Cochrane for Clinicians

Putting Evidence into Practice

Behavioral Interventions for Smoking Cessation

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Clinical Question

Which behavioral interventions help people quit smoking, and what factors influence how successful they are?

Evidence-Based Answer

A variety of behavioral interventions are effective for smoking cessation. Providing individual or group counseling (odds ratio [OR] = 1.44; 95% credibility interval [CrI], 1.22 to 1.70; number needed to treat [NNT] = 40), guaranteed financial incentives (OR = 1.46; 95% CrI, 1.15 to 1.85; NNT = 29), and text message–based counseling (OR = 1.45; 95% CrI, 1.17 to 1.80; NNT = 33) provide the greatest benefit. Population characteristics do not consistently affect the success of these interventions. All of the interventions provide additional benefit even when smoking cessation pharmacotherapy is prescribed. There are no apparent harms of behavioral interventions.[1] (Strength of Recommendation: A, based on consistent, good-quality patient-oriented evidence.)

Practice Pointers

In 2019, 20.8% of all adults in the United States (26.2% of men and 7% of women) reported tobacco use.[2] Worldwide, more than 7 million people die annually of tobacco-related illnesses, including cancer, cardiovascular disease, and chronic obstructive pulmonary disease.[1] Smoking cessation remains an important public health goal with the potential to save lives and reduce the burden of disease. Using the data from all relevant Cochrane reviews, the authors sought to summarize which behavioral interventions help smokers quit.

This review included 33 prior Cochrane reviews that examined behavioral interventions for smoking cessation encompassing 312 unique randomized controlled trials and a total of 250,563 participants.[1] To be included, randomized controlled trials had to compare one behavioral intervention with another or with no intervention and had to report a primary outcome of abstinence from smoking at a minimum of six months postintervention. Studies in which both groups received pharmacotherapy were included, but those in which only the intervention group received pharmacotherapy were excluded. Reviews had to include adult smokers 18 to 63 years of age in the general population, and most studies were conducted in the United States or Western Europe, with about 37% taking place in health care settings and 63% in community settings. Many (140) of the 312 studies included patients who were motivated to quit, eight studies included people who were not interested in quitting, and the remaining studies did not specify patient motivation. The median age of trial participants was 42 years, and the median percentage of women was 54%.

The authors chose 38 different components of behavioral interventions to analyze in the combined review, including the type of motivation (how or why to quit), the type of intervention (e.g., counseling, hypnotherapy, financial incentives), the mode of delivery (i.e., individual, group, web, or text message), and the clinician doing the intervention (including but not limited to physicians, nurses, and pharmacists). They also examined whether subsets of the population (e.g., socioeconomic status) or the intensity of the intervention (i.e., number of sessions or length of treatment) affected the degree to which these interventions worked.

Four interventions improved the rates of smoking cessation at six months' follow-up: phone counseling, text message–based interventions, individual or group counseling, and guaranteed financial incentives. Text message–based interventions compared automated text messages with minimal support (NNT = 33;

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CME This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 124.

SUMMARY TABLE

Rates of Smoking Cessation at Six Months With or Without Behavioral Interventions

Intervention	Probable outcome with intervention	Probable outcome without intervention	NNT (95% CI)	Participants (studies)	Evidence quality
Guaranteed financial incentives	106 per 1,000 (95% CI, 91 to 123)	71 per 1,000	29 (19 to 50)	20,097 (30 RCTs)	High
Text message–based counseling	90 per 1,000 (95% CI, 70 to 110)	60 per 1,000	33 (20 to 100)	14,133 (13 RCTs)	Moderate
Individual counseling	110 per 1,000 (95% CI, 100 to 120)	70 per 1,000	25 (20 to 33)	11,100 (27 RCTs)	High
Group counseling	90 per 1,000 (95% CI, 80 to 120)	50 per 1,000	25 (14 to 33)	4,395 (13 RCTs)	Moderate
Printed self-help materials	60 per 1,000 (95% CI, 52 to 69)	50 per 1,000	NA	13,241 (11 RCTs)	Moderate
Internet-based interventions	148 per 1,000 (95% CI, 130 to 167)	129 per 1,000	NA	6,786 (8 RCTs)	Low
Telephone counseling	100 per 1,000 (95% CI, 85 to 116)	72 per 1,000	36 (23 to 77)	32,484 (14 RCTs)	Moderate

NA = not applicable (CI includes the possibility of no effect); NNT = number needed to treat; RCT = randomized controlled trial.

95% confidence interval [CI], 20 to 100). They ranged in length from one week to six months; some were tailored to the individual and others were provided with general messages. Effective counseling interventions included group counseling compared with self-help (NNT = 25; 95% CI, 14 to 33) and individual cessation counseling compared with usual care, brief advice, or self-help materials (NNT = 25; 95% CI, 20 to 33). Group counseling interventions generally ran for six to eight sessions, and individual counseling consisted of face-to-face sessions, each lasting at least 10 minutes, with a smoking cessation counselor. Guaranteed financial incentives (including cash payments or vouchers for goods and groceries) improved rates of smoking cessation (NNT = 29; 95% CI, 19 to 50) compared with no incentives. Data did not make clear the optimal frequency or duration of any of these interventions. The evidence was insufficient to confidently determine whether tailoring interventions to specific patient characteristics, such as baseline motivation or socioeconomic status, changed the likelihood of success.

The U.S. Preventive Services Task Force recommends that clinicians ask all adults about tobacco use and provide behavioral interventions and U.S. Food and Drug Administration–approved pharmacotherapy aimed at cessation (Grade A recommendation).[3] This recommendation includes a summary of evidence-based behavioral interventions to consider, including physician or nurse advice, individual counseling, group counseling, telephone counseling, and mobile phone–based interventions. Many professional societies, including the American Heart Association and American Cancer Society, prominently include behavioral interventions as potentially successful parts of a tobacco cessation plan.[4] Several evidence-based behavioral interventions may be accessed free of charge through the Centers for Disease Control and Prevention, the American Cancer Society, and specific state departments of public health.[5]

The practice recommendations in this activity are available at https://www.cochrane.org/CD013229.

Editor's Note: The NNTs and their corresponding CIs reported in this Cochrane for Clinicians were calculated by the authors based on raw data provided in the original Cochrane review.

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Virtual vs. In-Person Pulmonary Rehabilitation for Chronic Lung Disease

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Clinical Question

Is virtual pulmonary rehabilitation effective for patients with chronic lung disease?

Evidence-Based Answer

For patients with chronic obstructive pulmonary disease (COPD), virtual pulmonary rehabilitation (delivered via telephone, computer or smartphone application, website, video conference, or virtual group) is equivalent to in-person pulmonary rehabilitation at reducing symptoms of breathlessness and increasing six-minute walking distance (6MWD). Participants in both virtual and in-person pulmonary rehabilitation programs show similar improvements on quality-of-life questionnaires. Telerehabilitation participants are more likely to complete the program compared with their in-person counterparts.[1] (Strength of Recommendation: B, based on inconsistent or limited-quality patient-oriented evidence.)

Practice Pointers

Compared with traditional (in-person) pulmonary rehabilitation programs, the effectiveness of telehealth-based rehabilitation, or telerehabilitation, has not been well established.[2] The COVID-19 pandemic has highlighted the increased need for delivery of virtual health care, not only for patients with preexisting chronic lung disease, but also for those with potential long-term respiratory complications of COVID-19.[3,4] The authors of this review sought to assess the benefits and risks of pulmonary telerehabilitation for patients with chronic lung disease.

The review included 15 controlled trials of adults (N = 1,904; mean ages = 62 to 75 years) from North America and Europe comparing initial or maintenance telerehabilitation programs with either traditional pulmonary rehabilitation or no rehabilitation.[1] Inclusion criteria required that all rehabilitation programs incorporate some type of exercise training, and programs designated as telerehabilitation had to deliver 50% or more of the rehabilitation via telehealth methods. Nearly all (99%) of the participants had COPD. Telerehabilitation methods varied by study.

In four trials (n = 556) that assessed 6MWD six to 12 weeks after completion of a primary rehabilitation program, telerehabilitation participants achieved a similar average 6MWD (range = 8 m to 434 m; n = 292) compared with those in traditional programs (range = 11 m to 445 m; n = 264). The mean difference (MD) in 6MWD between the two groups was 0.06 m (95% CI, –10.82 m to 10.94 m; moderate-certainty evidence).

At six to eight weeks of follow-up, improvements in mean quality-of-life scores were similar between primary telerehabilitation and in-person groups (with lower scores indicating better quality of life). Trials used the St. George's Respiratory Questionnaire (MD = –1.26; 95% CI, –3.97 to 1.45; n = 274; two trials; low-certainty evidence) and the COPD Assessment Test (MD = –1.37; 95% CI, –3.10 to 0.36; n = 224; two trials; moderate-certainty evidence). Symptoms of breathlessness improved similarly in both groups, as indicated by increases in the Chronic Respiratory Questionnaire dyspnea domain scores (MD = 0.13; 95% CI, –0.13 to 0.40; n = 426; three trials; low-certainty evidence). Telerehabilitation participants were more likely to complete their programs than those in traditional rehabilitation programs (odds ratio = 5.36; 95% CI, 3.12 to 9.21; n = 516; three trials), with completion defined as

achieving a minimum of either 60% or 70% of prescribed exercises.

Compared with control groups who received no rehabilitation, pulmonary telerehabilitation may increase 6MWD for those in both initial (MD = 22.17 m longer after eight weeks; 95% CI, –38.89 m to 83.23 m; n = 94; two trials; low-certainty evidence) and maintenance programs (MD = 78.1 m longer at four to 12 months of follow-up; 95% CI, 49.6 m to 106.6 m; n = 209; two trials; low-certainty evidence). Overall, there were no apparent increased or distinct adverse effects of telerehabilitation compared with in-person programs and control groups.

Limitations of this review included small sample sizes and heterogeneity of models for delivering telerehabilitation. Most of the studies did not include long-term outcome data and did not include patients with lung diseases other than COPD. Despite the limitations, these results are applicable in the primary care setting because of increased virtual health care delivery needs resulting from the COVID-19 pandemic.[5] Challenges to the widespread use of telerehabilitation include variable insurance coverage, lack of evidence-based guidelines for telerehabilitation, and limited access to technology that enables remote monitoring and supervision of patients.[6] High-quality studies are needed to determine optimal delivery modes, cost-effectiveness, availability, and patient receptiveness to pulmonary telerehabilitation.

The practice recommendations in this activity are available at https://www.cochrane.org/CD013040.

The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the U.S. Army, the U.S. Air Force, the Department of Defense, or the U.S. government.

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