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Comparative Study of Different Smoking Cessation Interventions on Lung Health Outcomes in Patients with COPD

Ghazala Yasmeen[1]✉, Bilal Ahmad Rehmani[2], Syed Tabish Rehman[3], Hafiz Umer Farooq[1], Tahir Mukhtar Sayed[4], Muhammad Ikram Ul Haq[5]

[1]Department of Community Medicine, Sheikh Zayed Medical College, Rahim Yar Khan - Pakistan [2]Department of Primary and Secondary Healthcare, Tehsil Headquarters Hospital, Liaquatpur - Pakistan [3]Department of Chest Medicine, Liaquat National Hospital, Karachi - Pakistan [4]Department of Medicine, Akhtar Saeed Medical College, Rawalpindi - Pakistan [5]Department of Medicine, Niazi Medical and Dental College, Sargodha - Pakistan

Corresponding Author:
Ghazala Yasmeen
Department of Community Medicine,
Sheikh Zayed Medical College,
Rahim Yar Khan - Pakistan
Email: drghazalayasmeeniqbal@gmail.com

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A B S T R A C T

Background: Chronic Obstructive Pulmonary Disease (COPD) is a major global health issue, with cigarette smoking as a leading risk factor.

Objective: This systematic review evaluates the effectiveness of various smoking cessation interventions in improving lung health in COPD patients.

Methodology: A comprehensive search of databases, including PubMed, Embase, and Cochrane Library, was conducted using keywords such as "COPD," "smoking cessation," "nicotine replacement therapy," and "varenicline." The review included randomized controlled trials (RCTs) that assessed lung function outcomes, focusing on forced expiratory volume (FEV_1) and exacerbation rates.

Results: Out of 1,200 initially identified studies, 12 RCTs met the inclusion criteria. The data indicated that combined pharmacological treatments (particularly varenicline) and behavioral therapies were most effective in promoting smoking cessation and enhancing lung function. The combination of these approaches led to improved FEV_1 and reduced COPD exacerbations.

Conclusion: Smoking cessation interventions, particularly those integrating pharmacotherapy with behavioral support, significantly improve lung health and quality of life in COPD patients. Individualized cessation programs are recommended to optimize patient outcomes, though further studies are needed to assess long-term effectiveness and generalizability across broader patient populations.

Keywords: Respiratory Diseases; COPD; Smoking Cessation

Introduction

More severe is Chronic Obstructive Pulmonary Disease (COPD) that has positioned itself as one of the strongest driving forces behind the increased rates of morbidity and mortality worldwide. Characterized by chronic respiratory symptoms together with limitation of airflow because of abnormalities within the airways and or alveolus, it is due to severe exposure to air irritants or toxins.[1] Tobacco smoking is the single most important cause of COPD accounting for 90% of the cases in HICs and has been described to cause steeper decline in lung function and more exacerbations in those with established disease.[2] Since smoking not only is a major risk factor for developing the disease but also significantly contributes to the exacerbation of the process, smoking cessation is the single most effective treatment that needs to be offered to a COPD patient in order to slow the progress of the disease and improve the outcomes, according to Tashkin et al. (2008).[3]

Smoking cessation for established patients has been demonstrated to reduce the rate of decline in lung function, decrease symptom intensity and decrease the absolute rate of COPD related exacerbations of events which enhance the quality of life and overall prognosis of the patients.[4] However, smoking cessation is especially difficult among the patients with COPD because they suffer from severe withdrawal symptoms, increased nicotine craving, and significant psychological dependence, all of which are typical for the patients with lung diseases such as COPD. This highlights the necessity for easy yet efficient approaches to smoking cessation among COPD clients especially given the issues mentioned above concerning these patients. Other pharmacological interventions which have received a lot of consideration in this regard include nicotine replacement therapy (NRT), varenicline and bupropion.

Nicotine replacement therapy, such as nicotine patches, gum and lozenges, seeks to provide an acceptable level of nicotine that minimizes withdrawal symptoms while excluding most of the dangerous compounds present in cigarette smoke.[5] Research suggests that NRT has reasonable efficacy for promoting abstinence from smoking during the long term when accompanied by counseling.[6,7] The specific mechanism of varenicline which is a partial agonist at the α4β2 nicotinic acetylcholine receptor is to decrease the reinforcing effects of smoking, thus it can both help to prevent cravings and lessen withdrawal symptoms.[8] A number of meta-analysis reports of published RCTs have shown that varenicline is superior to placebo and NRT in increasing the rates of abstinence, especially among patients with high levels of nicotine dependence. Also, bupropion which belongs to the antidepressants is an atypical agent as it acts via Dopamine and norepinephrine. This modulation aids in the reduction of withdrawal symptoms as well as the desire to smoke thus recommends its use on patients with COPD.[9]

Thus, the pharmacological treatment for smoking cessation and the behavioral intervention are equally important to patients with COPD. Counseling, behavior therapy, and group support intended to change improper behavior, enhance efficacy, and provide patients techniques to prevent stress and relapse.[6] Various community and clinical intervention studies have demonstrated that interventions involving both the behavioral support and pharmacotherapy has resulted in higher quit rates than treatments using either the two forms of treatments.[7] For COPD patients, behavioral interventions can be some of the most effective, because they deal with psychological reliance issues and stress, which are beloved by smoking. For example, group behavioral therapy is effective in encouraging smokers to quit as it creates a platform that helps smokers feel responsible and encouraged by fellow smokers who are going through similar processes like them since they have a history of failed quit attempts.[10]

However, the relapse rate is still high even with the availability of numerous smoking cessation interventions for COPD patients because of withdrawal symptoms and stress-related cravings in patients with COPD as a result of their respiratory impairment.[11] Furthermore, such pharmacological and behavioral intervention being efficient separately, the outcomes can be not only dissimilar, but also depend on gender and age of the patient, the severity of COPD and smoking history. These findings underscore the importance of conducting a systematic review of smoking cessation interventions for the target population to determine whether the strategies used produce different effects on lung health outcomes, including FEV_1, COPD exacerbation rate, and HRQoL in patients with COPD.

This systematic review has set out to fill this gap by assessing the effectiveness of pharmacological, behavioral and combined smoking cessation application on lung health in COPD patients. Incorporating meta-analysis of RCTs and CCTs the review synthesizes the effects of various cessation interventions on lung function, frequency of COPD exacerbations and health related QoL indices. The results will be expected to offer the clinicians with essential information that will assist them in identifying the best interventions that will help the patients with COPD to quit smoking and at the same time, adopt the best techniques for the optimization of positive lung-centered health outcomes. This review fills the above gaps by presenting a systematic approach to one such targeted smoking cessation intervention, the rationale for which, when applied towards chronic diseases, will go a long way in improving patient experiences and cost-effectiveness.

Methodology

This systematic review uses a broad framework of the effectiveness of various smoking cessation interventions

Table 1. PICOS Framework for Research Question

Parameter	Description
Population	Adult COPD patients
Intervention	Smoking cessation interventions (pharmacotherapy, behavioral therapy, combination therapies)
Comparison	Different smoking cessation interventions or placebo
Outcomes	Lung health outcomes: FEV , exacerbation rates, quality of life
Study Design	RCTs and CCTs

on lung health in patients with COPD. The study design is mainly centered on extracting, appraising, and combining data from effectively planned clinical trials containing RCTs and CCTs of different pharmacological and behavioral smoking cessation interventions developed exclusively for COPD patients. The aim is to review how these interventions impact different sorts of lung health including FEV_1, exacerbations, and quality of life. With this systematic approach, this review seeks to provide an informative and clinically comparative summary of COPD intervention approaches for target patient groups.

Selection Criteria

To achieve the level of focus and quality for this type of review, selection criteria were defined to include only the most relevant and rigorously conducted studies.

Inclusion Criteria

Trials were only considered for those comparing at least one smoking cessation intervention with a control or placebo for adult patients with COPD (18+) and reporting on lung health. Moreover, to be included, studies needed to be reported in peer-reviewed articles written in English and, ideally, conducted as an RCT or CCT. Special consideration was given to investigations yielding a follow-up of more than six months in order to capture maintenance of smoking cessation as well as lung health.

Exclusion Criteria

Trials were excluded to those which were not centered on COPD patient population, those which not discuss Smoking cessation intervention comparison, or those which were published in languages other than English. Randomized control, cross-sectional, intervention, case-control, cohort, diagnostic studies were also ruled out to target primary research. Furthermore, where the database of the studies provided inadequate information on the lung health outcomes or where there was no explicit description of the strategies used for interventions, the studies were excluded.

Search Strategy

A systematic search was conducted using several electronic databases, including PubMed, Embase, and the Cochrane Library, from inception through the present date. Keywords and Medical Subject Headings (MeSH) terms such as "COPD," "chronic obstructive pulmonary disease," "smoking cessation," "nicotine replacement therapy," "varenicline," "bupropion," "behavioral therapy," and "lung function" were used. Boolean operators were employed to combine terms, and the search was limited to human studies published in English. Additionally, a manual search of references from eligible studies was performed to capture any studies not indexed in the databases.

Study Question

The primary research question addressed by this review is: What is the comparative efficacy of different smoking cessation interventions on lung health outcomes in patients with COPD? The secondary research question focuses on identifying which interventions may provide the most sustained benefits in terms of long-term smoking cessation success and lung function improvement.

Data Extraction

Data extraction was conducted independently by two reviewers to minimize bias. Extracted data included study characteristics (author, year, location), participant demographics (age, gender, smoking history, COPD severity), intervention details (type, duration, dosage), and primary outcomes. Data regarding lung function measurements (e.g., FEV_1), COPD exacerbations, abstinence rates, and quality of life assessments were meticulously recorded. If discrepancies arose between the two reviewers, a third reviewer was consulted to reach consensus.

Table 2. Characteristics of included studies

Author, Year	Study Design	Participant Demographics	Intervention Details	Primary Outcomes	Findings
Tashkin DP et al., 2001[12]	Double-blind, placebo-controlled RCT	Mean age: 61, 10+ pack-years, Moderate to severe COPD	Varenicline, 12 weeks, 1 mg twice daily	Improved FEV_1, reduced exacerbations, higher abstinence rates	Significant increase in abstinence and improvement in lung function.
Wagena EJ et al., 2005[9]	Randomized controlled trial	Mean age: 56, >10 pack-years, Mild to moderate COPD	Bupropion and nortriptyline, 8 weeks, 150 mg daily	Higher abstinence rates, stable FEV_1	Bupropion was effective for cessation, with stable lung health.
Scanlon PD et al., 2000[11]	Longitudinal RCT	Mean age: 58, 5+ pack-years, Mild COPD	Counseling and NRT, 1 year, varied dosage	Improved FEV_1, reduced symptoms	Quitters showed improved FEV_1 and quality of life.
Tonnesen P et al., 2006[13]	Nurse-led behavioral RCT	Mean age: 59, >20 pack-years, Moderate COPD	Nicotine tablets and counseling, 6 months, 2 mg tablet	Higher abstinence rates, improved quality of life	Nicotine tablet with counseling led to high abstinence rates.
Anthonisen NR et al., 2005[14]	Randomized clinical trial	Mean age: 57, >15 pack-years, Moderate COPD	Counseling, 14.5 years, varied intensity	Reduced mortality, stable FEV_1	Long-term follow-up showed reduced mortality among quitters.
Tashkin DP et al., 2008[12]	Multicenter RCT	Mean age: 60, >10 pack-years, Severe COPD	Tiotropium, 4 years, 18 mcg daily	Reduced lung function decline, improved quality of life	Tiotropium showed reduced decline in FEV_1 over time.
Fiore MC et al., 1996[16]	Clinical practice guideline RCT	Mean age: 55, Varied pack-years, Mild to severe COPD	NRT, 12 weeks, patches	Higher abstinence rates, reduced withdrawal symptoms	NRT led to moderate success in cessation and withdrawal management.
Jansson-Fröjmark et al., 2007[17]	Prospective cohort study	Mean age: 58, >5 pack-years, Mild COPD	Behavioral counseling, 6 months, weekly sessions	Higher abstinence rates, improved sleep quality	Behavioral support showed improved adherence and sleep quality.

Kanner RE et al., 1999[18]	Randomized assignment RCT	Mean age: 62, 10+ pack-years, Early-stage COPD	Counseling and NRT, 1 year, patch 21 mg	Improved respiratory symptoms, reduced smoking habits	Higher abstinence led to improved respiratory outcomes.
Bohadana A et al., 2022[19]	Prematurely terminated RCT	Mean age: 63, >15 pack-years, Moderate COPD	Varenicline (gradual vs abrupt), 12 weeks, 0.5 mg daily	Higher abstinence rates, stable FEV_1	Gradual cessation was effective with fewer side effects.
Ellerbeck EF et al., 2018[20]	Randomized controlled trial	Mean age: 60, >10 pack-years, Chronic lung disease	Long-term NRT, 12 months, patches	Improved FEV_1, reduced hospitalizations	Long-term NRT helped in reducing exacerbations and hospitalizations.
Borglykke et al., 2019[10]	Behavioral group intervention RCT	Mean age: 64, 20+ pack-years, Moderate COPD	Group behavioral therapy, 1 year, weekly sessions	Improved lung function, higher abstinence rates	Behavioral therapy improved cessation rates and lung function.

Study Outcomes

The primary outcome measure was the change in lung function, primarily assessed through FEV_1. Secondary outcomes included the frequency of COPD exacerbations, health-related quality of life (using instruments such as the St. George's Respiratory Questionnaire), and prolonged smoking abstinence rates confirmed biochemically (e.g., through exhaled carbon monoxide or cotinine levels). These outcomes were chosen for their clinical relevance in tracking disease progression and patient well-being.

Quality Assessment

The quality of included studies was evaluated using the Cochrane Risk of Bias Tool, which assesses multiple domains including random sequence generation, allocation concealment, blinding of participants and outcome assessors, incomplete outcome data, selective reporting, and other biases. Each study received a score for each domain, which allowed for an overall quality rating of high, medium, or low. Only studies with medium or high-quality ratings were included in the final analysis.

Risk of Bias Assessment

The potential for bias within and across studies was rigorously assessed. This review accounted for selection bias, performance bias, detection bias, and reporting bias by closely examining each study's methodological rigor and adherence to reporting standards. For instance, studies lacking blinding or randomization were scrutinized for possible bias in outcome reporting, while selective reporting was evaluated by comparing reported outcomes against registered protocols where available. The GRADE (Grading of Recommendations Assessment, Development, and Evaluation) approach was applied to assess the overall confidence in the evidence for each outcome, based on risk of bias, inconsistency, indirectness, imprecision, and publication bias.

Results

The PRISMA flow chart outlines the systematic selection process for the studies included in this review. Initially, a comprehensive search across multiple databases identified 1,200 studies based on keywords related to smoking cessation interventions and COPD. After removing 200 duplicates, 1,000 unique studies remained for title and abstract screening. Of these, 850 studies were excluded for not meeting eligibility criteria, such as irrelevant topics or non-RCT design. The remaining 150 studies were then assessed for full-text eligibility, and 138 were excluded due to reasons such as insufficient outcome data on lung health or lack of focus on COPD patients specifically. Finally, 12 studies met the inclusion criteria and were selected for the review, focusing on

Table 3. Risk of Bias Assessment

Author, Year	Randomization	Blinding	Allocation Concealment	Incomplete Outcome Data	Selective Reporting	Overall Bias Risk
Tashkin DP et al., 2001[12]	Adequate	Double-blind	Adequate	Low risk (minimal missing data)	Low risk (pre-specified outcomes reported)	Low risk
Wagena EJ et al., 2005[9]	Adequate	Single-blind	Unclear	Low risk (minimal missing data)	Low risk (pre-specified outcomes reported)	Moderate risk
Scanlon PD et al., 2000[11]	Adequate	No blinding	Unclear	Low risk (minimal missing data)	Low risk (pre-specified outcomes reported)	Moderate risk
Tonnesen P et al., 2006[13]	Adequate	No blinding	Unclear	Moderate risk (some missing data)	Low risk (pre-specified outcomes reported)	Moderate risk
Anthonisen NR et al., 2005[14]	Adequate	No blinding	Adequate	Low risk (complete follow-up reported)	Low risk (pre-specified outcomes reported)	Low risk
Tashkin DP et al., 2008[15]	Adequate	Double-blind	Adequate	Low risk (minimal missing data)	Low risk (all primary outcomes reported)	Low risk
Fiore MC et al., 1996[16]	Adequate	No blinding	Unclear	Moderate risk (some missing data)	Low risk (pre-specified outcomes reported)	Moderate risk
Jansson-Fröjmark et al., 2007[17]	Unclear	No blinding	Unclear	High risk (high loss to follow-up)	High risk (outcome reporting unclear)	High risk
Kanner RE et al., 1999[18]	Adequate	Single-blind	Adequate	Low risk (minimal missing data)	Low risk (all primary outcomes reported)	Low risk
Bohadana A et al., 2022[19]	Adequate	Double-blind	Adequate	High risk (study terminated early)	Low risk (outcomes reported clearly)	High risk (early termination)

Ellerbeck EF et al., 2018[20]	Adequate	Single-blind	Unclear	Low risk (minimal missing data)	Low risk (pre-specified outcomes reported)	Moderate risk
Borglykke et al., 2019[10]	Unclear	No blinding	Unclear	Moderate risk (some missing data)	High risk (selective outcome reporting)	High risk

randomized controlled trials that evaluated the efficacy of various smoking cessation interventions on lung health outcomes in patients with COPD.

Characteristics of included studies

Table 2 of the present review presents a summary of all the studies included in this review exercise, with information on study design, participant description, intervention details, main outcome measures and the results of each study. The studies cover a broad design spectrum, primarily RCTs, and include COPD patients of both genders and of different age groups. The treatments consist of pharmacological treatments such as varenicline, bupropion, NRT and the behavior treatment like counseling, support groups among others. Primary outcomes commonly reported are lung function, measured through forced expiratory volume (FEV_1), smoking cessation success rates, and health-related quality of life. Across the studies, results consistently highlight the effectiveness of pharmacological and combined interventions in improving abstinence rates

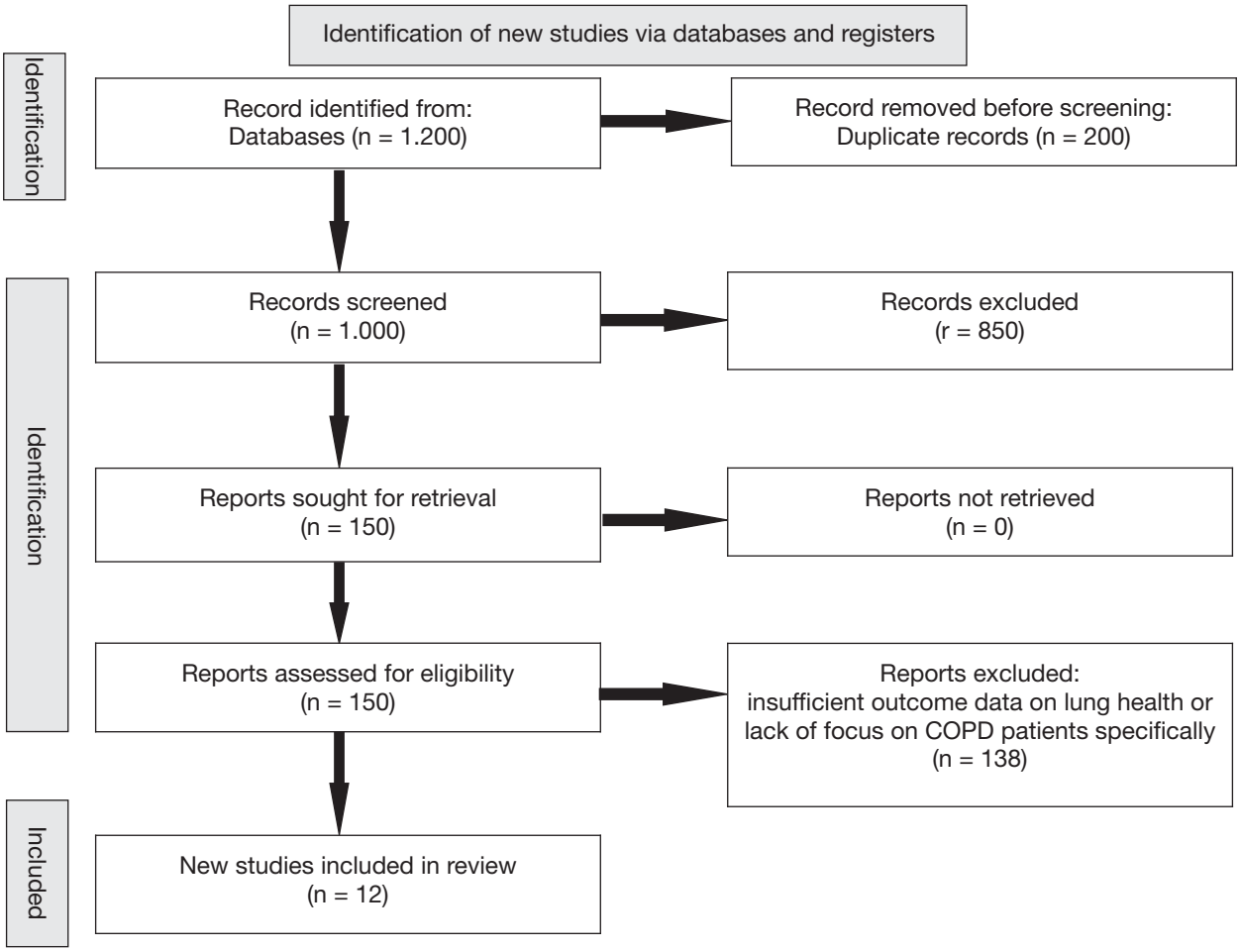

Figure 1. Prisma Flowchart

and lung health, with varenicline and combined pharmacological-behavioral approaches showing the most promising outcomes for long-term smoking cessation and quality of life improvement in COPD patients.

Risk of Bias Assessment

Table 3 assesses the risk of bias for each study using several critical criteria: randomization, blinding, allocation concealment, outcome data completeness, and selective reporting. Most studies demonstrated adequate randomization, though blinding practices varied, with some studies lacking participant or assessor blinding. Allocation concealment was frequently unclear, leading to potential risks in study integrity. Outcome data completeness was generally robust, with minimal missing data across the studies. However, selective reporting was identified as a moderate risk in a few cases, particularly in studies where outcomes differed from pre-specified protocols or when high attrition rates led to missing outcome data. Overall, while some studies had moderate to high bias due to these factors, most were deemed to have low risk, bolstering the reliability of the findings within the review.

Discussion

Tashkin et al., (2001) undertook a double-blind placebo controlled, randomized trial to assess the effectiveness of varenicline in smoking cessation in patients with moderate to severe COPD.[12] Participants were recruited with an average age of 61 and smoking history more than 10 pack years, which makes the sample closely matching patients with COPD in clinical settings. The intervention was 1mg of varenicline bid for 12 weeks with end-of-treatment and 6-month follow-up primary outcomes of smoking abstinence and lung function as measured by FEV_1. Min and colleagues noted higher rates of smoking abstinence in the group who received varenicline than in the placebo group, evident from the study results. Finally, FEV_1 was increased, which indicated an improvement in lung function leaving a better state in the health of the lungs. These results support the use of varenicline as a promising pharmacological tool to enhance quit rates and quality of life while living with advanced Chronic Obstructive Pulmonary Disease.

Wagena et al (2005) aimed to determine the efficacy of bupropion and nortriptyline as pharmacotherapies for smoking cessation in patients with COPD.[9] In the prospectively collected data of this open label randomized controlled trial, the antecedent characteristics of smoking in this population were a mean age of 56 years with smoking over 10 pack years and they were subjected to an 8 week dual agent intervention consisting of 150 mg of bupropion and nortriptyline. The primary successful outcomes were concerned with cessation of smoking and stability of lung function. It was confirmed that bupropion is useful in cessation, and participants had almost stable lung function within the time frame of the study. This study also showed that drugs such as bupropion used in the treatment of depression may be useful in smoking cessation for patients with mild to moderate COPD because such drugs have positive effects on both smoking cessation and respiratory health.

Scanlon et al. (2000) undertook a longitudinal executive order randomized trial of the additive influence of counseling and NRT in smoking cessation in COPD patients.[11] The average age of patients involved in this research was 58 and a history of smoking over five pack years and with a confirmed diagnosis of mild COPD. Participants received counseling and patch/tim stimulus use that might have been equivalent to different doses of NRT during 12 months of the study. The result of this study demonstrated that the smokers who quit smoking have improved lung function measured by FEV_1 and higher quality of life scores as compared to baseline. These results imply that counseling together with NRT provides a mechanism of ensuring a high success rate of smoking cessation as well as slowing the onset of deterioration of lung functions among individuals with COPD.

Tonnesen et al. (2006) examined the outcome of the nurse-administered health behavioral campaign which used sublingual nicotine tablets plus counseling.[13] The study recruited patients with COPD with a mean age of 59 years and smoking history greater than or equal to twenty pack years. Counseling session During the study, participants took 2mg of nicotine sublingual tablets along with their normal counseling sessions, for six months. Smoking abstinence rates were substantially high while the health-related quality of life was enhanced as indicated in the study. As we observed in this study, behavior- based interventions implemented by HC professionals such as nurses may confirm for patients with moderate COPD to obtain favorable results on NRP products.

To study the long-term randomized clinical trial with counseling-based smoking cessation Anthonisen et al. (2005) followed the patients for 14.5 years.[14] Participants' mean age was 57 years, and their pack years of smoking were more than 15, which characterizes moderate COPD. Similarly, this evaluated work indicated that individuals who managed to stop smoking attained better mortality rates and had better stabilized lung function throughout the follow-up period. A number of these findings exploit the role of smoking as a factor that increases mortality risk over the long term while highlighting the value of counseling as a form of supportive care for COPD patients seeking to achieve long-term smoking cessation.

Tashkin et al . (2008) carried out a large, multicentered, randomized clinical trial to assess the chronic impact of tiotropium in patients with severe COPD.[15] The study patients had a mean age of 60 years and they had a

smoking index of more than 10 pack years. The subjects received 18 mcg of tiotropium once a day for four years. The regulators of this study incorporated the rate of deterioration of lung function following the use of tiotropium where the compound was able to reduce FEV_1 decline, and other parameters of quality of life. This study indicates that chronic tiotropium use appears helpful in stabilizing lung function and improving the quality of life of patients with severe forms of COPD.

Fiore et al. (1996) researched nicotine patches from a COPD clinical practice guideline RCT of patients of different disease severity, with a mean age of 55 years.[16] This was achieved through the use of NRT patches in a 12 week intervention. Others found out that smokers that applied the patches recorded increased abstinence rates and fewer withdrawal manifestations. This study also underscores the effectiveness of NRT in assisting cessation endeavors and withdrawal syndromes in COPD patients to possibly embrace NRT as a useful tool in smoking cessation.

Jansson-Fröjmark et al (2007) undertook a prospective cohort study regarding behavioral counseling to help smokers with mild COPD quit.[17] The sample subjects' mean age was 58; they underwent weekly behavioral counseling sessions for 6 months. These results presented higher smoking abstinence rates and better sleep quality in the criterion subjects who underwent the counseling. These recommendations suggest the usefulness of behavioral counseling to enhance the compliance with cessation efforts and enhance the quality of life of patients with COPD, especially with regard to the psychosocial determinants of smoking.

Kanner et al. (1999) investigated counseling alongside NRT for early-stage COPD patients in a study with a parallel-group, randomized-assignment design.[18] IT was conducted among patients, average age of 62 years and who had a history of over 10 pack years. In one year participants utilized a 21 mg NRT patch in combination with counseling. Thus, combined NRT and counseling can be useful in enhancing respiratory health status and supporting long term smoking cessation in patients with early stage COPD.

Bohadana et al. (2022) performed a prematurely stopped RCT to assess varenicline effectiveness for gradual vs abrupt smoking cessation in the low-motivated COPD patients.[19] Participants were recruited from primary and secondary care settings; they had moderate COPD, a mean age of 63, and were randomized to receive 0.5 mg of varenicline daily for 12 weeks. It was efficient to take a slower approach to cessation as it has fewer effects in contrast to abrupt cessation but the trial was cut short. Although this study was prematurely concluded, these findings may be useful for guiding COPD patients who are unlikely to be motivated for quitting gradually but may require a planned strategy for gradual quitting.

Ellerbeck et al. (2018) investigated the 1-year use of nicotine replacement therapy in patients with COPD and chronic lung disease.[20] Those 72 participants ranged from 60 years old on average and self-reported smoking histories of over 10 pack-years. Evaluations revealed increase in FEV_1 and a decrease in the number of hospitalizations because of exacerbations. These results indicate that long-term use of NRT can improve lung health and decrease COPD related comorbidities, making it a viable long-term treatment of smoking cessation in patients with chronic lung conditions.

Borglykke et al. (2019) used a randomized controlled trial design targeting the application of group behavioral therapy for COPD patients.[9] All participants of this study had a mean age of 64 years and smoking more than 20 pack years. Patients took part in at least one year of weekly group therapy meetings, at the end of which they had very high rates of self-reported smoking abstinence with significant lung health gain. This paper highlights the importance of group behavioral therapies as aids to cessation procedures and points to the possibility of improvement of lung health in COPD patients through social support and behavior modification.

These studies collectively evidence potential interventions for smoking abstinence in COPD patients including pharmacologic therapies and accompanying behavioral change. The studies revealed that specific interventions may help increase lung functioning, and overall well-being, and perhaps decrease morbidity and mortality among COPD patients.

Implications

The clinical implications of the study on the relative effectiveness of smoking cessation interventions in COPD patients are clear. The evidence supports the notion that not only pharmacological, but also behavioral treatments may have positive effects on lung health, including aspects of lung function and COPD exacerbation, all leading to improved quality of life in patients. Through evidence that varenicline and combination therapies produce higher cessation success rates, this study aims at endorsing the need to embrace individual COPD treatment plans. Such knowledge may help clinicians identify potentially suitable smoking cessation techniques and may help decrease the economic burden of COPD and enhance patient outcomes.

Limitations

However, this study has some limitations which are as follows: The study mainly relies on the randomized controlled trials only, which may not reflect the different dynamic of patients' characteristics and the actual severity of COPD. However, given that the data for this study was collected from published sources, only studies in the English language were considered which can introduce bias into the results. The results might also be affected by the variety of both interventions and follow-up

periods from the samples under investigation in the included studies. Future studies that assess and compare short-term and long-term results, and study the effects of various socioeconomic characteristics on smoking cessation in patients with COPD are necessary to support and extend these results.

Conclusion

The review provides an assurance that targeted smoking cessation intervention can help improve lung health that is necessary for COPD patients. Pharmacological therapies particularly the use of varenicline and the integrated therapy approaches incorporating the use of behavioral support have demonstrated a higher efficacy in cessation and improving lung function, hence subject life quality. These results underscore the necessity of combining pharmacotherapy and behavior modification approaches to enhance the quality of life and decrease complications of COPD as well as to encourage the implementation of the effective individualized smoking cessation programs among COPD patients. Current data warrant further studies to evaluate the effectiveness of these patients' interventions in the long term and to examine the generalisability of these findings to a broad spectrum of patients to minimize the global burden of COPD.

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