cotinine) and level (urinary cotinine <60 ng/mL vs. <25 ng/mL), and method of measurement (self-report vs. biochemical validation) and outcomes (5 vs. 52 weeks abstinence) mean inter-study comparability is limited.

By not analysing results on an intention-to-treat basis, some studies may have overestimated the effect size.^{21,23} By contrast, a number of studies that found no effect were under-powered, meaning a true effect could have been masked.^{18,24} Evidence for behavioural interventions, including intervention type and effectiveness, was less clear. As blinding is almost impossible in these studies, the lack of significant findings could be due to contamination between intervention and control groups.

The main risk factor for COPD, smoking, is also associated with other serious health conditions, but most of the reviewed studies excluded people with 'severe co-morbidities', or alcohol dependence issues.^{21,24} The evidence identified in this review may therefore not be generalisable to all COPD patients.

What this study contributes

Despite COPD being a major public health problem, this review found a lack of high-quality

evidence for effective smoking cessation interventions for these patients. As such this review cannot recommend interventions that would definitely lead to increased quit rates. However, this study contributes an increased understanding of which interventions could improve smoking cessation rates, and highlights some of the barriers to quitting felt by patients.

Future research

Given the public health significance of COPD, it is surprising there is not more evidence for effective smoking cessation interventions in this group. Areas for future research include: effectiveness of pharmacological interventions; efficacy of psychosocial interventions; understanding the role of family; and the collection of more qualitative evidence around (perceived) barriers to quitting.

Conclusion

The findings from this review suggest how smoking cessation support for COPD patients could be improved to increase quit rates. In addition, areas that would benefit from further research are highlighted.

References

- Halbert RJ, Isonaka S, George D, Iqbal A. Interpreting COPD prevalence estimates: what is the true burden of disease? *Chest* 2003;**123**:1684–92
- World Health Organization. *Top Ten Causes of Death. Fact sheet No. 310*. Geneva: WHO, 2008. See <http://www.who.int/mediacentre/factsheets/fs310/en/index.html> (last checked 18 August 2010)
- Caverley P. COPD. In: *British Lung Foundation Lung Report III – Casting a shadow over the nation's health*. London: British Lung Foundation, 2003:13–15
- European Respiratory Society. Part 2: Major Respiratory Diseases. In: *European Lung White Book*. Sheffield: European Respiratory Society, 2003:34–43
- Wouters EF. Economic analysis of the Confronting COPD survey: an overview of results. *Respir Med* 2003;**97** (Suppl. C):3–14
- British Lung Foundation. See <http://www.lunguk.org/you-and-your-lungs/conditions-and-diseases/copd.htm?gclid=CNTqpKKD-aACFRg-1AoduQX0uQ> (last checked 9 April 2010)
- National Institute for Health and Clinical Excellence. Chapter 1.2: Managing Stable COPD. In: *Chronic Obstructive Pulmonary Disease: Management of Chronic Obstructive Pulmonary Disease in adult in primary and secondary care*. London: NICE, 2004:13–29

- 8 National Institute for Health and Clinical Excellence. Chapter 1.2: In: *Chronic Obstructive Pulmonary Disease: Management of Chronic Obstructive Pulmonary Disease in adult in primary and secondary care (partial update): Clinical Guideline*. London: NICE, 2010:18–36
- 9 National Institute for Health and Clinical Excellence. *Public Health Intervention Guidance: Brief interventions and referral for smoking cessation in primary care and other settings*. London: NICE, 2006
- 10 Tønnesen P, Carrozzi L, Fagerström K, et al. Smoking cessation in patients with respiratory diseases: a high priority, integral component of therapy. *Eur Respir J* 2007;**29**:390–417
- 11 van der Meer RM, Wagena E, Ostelo RWJG, Jacobs AJE, van Schayck OP. Smoking cessation for chronic obstructive pulmonary disease. *The Cochrane Library* 2003;**2**:CD002999
- 12 Wagena EJ, van der Meer RM, Ostelo RJWG, Jacobs JE, van Schayck CP. The efficacy of smoking cessation strategies in people with chronic obstructive pulmonary disease: results from a systematic review. *Respir Med* 2004;**98**:805–15
- 13 National Institute for Health and Clinical Excellence. Chapter 7: reviewing and grading the evidence. In: *The Guidelines Manual*. London: NICE, 2007:41–8
- 14 Wagena EJ, Knipschild PG, Huibers MJH, Wouters EFM, van Schayck CP. Efficacy of bupropion and Nortriptyline for smoking cessation among people at risk for or with chronic obstructive pulmonary disease. *Arch Intern Med* 2005;**165**:2286–92
- 15 van Schayck CP, Kaper J, Wagena EJ, Wouters EFM, Severens JL. The cost-effectiveness of antidepressants for smoking cessation in chronic obstructive pulmonary disease (COPD) patients. *Addiction* 2009;**104**:2110–17
- 16 Tønnesen P, Mikkelsen K, Bremann L. Nurse-conducted smoking cessation in patients with COPD using nicotine sublingual tablets and behavioural support. *Chest* 2006;**130**:334–42
- 17 Kotz D, Huibers MJH, West RJ, Wesseling G, van Schayck OCP. What mediates the effect of confrontational counselling on smoking cessation in smokers with COPD? *Patient Educ Couns* 2009;**76**:16–24
- 18 Kotz D, Wesseling G, Huibers MJ, van Schayck OC. Efficacy of confronting smokers with airflow limitation for smoking cessation. *Eur Respir J* 2009;**33**:754–62
- 19 Stratelis G, Molstad S, Jakobsson P, Zetterstrom O. The impact of repeated spirometry and smoking cessation advice on smokers with mild COPD. *Scand J Prim Health Care* 2006;**24**:133–9
- 20 Willemse B, Lesman-Leegte I, Timens W, Postma D, ten Hacken N. High cessation rates of cigarette smoking in subjects with and without COPD. *Chest* 2005;**128**:3685–7
- 21 Sundblad B-M, Larsson K, Nathell L. High rate of smoking abstinence in COPD patients: Smoking cessation by hospitalization. *Nicotine Tob Res* 2008;**10**:883–90
- 22 Hilberink SR, Jacobs JE, Bottema BJ, de Vries H, Grol RP. Smoking cessation in patients with COPD in daily general practice (SMOCC): six months' results. *Prev Med* 2005;**41**:822–7
- 23 Monninkhof E, van der Valk P, van der Palen J, et al. The effect of a minimal contact smoking cessation programme in out-patients with chronic obstructive pulmonary disease: a pre-post-test study. *Patient Educ Couns* 2004;**52**:231–6
- 24 Wilson JS, Fitzsimons D, Bradbury I, Elborn JS. Does additional support by nurses enhance the effect of a brief smoking cessation intervention in people with moderate to severe chronic obstructive pulmonary disease? A randomised controlled trial. *Int J Nurs Stud* 2008;**45**:508–17
- 25 Hilberink SR, Jacobs JE, Schlosser M, Grol RPTM, Vries H. Characteristics of patients with COPD in three motivational stages related to smoking cessation. *Patient Educ Couns* 2006;**61**:449–57
- 26 Christenhusz L, Pieterse M, Seydel E, van der Palen J. Prospective determinants of smoking cessation in COPD patients within a high intensity or a brief counselling intervention. *Patient Educ Couns* 2007;**66**:162–6
- 27 Schofield I, Kerr S, Tolson D. An exploration of the smoking-related health beliefs of older people with chronic obstructive pulmonary disease. *J Clin Nurs* 2007;**16**:1726–35
- 28 Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol* 1983;**51**:390–5
- 29 Österlund EE, Klang B, Larsson K, Ehrenberg A, Fossum B. Communication and self-management education at nurse-led COPD clinics in primary health care. *Patient Educ Couns* 2009;**77**:209–17
- 30 Global Initiative for Chronic Obstructive Lung Disease. *Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease*. Bethesda, MD: GOLD, 2009:44
- 31 Luker KA, Chalmers KI, Caress A-L, Salmon MP. Smoking cessation interventions in chronic obstructive pulmonary disease and the role of the family: A systematic literature review. *J Adv Nurs* 2007;**59**:559–68
- 32 Fässberg Norrhall M, Nilsfelt A, Varas E, et al. A feasible lifestyle program for easy intervention in patients with chronic obstructive pulmonary disease (COPD): a pilot study in primary care. *Prim Care Respir J* 2009;**18**:306–12

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