Perceived Difficulty Quitting Predicts Enrollment in a Smoking-Cessation Program for Patients With Head and Neck Cancer

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Purpose/Objectives: To determine the predictors of participation in a smoking-cessation program among patients with head and neck cancer.

Design: This cross-sectional study is a substudy of a larger, randomized trial of patients with head and neck cancer that determined the predictors of smokers' participation in a cessation intervention.

Setting: Otolaryngology clinics at three Veterans Affairs medical centers (Ann Arbor, MI, Gainesville, FL, and Dallas, TX), and the University of Michigan Hospital in Ann Arbor.

Sample: 286 patients who had smoked within six months of the screening survey were eligible for a smoking-cessation intervention.

Methods: Descriptive statistics and bivariate and multivariate logistic regression were used to determine the independent predictors of smokers' participation in an intervention study.

Main Research Variables: Perceived difficulty quitting (as a construct of self-efficacy), health behaviors (i.e., smoking and problem drinking), clinical characteristics (i.e., depression and cancer site and stage), and demographic variables.

Findings: Forty-eight percent of those eligible participated. High perceived difficulty quitting was the only statistically significant predictor of participation, whereas problem drinking, lower depressive symptoms, and laryngeal cancer site approached significance.

Conclusions: Special outreach may be needed to reach patients with head and neck cancer who are overly confident in quitting, problem drinkers, and patients with laryngeal cancer.

Implications for Nursing: Oncology nurses are in an opportune position to assess patients' perceived difficulty quitting smoking and motivate them to enroll in cessation programs, ultimately improving quality of life, reducing risk of recurrence, and increasing survival for this population.

Smoking is the major causative agent of head and neck cancer (Freedman, Abnet, Leitzmann, Hollenbeck, & Schatzkin, 2007). Smoking after a diagnosis of head and neck cancer can severely decrease quality of life, increase recurrence, and decrease survival (Dikshit et al., 2005; Duffy et al., 2007). Yet 35%–46% of patients with head and neck cancer continue to smoke after diagnosis of cancer (Duffy et al., 2007), compared to approximately 21% of the general population (Centers for Disease Control and Prevention, 2007).

The Health Promotion Model (HPM) (Srof & Velsor-Friedrich, 2006) has been used as a framework for predicting health-promoting lifestyles in a variety of populations, including patients with cancer (Frank-Stromborg, Pender, Walker, & Sechrist, 1990; Lusk, Ronis, Kerr, & Atwood, 1994). The HPM identifies key cognitive and perceptual variables which influence behavior change. A central component of the HPM that predicts behavior change, including smoking cessation, is self-efficacy (Friend & Pagano, 2007; Gritz et al., 1991). If a patient perceives that smoking cessation is a difficult task, his or her self-efficacy for that task would be low. Continuous smokers and those who decline cessation programs have been found to have a decreased level of risk perception associated with smoking along with lower motivation and self-efficacy for smoking cessation (Schnoll et al., 2003, 2004).

An association exists between level of nicotine dependence and smoking cessation, with less heavily dependent smokers being more successful in quitting (Pinto, Abrams, Monti, & Jacobus, 1987) and less likely to participate in cessation programs (Audrain-McGovern, Halbert, Rodriguez, Epstein, & Tercyak, 2007). Many smokers with head and neck cancer also regularly consume alcohol. Smoking increases during alcohol consumption, and heavy drinkers are less likely to attempt to quit and less likely to be successful when they do (Marks, Hill, Pomerleau, Mudd, & Blow, 1997; Piasecki, McCarthy, Fiore, & Baker, 2008).

People with depression are much more likely to use tobacco than nondepressed people (Epstein, Induni, & Wilson, 2009). Decreases in depression are associated with increases in smoking-cessation rates (Friend &

Pagano, 2007). For some, a diagnosis of head and neck cancer may result in a "teachable moment," a time when patients may be more likely to comply with smoking-cessation advice (Gritz et al., 2006). For others, a life-threatening disease may make quitting smoking a low priority because they believe that a cancer diagnosis means it is too late to quit (Sharp & Tishelman, 2005). Patients are more likely to continue smoking if they have an earlier stage of disease or have tumors in the oral cavity (Ostroff et al., 1995; Vander Ark, DiNardo, & Oliver, 1997), whereas patients with cancer of the larynx resulting in a total laryngectomy are more likely to quit smoking (Vander Ark et al., 1997). Patients with head and neck cancer often are perceived as difficult to reach and unlikely to adhere to behavior changes such as quitting smoking (Gritz et al., 1991).

Older patients tend to be heavier smokers than young adults and, therefore, have more difficulty with smoking cessation (Messer, Trinidad, Al-Delaimy, & Pierce, 2008). Women are less likely to quit than men (Husten et al., 1997). Caucasians are more likely to participate in smoking-cessation programs (Audrain-McGovern et al., 2007; Husten et al., 1997), but African Americans have a greater sense of self-efficacy for quitting and more interest in cessation services than Caucasians (Daza et al., 2006; Duffy et al., 2002). Educational level is inversely related to smoking; those with a high school education or greater are more likely to participate in smoking cessation (Husten et al., 1997).

The authors' prior work in a randomized, controlled trial showed that patients with head and neck cancer can quit if offered cessation services (Duffy et al., 2006); however, many eligible smokers who consented to be screened did not participate in the study. Identification of the characteristics of nonparticipants may assist healthcare providers in developing outreach strategies to capture patients with head and neck cancer for future smoking-cessation interventions. Hence, the purpose of this study was to determine the predictors of participation in a smoking-cessation program among patients with head and neck cancer.

Methods

Design

This cross-sectional study was a substudy of a larger, multisite, randomized, controlled trial that recruited patients with head and neck cancer into a combined smoking, alcohol, and depression intervention from 2000–2002 (Duffy et al., 2006). The substudy used existing data to determine the predictors of smokers' participation in the smoking-cessation intervention study. Patients with head and neck cancer (at any time after diagnosis) were approached in the waiting room while attending regularly scheduled otolaryngology clinic appointments and asked to participate in the research study. All subjects gave informed consent to complete a screening survey to determine eligibility for the intervention. Those who screened positive for one or more of smoking, problem drinking, or depressive symptoms were asked to participate in the combined intervention. All participants received a nursing assessment and brief counseling. Those in the enhanced usual-care arm received a handout for local resources, whereas those in the intervention arm received a cognitive behavioral therapy workbook, nurse-administered telephone counseling, and pharmacologic management as needed. The dependent variable for the analysis was the smoker's participation (yes or no) in the intervention. The major independent variables of interest included perceived difficulty in quitting (as a construct of self-efficacy), health behaviors (i.e., smoking and problem drinking), clinical characteristics (i.e., depression and cancer site and stage), and demographic variables. Institutional review board approval was obtained from all participating sites prior to the study.

Sample

Respondents of the larger study (N = 973) were patients with head and neck cancer screened at four sites: Ann Arbor, MI (n = 148), Gainesville, FL (n = 85), and Dallas, TX (n = 128) Veterans Affairs medical centers, as well as the University of Michigan Hospital in Ann Arbor (n = 612). Because relapse rates are high in the first six months after quitting smoking (Gritz et al., 1993), inclusion criteria were those who screened positive for smoking in the past six months (N = 286). Exclusion criteria were patients who, from the time of diagnosis and any time thereafter, were pregnant, were younger than 18 years, did not speak English, had terminal metastatic disease, or had severe unstable psychiatric or mental conditions such as suicidal ideation, acute psychosis, or dementia as evaluated by face-to-face contact during explanation of informed consent.

Measures

The dependent variable was participation in the smoking intervention (yes or no). Smokers were scored as participants if they agreed to participate. Refusal included active and passive (no response) refusal.

Self-efficacy: Although this research study was not designed to test the HPM in its entirety, perceived difficulty in quitting as a construct of self-efficacy was measured by the question, "How difficult do you think it would be to quit smoking?" (Frank-Stromborg et al., 1990). The question was rated on a five-point scale ranging from not at all difficult to extremely difficult.

Smoking: All participants had smoked in the past six months and were classified as currently smoking, quit in the past month, or quit in the past six months.

Cigarettes per day were measured by the number of packs smoked per day as identified by less than half a pack per day, half to 1 pack per day, 1 to 1.5 packs per day, or greater than 1.5 packs per day. The previously validated Fagerstrom Test for Nicotine Dependence (FTND) (Fagerstrom, Heatherton, & Kozlowski, 1990) was used to measure nicotine dependence. The FTND has a test-retest reliability of 0.85 and an internal consistency of 0.7 (Etter, Duc, & Perneger, 1999). Scores ranged from 0–10, with 0 being a nonsmoker and 10 being a heavy smoker. FTND scores are classified as 1–2 (very low), 3–4 (low), 5 (medium), 6–7 (high), and 8–10 (very high).

Problem drinking: The Alcohol Use Disorder Identification Test (AUDIT) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was used to measure problem drinking. The AUDIT has a test-retest reliability of 0.86 and has been shown to have good sensitivity and specificity to detect problem drinkers (sensitivity averaging about 0.9 and specificity averaging about 0.8) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). A score of 8 or higher on the AUDIT identifies problem drinkers.

Depressive symptoms: The Geriatric Depression Scale–Short Form (GDS-SF) was used as part of the survey to measure depressive symptoms; a score of 4 or more on the GDS-SF identifies depressive symptoms (National Center for Cost Containment, Department of Veterans Affairs, 1996). The GDS-SF has an internal consistency of 0.6 and a test-retest reliability of 0.46 (Lewinsohn, Seeley, Roberts, & Allen, 1997).

Clinical and demographic characteristics: A post-survey chart review was conducted to determine tumor site and stage. Tumor sites included larynx, oropharynx or hypopharynx, and oral cavity or other. For the multivariate analysis, tumor sites were dichotomized into two groups: larynx versus all others, as patients with tumors of the larynx have been shown to have higher quit rates (Chan et al., 2004). Tumor stage was measured with the American Joint Committee on Cancer (1997) staging classification system and grouped into stage 0, I, or II versus stage III or IV. Researchers recorded whether radiation, chemotherapy, and/or any head and neck surgery had been received as of the time of the survey. Because participants were surveyed at different times (ranging from before treatment to several years after), time since diagnosis was used in the analyses to control for treatment effects on participation in the intervention. Standard demographic variables were age, gender, race (white or nonwhite), education (high school or less versus some college or more), miles traveled one way to the clinic, and hospital site (University of Michigan Hospital or a Veterans Affairs hospital).

Data Analysis

Data were double-entered into a Microsoft® Access database and analyzed with SAS software. Because all of the respondents did not answer all of the questions, the sample size varied for different results. For all tests, a two-sided p value of less than 0.05 was considered statistically significant.

Descriptive statistics (means and frequencies) were analyzed for all variables. Bivariate associations were conducted between participation in the intervention (yes or no) and the independent variables (perceived difficulty quitting, health behavior, and clinical and demographic variables). Chi-square tests were used for categorical variables, and t tests were used for continuous independent variables. Multivariate logistic regression was used to determine the independent predictors of smokers' participation in the intervention study. Using calculations developed by Harrell, Lee, and Mark (1996), the researchers chose 11 predictor variables to be included in the logistic regression model, which was appropriate for the sample size (113 refusals and 119 participants).

Results

Of the 286 patients eligible to participate, only 136 (48%) agreed to do so. More than half of the smokers believed that quitting would be very to extremely difficult. More than 60% were currently smoking, and the rest had quit in the past month to six months. More than half were smoking a pack a day or less. The mean score on the FTND was in the medium range, with about half of the participants screening positive for nicotine dependence. About one-third screened positive for problem drinking, and more than half screened positive for depressive symptoms. There were similar numbers of larynx, oropharynx/hypopharynx, and oral cavity/other patients, and most presented with stage III or IV disease.

Bivariate analyses were conducted between participation in the intervention (yes or no) and the independent variables (perceived difficulty quitting, health behaviors, and clinical and demographic variables) (see Table 1). Significant associations were found between participation in the smoking-cessation intervention and high perceived difficulty in quitting, miles traveled to the clinic, and veteran hospital site ($p < 0.05$). Participation and greater depressive symptoms approached significance ($p < 0.07$). No significant association was found between participation status and FTND score, alcohol problem, time since diagnosis, tumor site, tumor stage, age, or educational level.

A multivariate logistic regression was conducted to determine the independent predictors of participation in a smoking-cessation program. Because the FTND score takes into consideration current smoking and number of cigarettes per day, it was chosen to represent smoking in the multivariate analyses. Because gender and hospital site were highly collinear (most veterans are men) only hospital site was left in the multivariate analysis.

Table 1. Bivariate Associations Between Independent Variables and Participation in the Intervention

Variable	Agreed (N = 136[a]) $\bar{X}$	Agreed (N = 136[a]) SD	Refused (N = 150[a]) $\bar{X}$	Refused (N = 150[a]) SD	p
Age (years)	57	9.7	58.4	10.3	0.254
Miles traveled to clinic	83	62	103	84	0.023
Fagerstrom Test for Nicotine Dependence score[b]	4.6	2.4	4.5	2.4	0.795
Variable	**n**	**%**	**n**	**%**	**p**
Gender					0.12
Male (n = 249)	114	84	135	90	
Female (n = 37)	22	16	15	10	
Race					0.917
White (n = 257)	122	90	135	90	
Nonwhite (n = 28)	13	10	15	10	
Education					0.191
High school or less (n = 165)	73	54	92	61	
Some college or more (n = 121)	63	46	58	39	
Hospital site					0.021
Veterans Affairs hospital (n = 131)	72	53	59	39	
University hospital (n = 155)	64	47	91	61	
Tumor site					0.227
Larynx (n = 105)	45	33	60	40	
All others (n = 179)	90	67	89	60	
Tumor stage					
III or IV (n = 170)	77	59	93	64	0.401
0, I, or II (n = 107)	54	41	53	36	
Treatment received at time of survey					
Radiation					0.096
Yes (n = 160)	83	61	77	52	
No (n = 124)	52	39	72	48	
Chemotherapy					0.313
Yes (n = 52)	28	21	24	16	
No (n = 232)	107	79	125	84	
Any head and neck surgery					0.783
Yes (n = 128)	62	46	66	44	
No (n =156)	73	54	83	56	
Time since diagnosis					0.104
One year or less (n =178)	78	58	100	67	
More than one year (n = 106)	57	42	49	33	
Significant depressive symptoms[c]					0.066
Yes (n = 160)	85	63	75	52	
No (n = 119)	50	37	69	48	
Alcohol problem[d]					0.386
Yes (n = 83)	37	27	46	32	
No (n = 197)	99	73	98	68	
Smoking status					0.191
Currently smoking (n = 176)	89	65	87	58	
Quit within past one month (n= 53)	26	19	27	18	
Quit within past six months (n = 57)	21	15	36	24	
Cigarettes per day					0.108
10 or fewer (n = 71)	32	25	39	30	
11–20 (n = 81)	39	30	42	32	
21–30 (n = 69)	42	33	27	20	
More than 30 (n = 39)	15	12	24	18	
How difficult do you think it would be to quit smoking?					0.005
Very or extremely difficult (n = 185)	100	76	85	60	
Not at all or moderately difficult (n = 87)	31	24	56	40	

[a] N varies slightly for individual questions because of missing data.

[b] Ranges from 0 (nonsmoker) to 10 (heavy smoker)

[c] Geriatric Depression Scale–Short Form score of 4 or more

[d] Alcohol Use Disorder Identification Test score of 8 or more and drank in past six months

Note. Because of rounding, not all percentages total 100.

Similarly, because race and hospital site were collinear, (most nonwhites were from the Veterans Affairs hospitals), race was omitted from the multivariate analysis. All other variables were included in the multivariate analysis, including perceived difficulty quitting, FTND score, alcohol problem, depressive symptoms, time since diagnosis, cancer site and stage, age, miles traveled to the clinic, hospital site, and educational level.

The odds of participating were three times greater for those who perceived quitting to be difficult compared to those who perceived quitting to be less difficult ($p < 0.05$). Alcohol problem, depressive symptoms, and cancer site approached significance ($p < 0.08$). The odds of participating were 40% less for those with an alcohol problem compared to those who did not have an alcohol problem. The odds of participating were 1.8 times greater for those with depressive symptoms compared to those without depressive symptoms. The odds of participating were 40% less for those with cancer of the larynx compared to other cancer sites (oral and oropharyngeal). FTND score, time since diagnosis, cancer stage, age, miles traveled to clinic, hospital site, and educational status did not predict participation in the smoking intervention (see Table 2).

Discussion

Controlling for a large number of covariates, perceived difficulty quitting was the strongest predictor of participation in a smoking-cessation program. Self-efficacy (a central construct of the HPM) is the judgment of one's personal capability to organize and execute a particular course of action (Bandura, 1986). Those who perceived quitting as difficult (low self-efficacy) recognized their need for assistance and were the most likely to participate in cessation services. Conversely, those who perceived quitting as less difficult (high self-efficacy) were less likely to participate, perhaps because they were more confident they could succeed on their own.

Prior research looking at the impact of high self-efficacy on actually quitting smoking has had conflicting results. Gritz et al. (1991) found that high self-efficacy, defined as confidence in not smoking, was positively associated with smoking cessation. However, Stuart, Borland, and McMurray (1994) found that high self-efficacy was associated with a decreased likelihood of quitting. The latter findings and the results of this study suggest that high self-efficacy may interfere with smokers reaching out and getting the assistance needed to quit.

The HPM can be used to guide practice by assessing a smoker's self-efficacy or perceived difficulty quitting and then tailoring an invitation to participate in a program accordingly. Those who feel they will have difficulty quitting may be easier to target. Those who feel confident in their own ability to quit may need additional information about the benefits of a program, such as additional support, improved quit rates, and the real difficulties associated with successful quitting.

Table 2. Multivariate Logistic Regression Odds Ratios for Agreeing to Participate in the Intervention

Variable	Odds Ratio	95% Confidence Interval	p
Difficult to quit[a]	2.98	1.58–5.62	< 0.001
Fagerstrom Test for Nicotine Dependence score	0.96	0.85–1.08	0.484
Alcohol problem[b]	0.59	0.32–1.08	0.087
Significant depressive symptoms[c]	1.78	0.99–3.2	0.055
More than one year since diagnosis (versus less than one year)	1.33	0.73–2.42	0.36
Larynx tumor site (versus all others)	0.59	0.32–1.09	0.091
Stage III or IV (versus 0, I, or II)	0.7	0.38–1.31	0.265
Age (in decades)	0.89	0.66–1.21	0.471
Miles traveled (10 miles)	0.97	0.93–1.01	0.108
Veterans Affairs hospital site (versus university)	1.52	0.83–2.76	0.173
High school or less	0.73	0.41–1.31	0.294

N = 232 (113 refused and 119 participated.)

[a] Very or extremely difficult versus not at all, somewhat, or moderately difficult

[b] Alcohol Use Disorder Identification Test score of 8 or higher and drank in past six months

[c] Geriatric Depression Scale–Short Form score of 4 or higher

Almost one-third screened positive for problem drinking compared to 8.5% in the general population (Grant et al., 2004), and problem drinking marginally predicted poor participation. Drinking has been shown to increase mortality among patients with head and neck cancer, possibly because of associated poor health habits such as cigarette smoking, poor diet, and emotional problems, all of which can exacerbate cancer as well as other comorbidities (Deleyiannis, Thomas, Vaughan, & Davis, 1996). Therefore, concurrently treating alcohol use may be important in patients with head and neck cancer to enhance quitting rates and success.

About half screened positive for depression compared to about 20% in the general population, and depression marginally predicted participation. One reason that patients with depression were more likely to participate is that, in the larger study, a depression intervention was offered concurrently with the smoking intervention. Nonetheless, the results indicate that smokers with depressive symptoms are likely to participate in smoking interventions. Because smoking and depression are highly comorbid and depressed smokers often have a harder time quitting, treating co-occurring depression may enhance cessation rates (Duffy et al., 2006).

The association between having cancer of the larynx and nonparticipation approached significance. Patients with cancer of the larynx and those with laryngectomies have been shown to be more likely to quit (Chan et al., 2004; Vander Ark et al., 1997) perhaps because of their surgery. Consequently, patients with laryngeal cancer may be more successful with independent smoking cessation and, therefore, find less value in a smoking-cessation program.

Equally as interesting were the predictors that were not significant in participation in a cessation program. Although severity of disease has been shown to be inversely associated with continued smoking (Ostroff et al., 1995), cancer stage did not predict participation in this smoking-cessation program. Those with head and neck cancer have been shown to be less likely to participate in cessation programs than patients with lung cancer (Schnoll et al., 2004). Patients with cancer may not be motivated to quit because of denial about the relationship between smoking and their disease, or they may feel it is too late to make any changes in their behavior (Wakefield, Olver, Whitford, & Rosenfeld, 2004). Patients who are diagnosed with cancer and continue to smoke typically are highly addicted to nicotine and may need more aggressive smoking-cessation treatment plans (Gritz et al., 1993; McBride & Ostroff, 2003).

Although significant in the bivariate analysis, mean miles traveled to the clinic and hospital site were not significant in the multivariate analysis, nor did age predict participation. Higher educational level has been shown to be associated with quitting smoking (Ostroff et al., 1995) and participation in smoking-cessation programs (Tucker, Ellickson, Orlando, & Klein, 2005), but educational level did not predict participation in the smoking-cessation intervention. The intervention was conducted face-to-face during clinic appointments with a large telephone follow-up component. Telephone counseling has been shown to be efficacious for smoking cessation (Sherman et al., 2008) and can reach those who might otherwise not attend, including those who are older, live far away, are of lower educational status, or are of lower socioeconomic status, such as those treated by the Department of Veterans Affairs medical centers.

Limitations

Although this study was able to evaluate participation in a smoking-cessation intervention, specifically among patients with head and neck cancer, while controlling for a large number of health behavior, clinical, and demographic characteristics, the study had several limitations. Perceived difficulty quitting is a construct of self-efficacy; however, a complete self-efficacy measure was not available in this data set. Although time since diagnosis was a control variable, patients were recruited at different points in their treatments, which may have affected their desire or self-efficacy regarding quitting smoking. Depressive symptoms and alcohol use were measured by a validated screener but were not confirmed by a medical evaluation, which may have resulted in an overestimation of the number of patients with problems drinking and depressive symptoms. Despite the researchers' efforts to recruit from three Veterans Affairs hospitals with a large number of minorities, the sample was predominantly white. Although the sample included 286 patients with approximately equal numbers of participants and nonparticipants, some of the covariates may have reached significance had the sample size been larger.

Nursing Implications

Clinic-based cessation interventions have the potential to reach a large number of smokers compared to outpatient programs, which reach only 15%–22% of smokers (Roth, Andrus, & Westman, 2005). Nurses often are the ideal providers of cessation services because they are educated in health behavior and education, have ready access to patients, have rapport with patients and physicians, and can facilitate the initiation of cessation medications (Duffy, Reeves, Hermann, Karvonen, & Smith, 2008; Sharp & Tishelman, 2005). In fact, a meta-analysis by Rice and Stead (2008) showed that nurse-administered interventions are more efficacious than non-nursing interventions. Unfortunately, cessation interventions often are not offered in busy oncology and otolaryngology clinics. One of the greatest barriers to the implementation of nurse-based interventions is lack of confidence and training (Lancaster, Silagy, & Fowler,

2000) because smoking cessation rarely is offered as part of nursing education. Therefore, training nurses in smoking-cessation interventions can increase their confidence and delivery of such services. Once trained, oncology nurses can assess patients' perceived difficulty in quitting smoking and tailor cessation advice to motivate them to enroll in cessation programs. Nursing interventions that assist smokers in overcoming their perceived difficulty in quitting may improve participation rates. Participation in smoking-cessation programs ultimately can improve quality of life, decrease risk of recurrence, and improve survival for this population.

In conclusion, perceived difficulty in quitting is a significant predictor of participation in a smoking-cessation program for patients with head and neck cancer. Although the association only approached significance, problem drinkers, those with less depressive symptoms, and those with laryngeal cancer were less likely to participate. Oncology nurses are in an opportune position to engage these high-risk groups in smoking-cessation interventions.

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References

American Joint Committee on Cancer. (1997). *AJCC cancer staging manual* (5th ed.). Philadelphia, PA: Lippincott-Raven.

Audrain-McGovern, J., Halbert, C.H., Rodriguez, D., Epstein, L.H., & Tercyak, K.P. (2007). Predictors of participation in a smoking cessation program among young adult smokers. *Cancer Epidemiology, Biomarkers and Prevention, 16,* 617–619. doi: 10.1158/1055-9965.EPI-06-0791

Babor, T.F., Higgins-Biddle, J.C., Saunders, J.B., & Monteiro, M.G. (2001). *AUDIT The alcohol use disorders identification test: Guidelines for use in primary care* (2nd ed.). Geneva, Switzerland: World Health Organization.

Bandura, A. (Ed.). (1986). *Social foundations of thought and action: A social-cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Centers for Disease Control and Prevention. (2007). Cigarette smoking among adults—United States, 2006. *Morbidity and Mortality Weekly Report, 56,* 1157–1161.

Chan, Y., Irish, J.C., Wood, S.J., Sommer, D.D., Brown, D.H., Gullane, P.J., . . . Lockwood, G.A. (2004). Smoking cessation in patients diagnosed with head and neck cancer. *Journal of Otolaryngology, 33*(2), 75–81.

Daza, P., Cofta-Woerpel, L., Mazas, C., Fouladi, R.T., Cinciripini, P.M., Gritz, E.R., & Wetter, D.W. (2006). Racial and ethnic differences in predictors of smoking cessation. *Substance Use and Misuse, 41,* 317–339. doi: 10.1080/10826080500410884

Deleyiannis, F.W., Thomas, D.B., Vaughan, T.L., & Davis, S. (1996). Alcoholism: Independent predictor of survival in patients with head and neck cancer. *Journal of the National Cancer Institute, 88,* 542–549. Retrieved from http://jnci.oxfordjournals.org/cgi/reprint/88/8/542

Dikshit, R.P., Boffetta, P., Bouchardy, C., Merletti, F., Crosignani, P., Cuchi, T., . . . Brennan, P. (2005). Lifestyle habits as prognostic factors in survival of laryngeal and hypopharyngeal cancer: A multicentric European study. *International Journal of Cancer, 117,* 992–995. doi: 10.1002/ijc.21244

Duffy, S.A., Reeves, P., Hermann, C., Karvonen, C., & Smith, P. (2008). In-hospital smoking cessation programs: What do VA patients and staff want and need? *Applied Nursing Research, 21,* 199–206. doi: 10.1016/j.apnr.2006.11.002

Duffy, S.A., Ronis, D.L., Valenstein, M., Fowler, K.E., Lambert, M.T., Bishop, C., & Terrell, J.E. (2007). Depressive symptoms, smoking, drinking, and quality of life among head and neck cancer patients. *Psychosomatics, 48,* 142–148. doi: 10.1176/appi.psy.48.2.142

Duffy, S.A., Ronis, D.L., Valenstein, M., Lambert, M.T., Fowler, K.E., Gregory, L., . . . Terrell, J.E. (2006). A tailored smoking, alcohol, and depression intervention for head and neck cancer patients. *Cancer Epidemiology, Biomarkers and Prevention, 15,* 2203–2208. Retrieved from http://cebp.aacrjournals.org/content/15/11/2203.long

Duffy, S.A., Terrell, J.E., Valenstein, M., Ronis, D.L., Copeland, L.A., & Connors, M. (2002). Effect of smoking, alcohol, and depression on the quality of life of head and neck cancer patients. *General Hospital Psychiatry, 24*(3), 140–147.

Epstein, J.F., Induni, M., & Wilson, T. (2009). Patterns of clinically significant symptoms of depression among heavy users of alcohol and cigarettes. *Preventing Chronic Disease, 6*(1), A09.

Etter, J.F., Duc, T.V., & Perneger, T.V. (1999). Validity of the Fagerstrom Test for Nicotine Dependence and of the Heaviness of Smoking Index among relatively light smokers. *Addiction, 94,* 269–281. doi: 10.1046/j.1360-0443.1999.94226910.x

Fagerstrom, K.O., Heatherton, T.F., & Kozlowski, L.T. (1990). Nicotine addiction and its assessment. *Ear, Nose, and Throat Journal, 69,* 763–765.

Frank-Stromborg, M., Pender, N.J., Walker, S.N., & Sechrist, K.R. (1990). Determinants of health-promoting lifestyle in ambulatory cancer patients. *Social Science and Medicine, 31,* 1159–1168.

Freedman, N.D., Abnet, C.C., Leitzmann, M.F., Hollenbeck, A.R., & Schatzkin, A. (2007). Prospective investigation of the cigarette smoking-head and neck cancer association by sex. *Cancer, 110,* 1593–1601. doi: 10.1002/cncr.22957

Friend, K.B., & Pagano, M.E. (2007). Timevarying predictors of smoking cessation among individuals in treatment for alcohol abuse and dependence: Findings from Project MATCH. *Alcohol and Alcoholism, 42,* 234–240. doi: 10.1093/alcalc/agm026

Grant, B.F., Stinson, F.S., Dawson, D.A., Chou, S.P., Ruan, W.J., & Pickering, R.P. (2004). Co-occurrence of 12-month alcohol and drug use disorders and personality disorders in the United States: Results from the National Epidemiologic Survey on Alcohol and Related

Conditions. *Archives of General Psychiatry, 61,* 361–368. Retrieved from http://archpsyc.ama-assn.org/cgi/content/full/61/4/361

Gritz, E.R., Carr, C.R., Rapkin, D., Abemayor, E., Chang, L.J., Wong, W.K., . . . Chonkich, G. (1993). Predictors of long-term smoking cessation in head and neck cancer patients. *Cancer Epidemiology, Biomarkers and Prevention, 2,* 261–270. Retrieved from http://cebp.aacrjournals.org/content/2/3/261.long

Gritz, E.R., Carr, C.R., Rapkin, D.A., Chang, C., Beumer, J., & Ward, P.H. (1991). A smoking cessation intervention for head and neck cancer patients: Trial design, patient accrual, and characteristics. *Cancer Epidemiology, Biomarkers and Prevention, 1,* 67–73. Retrieved from http://cebp.aacrjournals.org/content/2/3/261.long

Gritz, E.R., Fingeret, M.C., Vidrine, D.J., Lazev, A.B., Mehta, N.V., & Reece, G.P. (2006). Successes and failures of the teachable moment: Smoking cessation in cancer patients. *Cancer, 106,* 17–27. doi: 10.1002/cncr.21598

Harrell, F.E., Jr., Lee, K.L., & Mark, D.B. (1996). Multivariable prognostic models: Issues in developing models, evaluating assumptions and adequacy, and measuring and reducing errors. *Statistics in Medicine, 15,* 361–387. doi: 10.1002/(SICI)1097-0258(19960229)15:4<361::AID-SIM168>3.0.CO;2-4

Husten, C.G., Shelton, D.M., Chrismon, J.H., Lin, Y.C., Mowery, P., & Powell, F.A. (1997). Cigarette smoking and smoking cessation among older adults: United States, 1965–94. *Tobacco Control, 6,* 175–180.

Lancaster, T., Silagy, C., & Fowler, G. (2000). Training health professionals in smoking cessation. *Cochrane Database of Systematic Reviews, 3,* CD000214.

Lewinsohn, P.M., Seeley, J.R., Roberts, R.E., & Allen, N.B. (1997). Center for Epidemiologic Studies Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology and Aging, 12,* 277–287. doi: 10.1037//0882-7974.12.2.277

Lusk, S.L., Ronis, D.L., Kerr, M.J., & Atwood, J.R. (1994). Test of the Health Promotion Model as a causal model of workers' use of hearing protection. *Nursing Research, 43,* 151–157.

Marks, J.L., Hill, E.M., Pomerleau, C.S., Mudd, S.A., & Blow, F.C. (1997). Nicotine dependence and withdrawal in alcoholic and nonalcoholic ever-smokers. *Journal of Substance Abuse Treatment, 14,* 521–527.

McBride, C.M., & Ostroff, J.S. (2003). Teachable moments for promoting smoking cessation: The context of cancer care and survivorship. *Cancer Control, 10,* 325–333. Retrieved from http://www.moffitt.org/CCJRoot/v10n4/pdf/325.pdf

Messer, K., Trinidad, D.R., Al-Delaimy, W.K., & Pierce, J.P. (2008). Smoking cessation rates in the United States: A comparison of young adult and older smokers. *American Journal of Public Health, 98,* 317–322. doi: 10.2105/AJPH.2007.112060

National Center for Cost Containment, Department of Veterans Affairs. (1996). *Geropsychology assessment resource guide*. Milwaukee, WI: Author.

Ostroff, J.S., Jacobsen, P.B., Moadel, A.B., Spiro, R.H., Shah, J.P., Strong, E.W., . . . Schantz, S.P. (1995). Prevalence and predictors of continued tobacco use after treatment of patients with head and neck cancer. *Cancer, 75,* 569–576.

Piasecki, T.M., McCarthy, D.E., Fiore, M.C., & Baker, T.B. (2008). Alcohol consumption, smoking urge, and the reinforcing effects of cigarettes: An ecological study. *Psychology of Addictive Behaviors, 22,* 230–239. doi: 10.1037/0893-164X.22.2.230

Pinto, R.P., Abrams, D.B., Monti, P.M., & Jacobus, S.I. (1987). Nicotine dependence and likelihood of quitting smoking. *Addictive Behaviors, 12,* 371–374.

Rice, V.H., & Stead, L.F. (2008). Nursing interventions for smoking cessation. *Cochrane Database of Systematic Reviews, 1,* CD001188.

Roth, M.T., Andrus, M.R., & Westman, E.C. (2005). Outcomes from an outpatient smoking-cessation clinic. *Pharmacotherapy, 25,* 279–288. doi: 10.1592/phco.25.2.279.56957

Saunders, J.B., Aasland, O.G., Babor, T.F., de la Fuente, J.R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons With Harmful Alcohol Consumption—II. *Addiction, 88,* 791–804. doi: 10.1111/j.1360-0443.1993.tb02093.x

Schnoll, R.A., James, C., Malstrom, M., Rothman, R.L., Wang, H., Babb, J., . . . Goldberg, M. (2003). Longitudinal predictors of continued tobacco use among patients diagnosed with cancer. *Annals of Behavioral Medicine, 25,* 214–222.

Schnoll, R.A., Rothman, R.L., Lerman, C., Miller, S.M., Newman, H., Movsas, B., . . . Cheng, J. (2004). Comparing cancer patients who enroll in a smoking cessation program at a comprehensive cancer center with those who decline enrollment. *Head and Neck, 26,* 278–286. doi: 10.1002/hed.10368

Sharp, L., & Tishelman, C. (2005). Smoking cessation for patients with head and neck cancer: A qualitative study of patients' and nurses' experiences in a nurse-led intervention. *Cancer Nursing, 28,* 226–235.

Sherman, S.E., Takahashi, N., Kalra, P., Gifford, E., Finney, J.W., Canfield, J., . . . Kuschner, W. (2008). Care coordination to increase referrals to smoking cessation telephone counseling: A demonstration project. *American Journal of Managed Care, 14,* 141–148. Retrieved from http://www.ajmc.com/issue/managed-care/2008/2008-03-vol14-n3/Mar08-2944p141-148

Srof, B.J., & Velsor-Friedrich, B. (2006). Health promotion in adolescents: A review of Pender's health promotion model. *Nursing Science Quarterly, 19,* 366–373. doi: 10.1177/0894318406292831

Stuart, K., Borland, R., & McMurray, N. (1994). Self-efficacy, health locus of control, and smoking cessation. *Addictive Behaviors, 19,* 1–12.

Tucker, J.S., Ellickson, P.L., Orlando, M., & Klein, D.J. (2005). Predictors of attempted quitting and cessation among young adult smokers. *Preventive Medicine, 41,* 554–561. doi: 10.1016/j.ypmed.2004.12.002

Vander Ark, W., DiNardo, L.J., & Oliver, D.S. (1997). Factors affecting smoking cessation in patients with head and neck cancer. *Laryngoscope, 107,* 888–892.

Wakefield, M., Olver, I., Whitford, H., & Rosenfeld, E. (2004). Motivational interviewing as a smoking cessation intervention for patients with cancer: Randomized controlled trial. *Nursing Research, 53,* 396–405.