

Nurse Counseling as Part of a Multicomponent Tobacco Treatment Intervention

An Integrative Review

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Abstract

Introduction: Although tobacco use is widely recognized as a major cause of preventable morbidity and mortality, tobacco treatment remains challenging.

Purpose: The purpose of this integrative review is to synthesize the research findings regarding multicomponent tobacco treatment interventions combining nurse counseling and nicotine replacement therapy (NRT).

Methods: Published literature from 1990 through April 2019 was searched using the databases PubMed, CINAHL, PsycINFO, and Scopus. We extracted data into a literature matrix to facilitate comparison across primary sources and make conclusions about this body of literature as a whole.

Findings: This integrative review includes 21 publications that investigated the effects of tobacco treatment interventions incorporating both nurse counseling and NRT. Articles were reviewed for quality indicators.

Results: The evidence from this set of studies indicates that nurse counseling is an effective intervention when combined with NRT. The most successful interventions included long-term face-to-face counseling with a nurse. In addition, interventions in which longer courses of NRT were offered for free or at subsidized rates were most successful at engendering smoking cessation. Moreover, interventions that maximized social support for participants attempting to quit smoking resulted in favorable outcomes.

Discussion: The findings can provide useful guidance regarding the designing and implementation of effective tobacco treatment interventions that incorporate various components.

Conclusion: Nurse counseling augmented by additional effective tobacco treatment therapies including NRT leads

to beneficial outcomes in smoking cessation. Future researchers should capitalize on this apparent synergistic relationship between multiple tobacco treatment components.

Keywords: multicomponent, NRT, nurse counseling, tobacco treatment

INTRODUCTION

Chronic tobacco use is associated with negative health consequences including cancer, respiratory disease, cardiovascular disease, stroke, and poor birth outcomes (Centers for Disease Control and Prevention, 2017). Yet, 14% of Americans smoke cigarettes, and more than 16 million are living with a smoking-related illness (Centers for Disease Control and Prevention, 2017). Currently, tobacco remains a primary cause of preventable morbidity and mortality. It presents an overwhelming burden to the U.S. healthcare system; \$170 billion dollars are spent on the direct medical care of adults with tobacco-related illnesses (U.S. Department of Health and Human Services, 2014; Xu et al., 2015). Given the breadth of the tobacco epidemic, it is essential that effective tobacco treatment interventions are developed and disseminated to those who continue to smoke.

Ample research has been conducted regarding tobacco treatment interventions; there are a multitude of meta-analyses and reviews on the subject. Some meta-analysts investigating behavioral counseling interventions have shown a statistically significant effect of nurse counseling alone on tobacco treatment outcomes (Relative Risk = 1.29, 95% CI [1.21, 1.38]). However, in the absence of effective adjunctive therapies for tobacco treatment, nurse counseling has only a modest effect on smoking abstinence (Rice et al., 2017), suggesting that most people who smoke require more than simply behavioral counseling to successfully quit.

Overwhelmingly, evidence supports the role of nicotine replacement therapy (NRT) in tobacco treatment. People who smoke and who use NRT have shown 50%–70% increased rates of tobacco treatment success when compared with those who attempt to quit without NRT (Stead et al., 2012). However, researchers consistently find that NRT is more effective when administered in combination with behavioral counseling from healthcare providers to address psychological as well as physical addictions to tobacco (Stead et al., 2015; Stead,

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The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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DOI: 10.1097/JAN.0000000000000347

Buitrago, et al., 2013). As such, established tobacco treatment guidelines recommend behavioral counseling be offered with NRT to support people who smoke through withdrawal symptoms while they also attempt to modify their health behavior (Fiore, 2000). Although not all people who smoke require specific treatments to quit, overall, evidence suggests that providing NRT with behavioral counseling optimizes the chances of successful tobacco treatment. Yet, there remain relatively few studies that describe interventions combining both NRT and behavioral counseling interventions delivered by nurses.

Early investigations regarding the efficacy of nurse-led tobacco treatment interventions first appeared in the literature during the 1990s. Interest in using nurses to deliver tobacco treatment interventions has increased in recent years because nurses are in an advantageous position to deliver tobacco treatment counseling within the healthcare system. Although nurse counseling in isolation has shown modest effectiveness on tobacco treatment outcomes (Rice et al., 2017), no reviews have been conducted examining the effect of nurse-led behavioral counseling when combined with NRT. Therefore, the aim of this integrative review is to synthesize the research regarding multicomponent tobacco treatment interventions, which specifically combine nurse counseling and NRT.

METHODS

We conducted a search of published literature from 1990 through April 2019 using the databases PubMed, CINAHL, PsycINFO, and Scopus. The search terms included (smoking cessation OR quit* OR smok*) AND nurs* AND (nicotine replacement therapy OR NRT) AND (intervention* OR program*). In addition, hand searches of the journals *Addiction*, *Nicotine & Tobacco Research*, *Tobacco Control*, and *Journal of Addictions Nursing* were performed but did not yield any new articles for inclusion in the review. After using a reference manager to delete duplicate publications, the total number of unique articles remaining was 302. Through the process of screening the articles, the number of relevant articles was reduced to 21 (see Figure 1).

We included articles if they were published in English and researchers reported data regarding interventions incorporating nurse counseling and NRT. Interventions featuring additional components beyond nurse counseling and NRT were included, but articles had to include at least these two treatment modalities. We included articles that measured the outcomes of interest: point prevalence abstinence or continuous abstinence from smoking. Publications regarding interventions conducted by advanced practice nurses as well as registered nurses were included. However, those investigating interventions conducted by midwives were omitted from the analysis because smoking cessation in pregnancy was not the outcome of interest for this integrative review. In addition, interventions targeting multiple health outcomes, such as blood pressure and glucose control, in addition to tobacco treatment were excluded as tobacco treatment is the primary outcome of interest in this integrative review.

We extracted data from each study according to the methodology outlined by Whittemore and Knafl (2005). Information from each publication was reduced by creating a literature matrix to facilitate the comparison of data across primary sources. We compared the extracted data to identify patterns and relationships, discover conflicting evidence, and, ultimately, make conclusions about this body of literature as a whole.

FINDINGS

This integrative review includes 21 publications in which researchers examined multicomponent tobacco treatment interventions combining nurse counseling and NRT (see Table 1 for study details). The studies were conducted in diverse locations including the United States ($n = 6$), Europe ($n = 5$), Canada ($n = 3$), Australia ($n = 3$), Iceland ($n = 2$), China ($n = 1$), and Thailand ($n = 1$). Participants varied in demographic characteristics, including race, gender, education, income, and health status, but tended to be middle aged (mean age = 37.5–63.8 years) and have greater than 15 pack-year histories. Whereas some of the samples were described as healthy, other researchers recruited participants with specific medical diagnoses, including patients with diabetes, COPD/asthma, cardiovascular disease, stroke, and HIV/AIDS. Most participants were recruited from outpatient settings ($n = 15$). However, there were some interventions ($n = 6$) that were initiated with hospitalized patients and continued in the weeks after discharge.

To determine the quality of the studies included in this review, we used the Cochrane Collaboration's tool for assessing risk of bias (Higgins et al., 2011). Two independent reviewers rated the risk of bias on six domains (sequence generation, allocation concealment, blinding of participants and personnel, incomplete outcome data, and other sources of bias) as high, low, or unclear (see Table 2). Generally, the studies showed rigor, and each contributed substantive knowledge to this integrative review. The intervention studies included eight randomized controlled trials (RCTs) with large sample sizes ($n > 168$). We also included three pilot RCTs, in which researchers accrued too few participants to effectively detect statistically different changes between the intervention and control groups but described well-designed tobacco treatment interventions. The 10 remaining intervention studies were quasi-experimental. Researchers used repeated measures and a comparison group in four of the quasi-experimental studies to reduce threats to internal validity. In the remaining six quasi-experimental studies, the researchers utilized a pre-post one-group design. Although many of the researchers did report study limitations related to high rates of attrition, most researchers used intention-to-treat analyses to ameliorate this threat to validity. In addition, most of the researchers incorporated biochemical measures from blood, urine, or exhaled carbon monoxide to verify self-reports of quitting ($n = 15$), supporting the validity of the findings. Few researchers ($n = 6$) relied solely on participants' self-reports of quitting. The quality assessments, as a whole, indicate that the studies included in this integrative review are moderately to highly rigorous.

RESULTS

In this integrative review, we identified seven themes related to the features of the interventions, study participants, and settings. They are discussed below.

Counseling Dose

Although interventions included nurse counseling and NRT, in some studies, the nurse's role was a central part of the intervention, whereas in others, the nurse had an auxiliary role. In two of the included studies, researchers incorporated a single, brief counseling session with a nurse. All of the other interventions incorporated long-term follow-up with nurse counselors with the duration ranging from 4 weeks to 12 months and from 3 sessions to as many as 12 sessions.

In favor of high doses of counseling, several researchers showed a dose–response relationship between nurse counseling and successful tobacco treatment. In one study, participants who attended four weekly nurse counseling sessions showed significantly higher 6-month cessation rates than those who attended less than four counseling sessions (Zwar et al., 2011). Likewise, others found that participants who attended at least five counseling sessions had significantly

increased odds of achieving 6-month continuous abstinence than those who attended less than five sessions (Berndt et al., 2017). Moreover, participants who completed 12 weekly telephone calls with a nurse counselor demonstrated biochemically verified cessation rates of 33.3% (Ferketich et al., 2012) and 19.4% (Browning et al., 2016) indicating that more intensive nurse counseling engenders better tobacco treatment outcomes.

Despite this apparent dose–response relationship, we also found select studies with well-designed interventions in which brief nurse counseling was also highly effective. For example, in a RCT with a large sample size ($n = 1,070$), participants who received a single 10-minute nurse counseling session during hospitalization showed significantly higher quit rates than participants receiving usual care (Duffy et al., 2014). Given that we also found other examples of effective brief interventions among the studies, brief nurse counseling can also be an effective means to engender successful tobacco treatment when combined with other effective therapies.

Method of Delivering the Intervention

In these interventions, nurse counseling sessions were conducted face-to-face, over the telephone, or via a combination

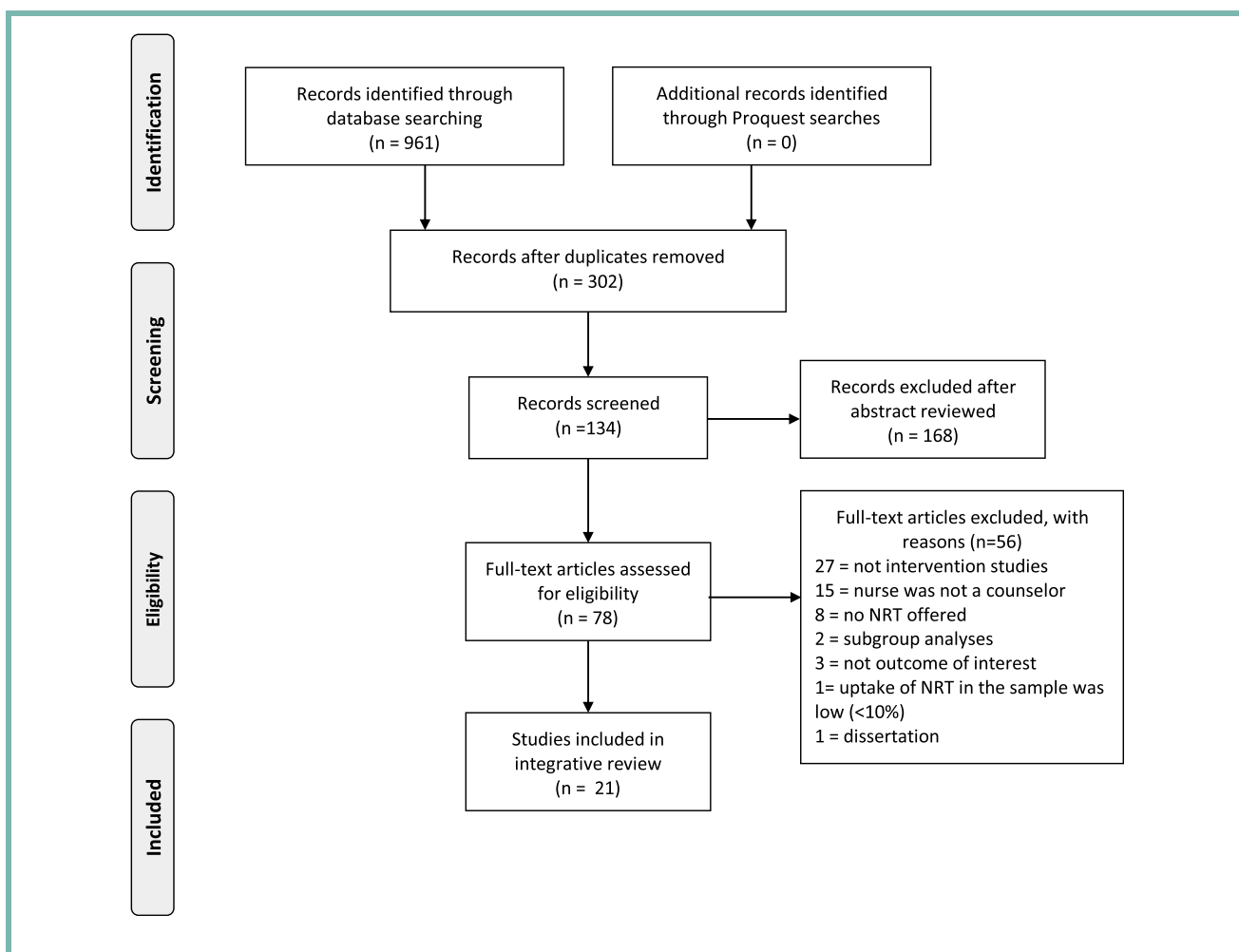


Figure 1. Flow of records during literature search and document review process.

TABLE 1 Characteristics of Studies						
Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Andrews et al. (2007) United States	Quasi-experimental; repeated measures vs. comparison group receiving written self-help materials and four group sessions conducted by a nurse.	103 community-dwelling, African American women living below the poverty line 100% female; mean age: 40.2 years	Outpatient: intervention conducted in a community of a low-income housing development in Georgia	"Sister to Sister"; culturally tailored, nurse-led behavioral/empowerment counseling in a group format, 1-hour sessions weekly × 6 weeks, booster counseling sessions at 12 and 24 weeks, free NRT transdermal patches offered for a maximum of 6 weeks, weekly face-to-face of telephone follow-up with a consistent, indigenous, and culturally similar CHW for 24 weeks.	Biochemically verified - 7-day PPA at 6, 12, and 24 weeks - CA at 26 weeks	Significant; 27.5% 6-month CA in the intervention group and 5.7% in the control group, intervention group 6 times more likely to quit ($OR = 6.18$), 7-day PPA at Weeks 6, 12, and 24 were 49%, 39.2%, and 39.2% for the intervention group and 7.6%, 15.3%, and 11.5% in the comparison group, respectively. Odds of quitting in the intervention group were significantly higher than the odds of quitting in the comparison group ($OR = 6.56$, $p = .001$).
Auer et al. (2016) Switzerland	Quasi-experimental; repeated measures with comparison group	458 smokers hospitalized for acute coronary syndrome 20% female; mean age: 55 years	Inpatient/outpatient: recruited from an academic hospital; continued postdischarge	Trained resident physicians delivered MIs to patients admitted for ACS, one brief face-to-face session before discharge and four telephone counseling sessions over 8 weeks by a nurse trained in MI, subsidized NRT, brochures on smoking cessation	Biochemically verified - 7-day PPA at 52 weeks	Nonsignificant trend; 12-month smoking abstinence, 43% during the observation phase and 51% in the intervention phase ($p = .08$). In the control sites, 47% quit smoking in the observation phase compared with 48% in the intervention phase.

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TABLE 1 Characteristics of Studies, Continued						
Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Aung et al. (2019) Thailand	RCT vs. usual care	319 heavy smokers with hypertension and/or diabetes 28.8% female; mean age: 64 years	Outpatient: recruited from primary care mobile clinics of the rural Mae Tha district hospital in the Lampang province	Evidence-based augmented package for smoking cessation (ESCAPE): monthly nurse counseling with the same nurse over 3 months, support from a family member trained by the nurse, diary, nicotine gum, and biofeedback using exhaled carbon monoxide level to enhance motivation	Biochemically verified - 6-month CA at 52 weeks	Significant; 6-month CA, 25.62% in the intervention group and 11.32% in the control group ($p < .001$; aOR = 2.95) 1 year after the intervention.
Berndt et al. (2017) Netherlands	Three-arm RCT, crossover at the unit level: telephone counseling vs. face-to-face counseling vs. usual care	380 smokers hospitalized for acute coronary syndrome 26.9% female; mean age: 55.3 years	Inpatient/outpatient: recruited from cardiac units; continued postdischarge	"Ask-Advise-Refer"; physician advice, 8 weeks of free nicotine patches, smoking cessation workbook, seven face-to-face MIs with nurse counselors conducted over 12 weeks.	Self-report - 7-day PPA at 26 weeks - CA at 12 weeks postintervention	Significant; attending more counseling sessions significantly increased CA ($p < .01$) and 7-day PPA ($p < .01$). Male gender, having quit smoking during hospital admission, and attending more counseling sessions predicted 6-month CA.
Browning et al. (2016) United States	Quasi-experimental; repeated measures with a single group	247 smokers with HIV/AIDS 15% female; mean age: 44.3 years	Outpatient: infectious diseases clinics	Treating tobacco use and dependence; weekly telephone CBT for 12 weeks with APRN, 12-week supply of varenicline or nicotine patches and gum.	Biochemically verified - 7-day PPA at 12 weeks and 52 weeks	Significant; 19.4% achieved 7-day PPA by 12 weeks and 10.2% by 52 weeks. Abstinence at 12 weeks associated with adherence to NRT/pharmacotherapy ($OR = 4.61$). Adherence to counseling associated with abstinence at 12 weeks ($OR = 7.58$) and 1 year ($OR = 5.91$).

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TABLE 1 Characteristics of Studies, Continued

Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Buchanan et al. (2004) United States	Pilot RCT vs. standard care (30 minutes with smoking cessation counselor, pamphlet, 6 weeks of NRT)	42 heavy smokers, motivated to quit Mean age: 46.31 years	Outpatient: ambulatory clinics in a large Midwestern healthcare system	Multicomponent treatment intervention; 2-hour face-to-face visit, 4 hours of behavioral therapy with APRN over the telephone, 6 weeks of NRT, support partner, written contract, withdrawal symptom diary, self-help booklet.	Self-report - CA at 6 and 12 weeks	Nonsignificant; no difference in smoking cessation between groups. The intervention group was significantly more likely to adhere to NRT ($p < .05$); significantly higher self-efficacy ($p < .04$).
Duffy et al. (2014) United States	Quasi-experimental; repeated measures vs. usual care at control site	1,070 veterans, heavy smokers, primarily White 6% female; mean age: 55.3 years	Inpatient/ outpatient: hospitalized at a Midwestern VA Medical Center; continued postdischarge	"Tobacco Tactics"; brief face-to-face intervention followed by nurse counseling telephone calls over 8 weeks, brochure, DVD, manual, free NRT, varenicline/bupropion offered, physician advice, quitline referral.	Biochemically verified - 7-day PPA at 26 weeks postintervention	Significant; improvement in 6-month cessation rates between intervention and control sites ($p = .02$). Nonsignificant trend increase in quit rates between preintervention and postintervention periods in the intervention sites.
Ferketich et al. (2012) United States	Pilot RCT: CT followed by smoking cessation counseling vs. cessation counseling followed by CT.	18 heavy smokers, getting chest CT scan for lung cancer screening 68% female; mean age: 58.1 years	Outpatient: recruited from a medical oncology clinic while getting screening for lung cancer	CT scan for lung cancer screening, appointment with a medical oncologist, advice to quit smoking, discussion of scan results, 12 weeks of varenicline or 8 weeks of nicotine patches and gum, 12 weekly nurse-delivered counseling sessions (one in-person and 11 over the phone), behavioral therapy based on USPHS Clinical Practice Guidelines.	Biochemically verified - 7-day PPA at 18 and 26 weeks	Nonsignificant; 27.8% had quit by 4 months, 16.7% remained abstinent at 6-months follow-up; 72.2% made at least one 24-hour quit attempt.

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TABLE 1 Characteristics of Studies, Continued						
Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Frandsen et al. (2012) Denmark	Pilot RCT: minimal smoking cessation intervention vs. intensive smoking cessation intervention	94 patients admitted with ischemic stroke or transient ischemic attack 41% female; mean age: 57 years	Inpatient/outpatient: Department of Neurology, Odense University Hospital	Minimal intervention: individual, face-to-face nurse counseling for 30 minutes, booklet, free nicotine patches. Intensive intervention: additional five sessions of nurse counseling over the telephone conducted over 16 weeks.	Biochemically verified - 1-day PPA at 26 weeks	Nonsignificant differences between groups, but high rates of smoking cessation observed in both groups. Smoking cessation achieved by 28.9% of the minimal intervention and 32.7% of the intensive intervention ($p = .69$, $OR = 1.19$).
Huang (2005) China	Quasi-experimental; repeated measures with a single group	10 healthy, heavy smokers 0% female; mean age: 51.7 years	Outpatient: recruited from the community in or near Tainan County	Two-hour-long nurse-delivered group CBT conducted monthly $\times 3$, free NRT, seven supportive telephone calls from CHWs, support partner, diary of smoking behaviors and triggers, quitting contract.	Biochemically verified - 1-day PPA at 12 and 48 weeks postintervention	Significant decrease in the number of cigarettes smoked over time ($p < .01$). Five participants (50%) abstinent from smoking at 9-month follow-up; three participants (30%) decreased cigarette consumption by 50%.
Jonsdottir et al. (2004) Iceland	Quasi-experimental; repeated measures with a single group	85 acutely ill smokers with COPD/asthma 62.8% female; mean age: 63.8 years	Inpatient/outpatient: recruited from the pulmonary unit of a university hospital, continued postdischarge	Individual nurse-delivered counseling sessions, four to six sessions lasting 10–15 minutes, nicotine patches plus gum, nasal spray or inhaler, optional weekly nurse-mediated support group for families, biweekly physician-taught smoking cessation class, relaxation techniques, five telephone follow-up calls over 1 year.	Self-report - 1-day PPA at 52 weeks - CA at 52 weeks	39% of participants reported CA at 1 year, and 52% reported PPA at 1 year.

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TABLE 1 Characteristics of Studies, Continued

Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Jonsdottir & Jonsdottir (2001) Iceland	Quasi-experimental; repeated measures: NRT plus nurse counseling vs. NRT, nurse counseling, and exercise	67 healthy smokers motivated to quit 61.8% female; mean age: 43.5 years	Outpatient: recruited from the community	Intervention 1: weekly group counseling for 1 month, individual telephone counseling every 3 months for 1 year, NRT in the form of patches as long as the participant required it Intervention 2: also participated in aerobic exercise and stretching for 80 minutes 3 × a week	Self-report - CA at 52 weeks	Nonsignificant between-group differences. At 1 year, CA was 39.4% in the exercise intervention group and 20.6% in the nonexercise group ($p = .16$, $OR = 2.5$). Participants in the exercise intervention made significantly more quit attempts.
Jorenby et al. (1995) United States	RCT, three arms; minimal vs. group vs. individual nurse-delivered counseling	504 healthy smokers motivated to quit 55% female; mean age: 44 years	Outpatient: recruited from the community	Minimal counseling: nicotine patches and self-help pamphlet. Individual counseling: additional ×8 weekly brief face-to-face meetings with a nurse, motivational message from a physician, diary of smoking behavior. Group counseling: additional weekly, 1-hour group with a smoking cessation counselor.	Biochemically verified - 7-day PPA at 4, 8, and 26 weeks	Significant; 63% of all participants were abstinent at 4 weeks, 54% at 8 weeks, and 28% at 26 weeks. Four-week cessation outcomes showed significant main effects for counseling ($p < .05$). Cessation in 56% of the minimal counseling group, 66% of the individual counseling group, and 68% for group counseling.
Lee et al. (2013) Canada	RCT vs. usual care	168 smokers preoperative for elective surgery 51%–58% female; mean age: 47.5 years	Outpatient: recruited from ambulatory and short-stay surgical facility	Five-minute nurse counseling session during preadmission assessment, brochures, quitline referral, and free 6-week supply of nicotine patches.	Biochemically verified - 7-day PPA on the day of surgery and 30 days postoperative	Significant; 52% of the participants contacted quitline. Thirty days postoperatively, 28.6% of the intervention group and 11% of the control group reported 7-day PPA ($p = .008$). 83% of the intervention group felt well-supported in quitting compared with 49% of the control group ($p < .0005$).

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TABLE 1 Characteristics of Studies, Continued						
Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Lindson-Hawley et al. (2016) England	RCT: abrupt vs. gradual smoking cessation	697 healthy, heavy smokers 49.8% female; mean age: 49 years	Outpatient: recruited from primary care clinics	Gradual cessation group: reduce smoking slowly over 2 weeks, nicotine patches plus short-acting NRT, nurse-delivered behavioral therapy in person weekly for 6 weeks. Abrupt cessation group: same intervention except quit abruptly and used NRT before quitting.	Biochemically verified - 7-day PPA at 4, 8, and 26 weeks	Both groups showed high quit rates. Seven-day PPA at 4 weeks was 39.2% in the gradual cessation group and 49% in the abrupt cessation group.
Reid et al. (2006) Canada	Quasi-experimental; single group, measurements at one time point	1,164 smokers with coronary artery disease, motivated to quit 22% female; mean age: 56 years	Inpatient-outpatient: interventions started in the hospital and continued postdischarge	All hospitalized smokers referred for brief nurse counseling based on the nursing best practice guidelines, nicotine patches, booklet, quitline referral, family counseling sessions over 4 weeks, and optional ongoing telephone follow-up with a nurse.	Self-report - 7-day PPA at 26 weeks - CA at 26 weeks	54% quit smoking by postoperative day 30; 90% of the participants elected to receive ongoing telephone support from a nurse counselor. Six months postoperatively, 44% reported 7-day PPA and 35% reported CA.
Reid et al. (1999) Canada	RCT vs. usual care (NRT, self-help booklet, brief physician advice)	396 heavy smokers with heart disease, motivated to quit 48% female; mean age: 37.5 years	Outpatient: recruited from a cardiac care ambulatory clinic	Physician advice during clinic visit, self-help booklet, nurse telephone counseling sessions 2, 6, and 13 weeks after target quit date, free 12-week supply of nicotine patches.	Biochemically verified - 7-day PPA 4, 12, 26, and 52 weeks after quit date	Nonsignificant; the overall all quit rates were 45.9% at 4 weeks, 36.1% at 12 weeks, 28.5% at 26 weeks, and 23.8% at 1 year. Participants who were abstinent at 12 weeks used more patches than those who were still smoking ($p < .01$).

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TABLE 1 Characteristics of Studies, Continued

Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA	Findings
Segan et al. (2015) Australia	Quasi-experimental; repeated measures with a single group	49 homeless heavy smokers, motivated to quit 37% female; mean age: 48 years	Outpatient: recruited from a primary care clinic targeted to the needs of homeless individuals	Comanagement model: free appointment with physician and nurse for CBT, 12 weekly face-to-face nurse-delivered counseling sessions, proactive calls from smoking cessation counselors for 3 months, brochure, free short-acting forms of NRT, or 12-week supply of subsidized pharmacotherapy.	Self-report - 1-day PPA at 12 and 26 weeks	Nonsignificant; only 6% of the participants were abstinent from smoking 3 months postintervention. Mean consumption of cigarettes was significantly reduced within subjects after the intervention ($p = .001$).
Tonnesen & Mikkelsen (2000) Denmark	RCT, four arms: minimal behavioral support plus four different doses and forms of NRT	446 healthy, heavy smokers motivated to quit 46% female; mean age: 48–50 years	Outpatient: recruited from pulmonary clinics	Five brief (15-minute) nurse-delivered face-to-face counseling sessions conducted over 9 months, free NRT recommended for up to 3 months, physician advice, resource booklet.	Biochemically verified - 7-day PPA at 52 weeks - CA at 52 weeks	Very high attrition and relapse rates made analysis in this study challenging. High motivation, male gender, older age, lower baseline cigarette consumption, lower nicotine dependency, and use of NRT were significant predictors of abstinence.
Zwar et al. (2011) Australia	Quasi-experimental; repeated measures with a single group	498 highly nicotine-dependent, heavy smokers, motivated to quit 61.2% female; mean age: 46.4 years	Outpatient: recruited from general practices in rural areas near Sydney	Weekly face-to-face nurse counseling sessions (30 minutes), 8-week supply of free nicotine patches, optional bupropion, physician advice, quitline referral.	Biochemically verified - 7-day PPA at 4 and 26 weeks - CA at 4 and 26 weeks	Significant; 25.9% of the sample achieved 4-week CA; 15.9% achieved 26-week CA. 99% of the sample elected to use NRT or bupropion. Attending four or more nurse counseling sessions significantly increased 6-month CA ($p < .0001$).

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TABLE 1 Characteristics of Studies, Continued					
Study	Design	Sample Description	Setting	Intervention	Outcome: PPA/CA
Zwar et al. (2015) Australia	RCT; three-arm cluster (randomized at practice level): nurse counseling intervention vs. quitline referral vs. usual care	2,390 healthy smokers, motivated to quit 52.8%–54.8% female; mean age: 41.2 years	Outpatient: general practices in Sydney and Melbourne	“Quit with Practice Nurse Intervention”: 5As approach to smoking cessation counseling, × 4 weekly face-to-face visits with a nurse or telephone support, “Quit Kit” resource workbook, physician advice, quitline referral, 8-week supply of nicotine patches, bupropion/varenicline offered.	Self-report - 7-day PPA at 12 and 52 weeks - CA at 12 and 52 weeks
Findings					
Nonsignificant; 12-month CA was higher in the intervention group, but the difference was not statistically significant. Intervention uptake was low across all groups. 16.9% of the intervention group completed three or more follow-up visits with a nurse. Attending more nurse counseling sessions significantly increased CA and PPA ($p < .001$).					

Note. PPA = point prevalence abstinence; CA = continuous abstinence; RCT = randomized controlled trial; OR = odds ratio; aOR = adjusted odds ratio; NRT = nicotine replacement therapy; CHW = community health worker; MI = motivational interview; CBT = cognitive behavioral therapy; ACS = acute coronary syndrome; COPD = chronic obstructive pulmonary disease; CT = computed tomography; APRN = advanced practice nurse; USPHS = United States Public Health Service.

of both methods. We found that face-to-face nurse counseling sessions were more effective than telephone counseling alone. For example, a large sample ($n = 627$) of primary care patients achieved cessation rates as high as 49% after meeting with nurses for eight weekly face-to-face visits throughout their quit attempts (Lindson-Hawley et al., 2016). In addition, some researchers found that adding telephone follow-up to a face-to-face intervention did not improve tobacco treatment outcomes. In two studies, participants in the intervention groups received brief advice plus telephone follow-up sessions with nurses, whereas the control group only participated in brief face-to-face nurse counseling (Jorenby et al., 1995; Reid et al., 1999). In both studies, the researchers determined that quit rates did not differ significantly between the control and intervention groups. As a whole, the findings indicate that in-person interactions were superior to telephone interactions for the delivery of nurse counseling.

Despite these findings, it is important to note that telephone counseling played important roles when in-person counseling was untenable. For example, Browning and colleagues (2016) found that 10.2% of participants with HIV/AIDS who received telephone nurse counseling plus NRT were abstaining from smoking 1 year after the intervention. Likewise, Reid and colleagues (1999) found that nearly 24% of participants in the intervention group showed smoking abstinence 1 year after receiving only nurse counseling over the telephone. In short, the findings from this integrative review indicate that telephone counseling is not as effective as face-to-face counseling, but it still is somewhat effective (10.2%–24% vs. 49%).

Whereas most of the counseling sessions were conducted with individual patients, four of the research teams used group settings to deliver interventions. Participants who received nurse-led group counseling showed positive tobacco treatment outcomes (Andrews et al., 2007; Huang, 2005; Jonsdottir & Jonsdottir, 2001; Jonsdottir et al., 2004). For example, in the study by Jonsdottir and Jonsdottir (2001), as many as 39.4% of participants receiving nurse counseling in a group setting reported continuous abstinence 1 year after the intervention. Thus, the findings from this integrative review indicate that group counseling interventions as well as interventions delivered to individuals can potentially improve tobacco treatment outcomes.

Rapport/Social Support

We also found that rapport between the participants and nurses delivering the counseling improved tobacco treatment outcomes. For example, Browning and colleagues (2016) found that participants' ratings of their rapport with the nurse conducting their counseling were significantly associated with adherence to the tobacco treatment program and with taking prescribed NRT or pharmacotherapy. Rapport scores were also positively associated with achieving biochemically verified 7-day point prevalence abstinence at 3 months (odds ratio [OR] = 8.16) and 12 months (OR = 4.33). Likewise, Andrews and colleagues (2007) found that participants in the intervention group reported significantly higher social support

Author(s), Year	Sequence Generation	Allocation Concealment	Blinding of Participants	Blinding of Interventionists	Blinding of Outcome Assessors	Incomplete Outcome Data	Other Source of Bias	Attrition Rate
Andrews et al. (2007)	+	+	+	–	?	+	–	0.13
Auer et al. (2016)	–	–	+	–	?	+	–	0.06
Aung et al. (2019)	+	+	+	–	?	+	–	0.06
Berndt et al. (2017)	+	+	+	–	+	+	+	0.02
Browning et al. (2016)	–	–	–	–	–	–	–	0.43
Buchanan et al. (2004)	+	+	+	–	+	–	–	0.43
Duffy et al. (2014)	–	–	+	–	?	+	–	0.39
Ferketich et al. (2012)	+	+	+	–	?	–	+	0.00
Frandsen et al. (2012)	+	–	–	–	?	+	+	0.09
Huang (2005)	–	–	–	–	–	–	–	0.30
Jonsdottir et al. (2004)	–	–	–	–	–	–	–	0.40
Jonsdottir & Jonsdottir (2001)	–	–	–	–	–	–	–	0.70
Jorenby et al. (1995)	+	+	+	+	?	?	–	0.16
Lee et al. (2013)	+	+	+	+	+	+	+	0.07
Lindson-Hawley et al. (2016)	+	+	–	–	–	+	+	?
Reid et al. (2006)	–	–	–	–	–	–	–	?
Reid et al. (1999)	+	–	–	–	–	+	–	0.15
Segan et al. (2015)	–	–	–	–	–	–	–	0.45
Tonnesen & Mikkelsen (2000)	+	+	+	–	–	–	+	0.89
Zwar et al. (2011)	–	–	–	–	–	+	–	0.24
Zwar et al. (2015)	+	+	+	–	–	+	–	0.18

Note. Minus sign (–) indicates “high risk of bias,” plus sign (+) indicates “low risk of bias,” and question mark (?) indicates “unclear risk of bias.”

scores than those in the comparison group. They also found that social support provided by nurses predicted 6-month continuous abstinence in this group of participants. Taken together, these findings indicate that the social support from nurses was integral to the success of these specific interventions.

Setting

Most interventions were conducted in outpatient settings. However, some began while patients were hospitalized for acute illness and continued after discharge. We found that the location did not make a difference in the success of the tobacco treatment interventions. Some interventions conducted solely in outpatient settings showed favorable tobacco treatment outcomes (Andrews et al., 2007; Aung et al., 2019; Jorenby et al., 1995; Zwar et al., 2011), whereas others did not (Tonnesen & Mikkelsen, 2000). Likewise, some of the interventions that started in the inpatient setting conferred beneficial tobacco treatment outcomes (Berndt et al., 2017; Frandsen et al., 2012; Reid et al., 2006), whereas others did not (Auer et al., 2016; Buchanan et al., 2004). Thus, factors other than the setting are salient to tobacco treatment outcomes.

Patient

While synthesizing this body of literature, we noticed that measured motivation, nicotine dependence, and health status of the participants influenced the interventions. Samples of participants that reported high levels of motivation to quit showed high rates of successful tobacco treatment in both the intervention and control groups (Frandsen et al., 2012; Jorenby et al., 1995; Reid et al., 1999; Zwar et al., 2015). For example, Frandsen and colleagues (2012) found that quit rates were 28.9% in their minimal intervention group and 32.7% in their intense intervention group. As comparable rates of quitting occurred in both the intervention and control groups, it appears that those who are highly motivated to quit can benefit from even minimal interventions.

Health status also influenced tobacco treatment in this sample of studies. Researchers who recruited healthy volunteers from outpatient settings (Buchanan et al., 2004; Jonsdottir & Jonsdottir, 2001; Reid et al., 1999; Segan et al., 2015; Zwar et al., 2015) did not show changes in smoking abstinence, whereas researchers who recruited participants with chronic health conditions (Auer et al., 2016; Aung et al., 2019; Berndt et al., 2017; Ferketich et al., 2012; Lee et al., 2013) tended to show better tobacco treatment outcomes. Moreover, researchers showed that higher nicotine dependency (as measured by the Fagerström Nicotine Dependency Scale) negatively predicted smoking abstinence among their participants (Berndt et al., 2017). Thus, individual patient characteristics moderate the effects of tobacco treatment interventions.

NRT/Pharmacotherapy

Most of the studies ($n = 17$) included in this integrative review incorporated the use of NRT for 6–8 weeks. However, in studies with 12 weeks of NRT (Browning et al., 2016; Reid et al., 1999; Zwar et al., 2011) or longer (Jonsdottir et al., 2004),

researchers reported high rates of successful tobacco treatment in the groups receiving NRT (25.9%–39.4%). Zwar and colleagues (2011) reported that those participants who used NRT for more than 8 weeks showed significantly higher rates of quitting than those who used NRT for less than 8 weeks. Overall, longer courses of NRT along with nurse counseling showed the strongest evidence for tobacco treatment success.

The findings from this integrative review also suggest that covering the cost improves uptake of NRT and pharmacotherapy, thereby improving tobacco treatment outcomes (Andrews et al., 2007; Auer et al., 2016; Lee et al., 2013; Reid et al., 1999; Zwar et al., 2011). Participants who were offered NRT for free elected to use it more than people who were offered NRT at a cost. Zwar et al. (2011) found that 99% ($n = 498$) of their large sample used either free NRT or subsidized bupropion to quit smoking. Overall quit rates in this sample were high, with 25.9% and 15.9% abstinent at 4 and 6 months, respectively, indicating that tobacco treatment outcomes improve when the cost of treatment is not a barrier.

Some of the researchers also tailored the dose of NRT according to participants' degree of nicotine dependency and smoking history. For example, in the study by Jonsdottir and Jonsdottir (2001), those who smoked heavily and those who were highly nicotine dependent received 4 months of NRT, whereas people who smoked less received 1 month of NRT. They found that 39% of their sample maintained continuous abstinence 1 year after the intervention, which is one of the highest rates of quitting reported in this group of studies. Although based on findings from only a few studies, we found that tailoring the dose of NRT to the individual needs of the patient engenders smoking abstinence.

Adjunct Components

Although all of the interventions included a combination of nurse counseling and NRT, most of the interventions also included components beyond these two treatment modalities. Additional elements included physician advice to quit smoking, smoking quitline referrals, exercise, brochures, resource workbooks, relaxation techniques, keeping a diary of withdrawal symptoms, social support partners, and community health workers (CHWs). In general, the most effective adjunct therapies were those that served to increase social support throughout the tobacco treatment process.

Specifically, interventions in which researchers used a designated family support partner showed beneficial tobacco treatment outcomes (Aung et al., 2019; Huang, 2005; Jonsdottir et al., 2004; Reid et al., 2006). For example, Aung and colleagues (2019) asked participants to identify a formal support partner. A feature that was unique to this one intervention was that the support partners also received formal training from the nurse counselors on how to best support their loved ones through the process of tobacco treatment. Moreover, support partners were given their own diary to document the successes and relapses of the family member they were assisting. By training the family support partners and formalizing their role in the tobacco treatment process, these researchers designed an effective

intervention: participants who received the intervention were nearly 3 times more likely to quit smoking than those in the usual care condition.

Similarly, participants who received frequent follow-up with CHWs showed favorable tobacco treatment outcomes (Andrews et al., 2007; Huang, 2005). Andrews and colleagues (2007) designed an intervention in which participants received 24 weekly telephone calls with a consistent CHW to enhance social support throughout the quitting process. This group of researchers found that 27.5% of the intervention group maintained 6-month continuous abstinence compared with only 5.7% of the control group ($OR = 6.18$). They attributed much of their intervention success to the long-term social support provided by the CHWs.

DISCUSSION

Smoking abstinence is a challenging behavior change to accomplish; it is often accompanied by relapses, nicotine withdrawal symptoms, psychological withdrawal, and relapses, all which present significant burdens (Fiore, 2000). Researchers indicate that there is not a single tobacco treatment modality that is far superior to another but that the success of the intervention depends on the use of multiple modalities (Kottke et al., 1988). However, lengthy, multicomponent interventions may not be feasible or cost effective. As nurses are well poised to deliver behavioral counseling within the healthcare system and NRT is a highly effective tobacco treatment aid, combining these two interventions could be effective while still conserving costs and resources.

By synthesizing the findings across intervention studies combining NRT and nurse counseling, we found several noteworthy patterns. Most importantly, NRT was integral to the success of interventions. NRT was offered to participants in all of the studies included in this review, but authors reported various degrees of uptake in their samples. We found that, in samples with high uptake of NRT, the participants had better tobacco treatment outcomes than those in which researchers reported low uptake of NRT. This is not surprising given that ample research confirms that NRT enhances tobacco treatment outcomes. In a meta-analysis conducted by Moore and colleagues (2009), the researchers found that NRT was twice as effective as placebo to help those described as unmotivated to quit achieve sustained smoking abstinence for 6 months. Similarly, in a large meta-analysis of 133 studies, researchers found that NRT increased the rate of quitting by 50%–60% (Hartmann-Boyce et al., 2018). The preponderance of evidence supports the effectiveness of NRT, thus, it should always be offered to those attempting to quit smoking.

In this review, we additionally found that offering NRT for free or at a subsidized price incentivized its use; participants in these interventions elected to use NRT and tended to use it for longer periods. This is consistent with findings from other researchers. Alberg and colleagues. (2004) found that adding free nicotine patches increased enrollment in a tobacco treatment program by 37% and significantly increased short-term quit rates. In addition, a review of 17 studies indicated that

financial incentives increased the proportion of people who smoke who made a quit attempt and successfully quit smoking (van den Brand et al., 2017). Moreover, insurance coverage of tobacco treatments is cost effective and increases rates of successful quitting (Fiore et al., 2008). In short, evidence suggests that NRT should be offered to patients at a low or no cost to maximize its uptake and, therefore, effectiveness.

In addition, we found that those who smoke heavily and are highly nicotine dependent are likely to be more successful in quitting if they receive longer courses of NRT. Careful tailoring of the length of NRT treatment according to the patients' individual needs, such as pack-year history or measured nicotine dependency, may yield better tobacco treatment outcomes. Yet, in this integrative review, most of the tobacco treatment interventions only incorporated 6–8 weeks of NRT. Moreover, we found very few studies in the extant literature in which researchers tailored dose of NRT to the individual's needs based on their nicotine dependency. As little is known about the effectiveness of tailoring NRT treatments, future research is needed to determine if giving lengthier treatments to those with higher nicotine dependency enhances tobacco treatment outcomes.

Unfortunately, NRT is contraindicated for patients with arrhythmias, heart disease, and history of stroke and also for pregnant women (Hasford et al., 2003). Moreover, NRT can cause side effects including itching or rash at the site of the patch, sweating, insomnia, tachycardia, pounding heart, headaches, and gastrointestinal symptoms. In one study of 484 people using nicotine patches, 36.2% of the sample reported adverse side effects and 21% discontinued use because of these side effects (Hasford et al., 2003). For patients who find the side effects onerous and for those who cannot take NRT, other pharmacotherapy is a viable alternative. In five of the studies included in this review, varenicline or bupropion was offered to participants in lieu of NRT. Just as other researchers have found pharmacotherapy to be an effective tobacco treatment aid (Aubin et al., 2008; Jorenby et al., 1999; Taylor et al., 2017), we also found that nurse counseling combined with varenicline or bupropion had a positive impact on tobacco treatment outcomes. The effectiveness of pharmacotherapy is well established; some researchers found that it is superior to NRT alone for helping people who smoke achieve sustained abstinence (Aubin et al., 2008; Jorenby et al., 1999; Taylor et al., 2017). However, more research is needed to determine the effectiveness of combining nurse counseling with pharmacotherapy as there are few studies addressing these types of interventions.

Overall, the findings of this review indicate that NRT or other pharmacotherapy must be an integral part of tobacco treatment interventions. Not all people who smoke require NRT to successfully quit, but ample evidence supports its beneficial effects on tobacco treatment outcomes. Therefore, if tobacco treatment interventions are to be optimally designed, NRT should be offered, for as long as the people who smoke require it, and if possible, at a little or no cost.

Although NRT is key for ameliorating nicotine withdrawal symptoms, established tobacco treatment guidelines recommend that NRT be given in conjunction with counseling to

help patients achieve the behavioral changes implicit in maintaining long-term abstinence from smoking (Fiore, 2000). In this review, we found that behavioral counseling and support from nurses added substantively to the success of well-designed tobacco treatment interventions. In addition to smoking abstinence (Rice et al., 2017), behavioral counseling delivered by nurses is effective for modifying a multitude of health behaviors. Nurse-delivered interventions have been found to increase physical activity (Richards & Cai, 2016), reduce excessive alcohol consumption (Joseph et al., 2014), promote medication adherence (Van Camp et al., 2013), and modify health behaviors to prevent coronary heart disease (Chiang et al., 2018). Thus, research on various conditions indicates that nurses are an effective resource for delivering interventions targeting specific behavior modification.

Nurses fulfill a host of demands in an increasingly burdened healthcare system. With chronic diseases on the rise and increasing numbers of patients receiving outpatient-based care, nurse-led services provide a viable solution to decrease waiting times, allocate resources judiciously, and contain costs while promoting patient safety and satisfaction. Many nurse-led services have shown equivalent and sometimes better health-related quality-of-life outcomes when compared with physician-led care (Chan et al., 2018). Nurses maintain close contact with patients throughout their continuum of care and have training that aids in delivering behavioral counseling to patients. They serve as liaisons between members of the healthcare team and patients. Moreover, clients find nurses to be trustworthy (Olshansky, 2011). In many ways, nurses are the ideal healthcare providers to deliver tobacco treatment interventions.

Nurses are prime candidates to nurture the therapeutic relationships that enhance tobacco treatment outcomes. As such, in many of the studies included in this review, researchers reported that the social support provided by the nurse counselors was central to the success of the tobacco treatment interventions. Additional research findings underscore the salience of the nurse–patient relationship to the success of tobacco treatment interventions. For example, Sharp and Tishelman (2005) conducted qualitative analyses of diaries kept by patients with head and neck cancer who were receiving tobacco treatment counseling from oncology nurses while undergoing radiation therapy. Participants reported that the bond they had with the nurses conducting their counseling provided them with the encouragement they needed to make a quit attempt.

Although nurses are often well poised to deliver tobacco treatment interventions, the assets that make them effective counselors are not exclusive to the nursing profession. Effective tobacco treatment counseling can also be implemented by trained CHWs. In this review, we found that tobacco treatment interventions incorporating follow-up with CHWs were highly successful. CHWs checked in with patients frequently and increased social support for members of their own communities who were attempting to quit smoking (Andrews et al., 2007; Huang, 2005). In addition, other researchers showed that behavioral counseling delivered solely by CHWs was effective in helping members of an Ohio Appalachia

community achieve long-term smoking abstinence (Wewers et al., 2017). Given their ability to provide culturally competent care to members of their own communities, CHWs are likely to be highly effective at supporting patients throughout tobacco treatment. Future research is needed to further investigate the role of CHWs in tobacco treatment interventions and how they can be optimally utilized within their communities.

Social support can also be provided by peers who smoke. As such, we found that group therapy had positive effects on tobacco treatment outcomes. Other substance treatment programs, such as Alcoholics Anonymous and Narcotics Anonymous, capitalize on the social support of others in various stages of rehabilitation. These relationships provide accountability key to engendering long-term abstinence from substances (Groh et al., 2008; Kaskutas et al., 2002). Moreover, group therapy is cost effective and allows for the delivery of interventions to more potential quitters than individual counseling. Social support from peers who smoke is likely to be highly effective, as it has been found to be effective for other substance abuse programs. However, very few of the studies included in this review incorporated nurse-led group therapy sessions; thus, future research is needed to determine their effectiveness when combined with other tobacco treatment modalities.

Asides from nurses and CHWs, family members or friends can provide essential social support during quit attempts. The findings from this review indicate that identifying a formal support partner is effective for achieving smoking abstinence. Moreover, providing formal training for support partners was particularly effective. Whereas some of the available research indicates that patients are likely to achieve long-term smoking abstinence when they have enhanced familial social support (Hanson et al., 1990), there are many studies in the extant literature in which support from family members has negative effects on smoking cessation outcomes (Faseru et al., 2018; May & West, 2000; Park, Schultz, et al., 2004; Park, Tudiver, et al., 2004). As interventions that enhance familial social support for other types of substance users are effective (Fernandez et al., 2006; Litt et al., 2007), this discrepancy could be explained by the fact that social support from family members may not be positive but rather manifested as nagging and berating, which may have a negative impact on tobacco treatment outcomes. It is likely that training family members to be effective support partners would decrease negative social support from family members and give them the tools to provide effective support throughout the tobacco treatment process. This is the only study we have found in which the researchers trained the support partners and formalized their role in the tobacco treatment of their family members. Thus, future researchers need to investigate the effectiveness of this potentially beneficial adjunct tobacco treatment modality.

Although we reviewed studies in which the social support was primarily provided by nurse behavioral counselors, social support from people other than nurses is also an effective tool. As discussed, nurses remain great candidates for the provision

of social support throughout the continuum of tobacco treatment, but it is unlikely that the nurse is the essential component. Rather, social support and therapeutic relationships from any source are the key to the success of these interventions. Fellow peers who smoke, CHWs, friends, or well-trained family members are readily available resources for increasing social support to those attempting to quit smoking.

Social support and NRT are the central components of these interventions. However, we did find several other noteworthy patterns that are more auxiliary but still influential to the success of interventions. First, our findings indicate that, generally, nurse counseling provided face-to-face resulted in better outcomes than those sessions that were provided over the phone. Qualitative interviews with a subset of participants in one of the included studies indicated that they preferred the personal nature of the face-to-face interaction with nurses over the impersonal, anonymous relationship with the smoking quitline counselors (Zwar et al., 2011). Likely, the aforementioned nurse–patient therapeutic relationship is easier to develop during face-to-face interactions.

However, telephone counseling can also be effective in well-designed interventions and provides a more tenable delivery method, especially when counseling hard-to-reach patient populations. In a large meta-analysis of studies investigating telephone counseling tobacco treatment interventions, researchers concluded that telephone counseling had a beneficial effect on tobacco treatment outcomes (Stead, Hartmann-Boyce, et al., 2013). So although we found that face-to-face counseling is likely to be more effective, if telephone counseling is more practical and patients are unlikely to appear in-person for counseling, telephone counseling can also provide an effective means to reach patients.

The intensity of smoking cessation counseling also appears to play a small role in tobacco treatment outcomes. Lengthier interventions provide more time for the development of therapeutic relationships and more opportunities to intervene with patients throughout the continuum of tobacco treatment. However, intensive behavioral support is not associated with improved tobacco treatment outcomes (Stead & Lancaster, 2012). Likewise, within this reviewed group of studies, some of the researchers showed high rates of cessation in both the control and intervention groups (Frandsen et al., 2012; Jorenby et al., 1995; Reid et al., 1999; Zwar et al., 2015), indicating that even simple interventions can be effective if patients are motivated to quit and concurrently taking NRT for withdrawal support. This is consistent with current tobacco treatment guidelines, which suggest that people who are unmotivated to quit should receive brief motivational messages with the goal of moving them into the preparation stage of change where they are more ready to quit. More lengthy interventions should be reserved for those who are motivated to quit and, thus, stand more to gain from intensive intervention (Fiore, 2000). Although brief interventions are ideal given their cost effectiveness and patient convenience, it is also important that the counseling is optimally dosed to enhance participant adherence to behavioral changes and provide the necessary social support to enhance tobacco treatment outcomes. Therefore, future researchers should

investigate the role of tailoring the counseling dose according to patients' motivation to quit.

The strength of this integrative review is that it provides a synthesis regarding multicomponent tobacco treatment interventions that incorporate nurse counseling and NRT. To our knowledge, this type of review has not been completed. The findings provide useful guidance regarding designing and implementing effective tobacco treatment interventions that incorporate various components.

Limitations of this review include the fact that some of the intervention studies were quasi-experiments that lacked comparison groups. This made it challenging to determine the effectiveness of these specific interventions. In addition, the interventions investigated were diverse, making comparison across studies challenging. For example, some researchers measured smoking abstinence as little as 1 month to as long as 1 year after interventions were completed, making the outcomes of interest somewhat difficult to compare with one another. Moreover, in some of the intervention studies, control groups received little to no tobacco treatment advice, whereas those in other studies received treatments that significantly overlapped with the intervention group, again complicating the process of synthesizing the literature.

In summary, although there are some high-quality RCTs in this group of literature, there remain many gaps in our knowledge about multicomponent tobacco treatment interventions. Nurse counseling and NRT are effective methods to help people quit smoking, but the dose, optimum time frame, and whether interventions should be administered to groups, individuals, over the telephone, or face-to-face require further rigorous studies. Moreover, future researchers need to determine the role of social support in tobacco treatment as well as test interventions that optimize social support to those attempting to quit smoking. There is more to learn about the need to tailor interventions for specific populations such as patients with a cancer diagnosis or cardiovascular disease. In addition, few of the researchers report the cost effectiveness of the interventions. Future researchers should assess the cost-effectiveness of multicomponent interventions as this information is essential to their implementation. It is also important to determine the efficacy of tailoring NRT treatment courses and the doses of nurse counseling according to the patients' levels of nicotine dependency as well as their motivation to quit. Finally, many effective tobacco treatment interventions are developed, studied, and then never implemented. Researchers need to not only investigate effective tobacco treatment interventions but also determine how best to implement and disseminate the interventions to healthcare providers and the public.

CONCLUSION

Despite the abundance of resources that have been allocated to the study of tobacco treatment, many people continue to smoke indicating that there remain important advances to be made in this field. This review of multicomponent tobacco treatment interventions incorporating nurse counseling and NRT revealed lingering gaps in knowledge and areas that

require further investigation. Researchers need to conduct high-quality RCTs testing the effectiveness of tobacco treatment interventions and disseminate those interventions that positively impact smoking abstinence outcomes while remaining cost effective. To summarize, nurse counseling augmented by additional effective tobacco treatment therapies leads to beneficial outcomes in smoking abstinence. Therefore, future researchers should capitalize on this apparent synergistic relationship between multiple tobacco treatment components as they have the potential to greatly benefit people who smoke in their attempts to quit.

Acknowledgments: I would like to acknowledge the Jonas Foundation, the Marion Bender Scholarship Fund, and the Oncology Nursing Society for their generous scholarships that helped fund my education.

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