Article

Smoking Cessation in a Woman With Breast Cancer, Cardiovascular Problems, and Depressive Symptomatology: Case Study

Carmela Martínez-Vispo[1] and Elisardo Becoña[1]

Abstract

Smoking is the leading preventable cause of morbidity and mortality and has been linked with diseases such as cancer and cardiovascular diseases. The case of a 50-year-old woman with breast cancer, who suffered a stroke the previous month and is in treatment for depression and wants to quit smoking, is analyzed. She smoked 10 cigarettes a day and had never quit smoking. She received six sessions of a cognitive-behavioral psychological intervention to quit smoking. She stopped smoking and remained abstinent through the 1-year follow-up, showing a clear physical improvement and a significant reduction of depressive symptomatology (from 24 on the Beck Depression Inventory–II [BDI-II] before treatment to 1 at the 12-month follow-up). This indicates that, in many cases, smoking cessation produces an improvement not only in physical health but also in mood.

Keywords

smoking cessation, cancer, stroke, depression

Introduction

According to the report of the Surgeon General of 2014, there is sufficient evidence to establish a causal relation between smoking and different physical illnesses, constituting one of the most important avoidable health problems in developed countries (U.S. Department of Health and Human Services [USDHHS], 2014). In fact, almost 6 million people die from tobacco consumption each year worldwide, a figure that is estimated will reach 7.5 million in 2020 (World Health Organization [WHO], 2015). Thus, 30% of deaths from cancer are attributed directly to tobacco consumption, especially cancer of the oral and pharyngeal cavity, cancer of the larynx, the trachea, the bronchus, and lung, esophageal, gastric, pancreatic, bladder, kidney, and cervical cancers. Moreover, smoking has been related to oncological patients' poorer quality of life, to a worse prognosis of the disease, and to greater risk of relapse. It is also reported that smoking cessation reduces the toxicity of many of the pharmacological treatments used in this type pathologies (USDHHS, 2014). In addition, tobacco is one of the main risk factors that affect the onset and prognosis of cardiovascular diseases, and it is considered responsible for at least 30% of the deaths due to aneurysms, cardiac arrest, arteriosclerosis, ischemic heart disease (angina pectoris and myocardial infarction) and acute coronary syndrome, hypertension, and cerebrovascular disease (Messner & Bernhard, 2014).

Furthermore, 8% to 24% prevalence rates of depression have been found in patients with cancer (Krebber et al., 2014), and cancer patients' mood has been related to different symptoms (Fischer, Villines, Kim, Epstein, & Wilkie, 2010) such as exhaustion, fatigue, sleeping difficulties, anxiety, pain, and a decreased perception of quality of life, as well as to important changes in daily activities and routines (Kokkonen et al., 2016). It has been observed that such depressive symptomatology can interfere with patient's capacity to cope with the burden of cancer itself, and it can decrease compliance with the cancer treatment and increase the risk of suicide (Dauchy, Dolbeault, & Reich, 2013).

Likewise, it was found that the presence of depressive symptomatology is common in patients with cardiovascular disease, which also is related to higher mortality and morbidity rates and with the perception of poorer quality of life (Hare, Toukhsati, Johansson, & Jaarsma, 2014).

Although the diagnosis of cancer (McBride & Ostroff, 2003) and the occurrence of a coronary event (Tofler et al.,

[1]University of Santiago de Compostela, Spain

Corresponding Author:
Carmela Martínez-Vispo, Unidad de Tabaquismo & Trastornos Adictivos, Departamento de Psicología Clínica & Psicobiología, Facultad de Psicología, Universidade de Santiago de Compostela, Campus Vida, 15782 Santiago de Compostela, A Coruña, Spain.
Email: carmela.martinez@usc.es

2015) are both considered "teachable moments" to smoking cessation because they often spontaneously lead to quitting smoking, the persistence of smoking behavior is a serious and frequent clinical problem (Underwood et al., 2012). Moreover, smoking adversely affects the treatment efficacy for comorbid conditions, and smoking invariably continues to promote a host of other adverse health conditions (Rojewski et al., 2016).

Therefore, the specific health risks associated with smoking, cancer and cardiovascular disorders, and the probability of the presence of depressive symptomatology in these patients, are sufficiently important reasons to provide an evidence-based psychological intervention to quit smoking.

Below, we present the analysis of the case of a woman in treatment for breast cancer, who had suffered a stroke the previous month, and who also suffers from major depression, and requests help to quit smoking.

Method

Case Presentation

O.L. requested help to quit smoking in the Smoking Cessation and Addictive Disorders Unit of the University of Santiago de Compostela (Spain). At the assessment meeting, we explained the assessment and intervention protocol, and she signed the informed consent.

She is a 50-year-old woman, married, with three children, with a basic educational level. She is a home keeper, and she lives with her mother, her husband, and their three sons, one of whom also smokes. At the time of the assessment, she was in treatment for breast cancer (chemotherapy) and she had suffered a stroke 1 month previously.

With regard to tobacco consumption, at the time when O.L. requested help, she smoked an average of 10 cigarettes per day of 0.9 mg of nicotine ("Ducados Rubio" [a Spanish brand of cigarettes]). She pointed out that she smoked more in the earliest hours of the morning, stabilizing during the afternoon and evening, and then going up slightly again at night. When assessing distinct psychological functions of cigarettes, she reports as a coping strategy to manage stress and negative affect and in social settings. In the past year, the maximum number of cigarettes she smoked on a single day was 22, indicating the cause of this high consumption as "boredom."

She smoked her first cigarette at the age of 16 and began smoking on a regular basis at 20, so she had been smoking for 30 years. She inhales when smoking, she gives quite a few puffs to each cigarette, and she smokes the whole cigarette up to the filter. Due to her health condition, she had reduced her consumption of cigarettes during the last year, dropping from 20 to 10 cigarettes per day.

She had never managed to quit smoking even for 24 hr, in spite of the fact that she suffered from various physical problems directly related to tobacco consumption (fatigue, shortness of breath, bad circulation, headaches, and mucous secretions), and despite being in chemotherapy treatment for breast cancer and having suffered a stroke. She thought that smoking cigarettes affected health very much, and both her family doctor and her oncologist have suggested that she should quit smoking. Her father died of tongue cancer caused by tobacco.

At the time of the assessment, she was also receiving pharmacological treatment for depression (venlafaxine, mirtazapine, and tryptizol) from her family doctor, since 4 years ago. At that time, she also took an antithrombotic (Adiro) and an inhibitor of 3-hydroxy-3-methyl-glutaryl-coenzyme A (HMG-CoA) reductase (Atorvastatin).
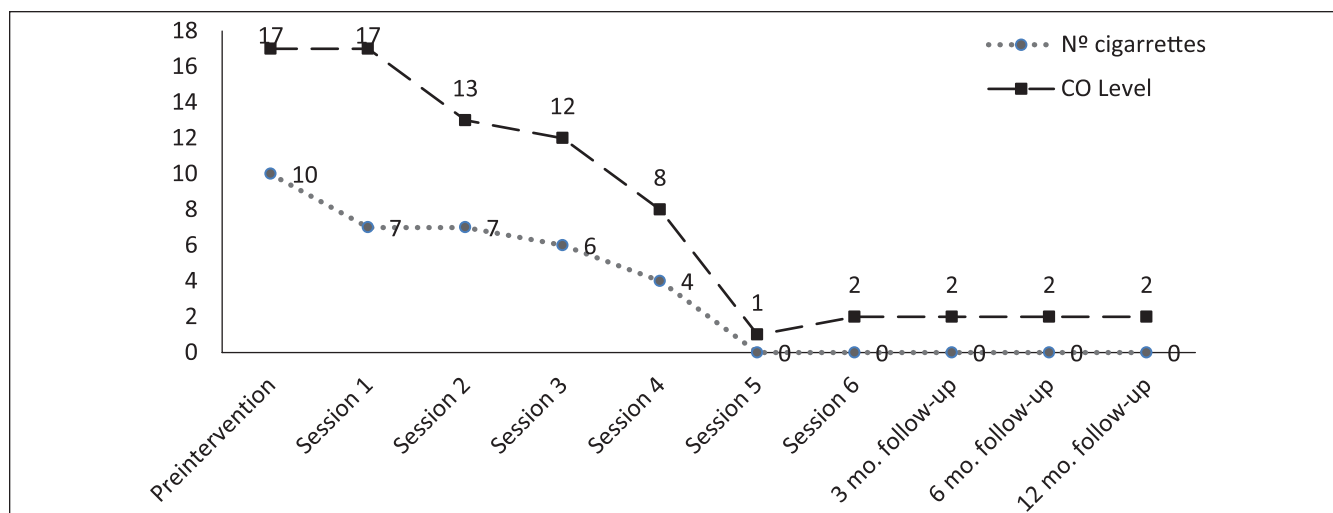
Assessment

We performed a clinical interview and applied the following questionnaires: the Smoking Habit Questionnaire (Becoña, 1994), which collects information about sociodemographic variables and tobacco consumption characteristics; the Stage of Change Questionnaire (SCQ; McConnaughy, Prochaska, & Velicer, 1983); Self-Efficacy/Temptation to Smoke Inventory–Short Form (Velicer, DiClemente, Rossi, & Prochaska, 1990); the Fagerström Nicotine Dependence Test (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991); the Beck Depression Inventory–II (BDI-II; Beck, Steer, & Brown, 1996; Sanz & Vázquez, 2011); the Symptom Checklist 90–Revised (SCL-90-R; Derogatis, 1994/2002); and the State-Trait Anxiety Inventory (STAI-A-E and STAI-A-R; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

We also assessed the level of carbon monoxide (CO) in expired air using the Micro+ Smokerlyzer® (Bedfont Scientific Instruments Ltd., Sittingbourne, Kent, UK).

Cognitive-Behavioral Intervention

We used a standardized and manualized cognitive-behavioral intervention named "Smoking Cessation Program" (Becoña, 2007), which has demonstrated its efficacy in previous studies (Becoña & Míguez, 2008). The manual of the "Smoking Cessation Program" specifies the intervention modules and the session-by-session procedures. The intervention components are the following: therapeutic contract, self-report, graphic representation of consumption, general information about tobacco, nicotine fading (change of cigarette brands each week progressively decreasing the intake of nicotine and tar), stimulus control, strategies to prevent suffering from nicotine withdrawal symptoms, physiological feedback of cigarette consumption (assessment of CO in expired air), and training in relapse prevention strategies (training in assertiveness, problem solving, changing erroneous beliefs, anxiety and anger management, physical exercise, weight control, and self-reinforcement), and maintenance of abstinence. This is an exclusively psychological intervention, in which the participants do not receive pharmacological aid of

Figure 1. Evolution of tobacco consumption (number of cigarettes per day) and level of carbon monoxide (CO) in particles per million in the sessions of assessment, intervention, and follow-up.

any type to quit smoking. Treatment was delivered across six 60-min individual therapy sessions. A trained therapist (master's level in clinical psychology) conducted the assessment and the intervention sessions.

After the cognitive-behavioral intervention, presential follow-ups were carried at 3, 6, and 12 months. Abstinence was biochemically validated by means of the assessment of CO in the expired air in each of the follow-ups.

Results and Discussion

At the time of the assessment, her desire to quit smoking and carry out the program to quit smoking was 10 (on a scale from 0 to 10). In the assessment of the stages of change, she was at the stage of contemplation (had the intention to quit in the next 30 days but she had not quit smoking any day in the past year). She scored 7 on the FTND, which indicates the presence of nicotine dependence (score equal to or higher than 6; Fagerström et al., 1996).

The BDI-II was administered at pretreatment, posttreatment, and at follow-ups at 3, 6, and 12 months to determine the evolution of her depressive symptomatology when she stopped smoking. In the pretreatment assessment, she had a BDI-II score of 24, which indicates the presence of moderate depressive symptomatology (Beck et al., 1996). On the SCL-90-R, she was within the table of psychiatric population, with scores above the mean on most of the subscales (except for the Obsessive-Compulsive subscale, with a percentile of 50, and the Depression subscale, with a percentile of 40). On the State-Anxiety-STAI, her raw score was 7, which is located at percentile 5, and on the Trait-Anxiety-STAI, it was 29, at percentile 65, obtaining a higher score than the mean of the normal population.

On the Self-efficacy/Temptation to Smoke Inventory, she obtained high scores on its three subscales at the pretreatment

assessment, indicating a greater temptation to smoke in situations related to negative affect, positive affect, and craving/habit. After completing the intervention sessions, O.L. manifested a reduction in the temptation to smoke in all these situations, which also implies an improvement in her self-efficacy to manage such situations.

With regard to O.L.'s evolution during the intervention, over the first four sessions, there was a gradual decrease in consumption both of the number of cigarettes and of the milligrams of nicotine, through the change of cigarette brands (nicotine fading). Throughout those weeks, O.L. reported some problems to control her cravings to smoke, especially when she was accompanied by people who were smoking or in situations of stress. However, she performed all the tasks and changes of the cigarette brands without difficulties. As she had been informed during the fourth intervention session, she attended the fifth session without having smoked for 24 hr and remained abstinent and without smoking even a puff during the follow-ups at 3, 6, and 12 months (Figure 1). Abstinence was biochemically validated with the measurements of CO in expired air at all the follow-ups, obtaining in all of them values of less than 10 ppm (West, Hajek, Stead, & Stapleton, 2005).

O.L. pointed during treatment sessions that all the components of the smoking cessation treatment applied had contributed in some way to facilitate the process of quitting smoking, especially nicotine fading, stimulus control, physiological feedback through CO assessment, anxiety and mood management training, and self-reinforcement training. During the follow-ups, she stated that she easily controls temptations or urges to smoke by implementing specific strategies trained during the treatment, such as deep breathing or changing the activity.

There was an improvement in her depressive symptomatology from the start till the end of the treatment, going
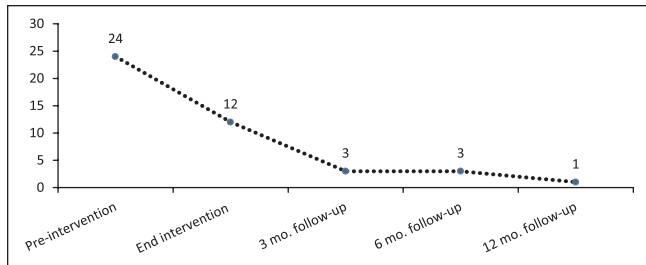
Figure 2. Evolution of the scores in depressive symptomatology assessed with the BDI-II.
Note. BDI-II = Beck Depression Inventory–II.

from a BDI-II score of 24 in the pretreatment assessment to a score of 12 at treatment completion. This reduction continued in the follow-ups, dropping to 3, 3, and 1 at 3-, 6-, and 12-month follow-ups, respectively (Figure 2). This improvement in mood is consistent with the results obtained in previous studies in which smoking cessation and the maintenance of abstinence are associated with a long-term reduction of depressive symptomatology (Mathew et al., 2013; Rodríguez-Cano et al., 2016).

With regard to compliance with the intervention, O.L. came to all six sessions and to all the follow-ups. The intervention sessions were held over 9 weeks because some schedule changes were made, and several intervention sessions had to be postponed due to O.L.'s physical distress when she received chemotherapy for her cancer. Despite the side effects caused by chemotherapy, she reported good compliance, attending to all chemotherapy sessions assigned by the oncology service.

Her family, her family doctor, and her oncologist all encouraged and reinforced her for having achieved smoking cessation and for staying abstinent throughout a year. This was very important for O.L. because she valued the social support she received from them very positively.

Regarding to her physical and psychological improvements during the treatment, O.L. stated that she had experienced many benefits, including health improvements such as less fatigue and exhaustion, better appearance of skin and hair, improvement in her perception of tastes and smells, and above all, a better self-esteem and feeling more freedom for not depending on a substance. Among the difficulties experienced after quitting smoking, she pointed had experienced tobacco craving in certain boredom moments and in social situations with people who smoked.

With regard to the evolution of her breast cancer and her stroke, 1 year after receiving the smoking cessation intervention, she has recovered from the breast cancer and the stroke and, although she is still under medical supervision, she has been discharged.

Although the presence of depressive symptoms is associated with undergoing a stronger withdrawal syndrome, with more difficulty to quit smoking, and with a greater likelihood

of relapse (Brodbeck, Bachmann, Brown, & Znoj, 2014), the positive results obtained in O.L.'s smoking cessation intervention confirm that achieving abstinence from tobacco is, in many cases, associated with a reduction of stress and depressive and anxious symptomatology, as well as with an improvement in mood and the perception of quality of life (Taylor et al., 2014).

Rojewski et al. (2016) in a recent review emphasized the relevance of the interaction between physical and psychiatric conditions and tobacco dependence treatment. Therefore, smoking cessation should be considered a critical component of comorbid condition management, and researchers and clinicians need to consider how the specific comorbid conditions could influence smoking cessation and vice versa. In the same line as Rojewski et al. (2016) pointed, in our opinion, smokers with physical conditions and mental disorders as depression may need tailored smoking cessation treatment to address this comorbidity. In fact, there exists some evidence about the efficacy of tailored smoking cessation interventions addressed to patients with comorbid conditions, such as Duffy et al. (2006) who developed and tested a tailored smoking, alcohol, and depression intervention for patients with head and neck cancer. In addition, there exist few case reviews about smoking cessation programs tailored to patients with other comorbid conditions such as personality disorders and/or anxiety disorders (López-Durán & del Río, 2011; Piñeiro & Becoña, 2012).

Smoking cessation interventions with specific mood management components had received empirical support in smokers with depression (van der Meer, Willemsen, Smit, & Cuijpers, 2013), but very few smoking cessation interventions have been tested to determine their efficacy among patients diagnosed with cancer (Chang, Braith, Hitsman, & Schnoll, 2017). Therefore, further research is needed to determine the most effective evidence-based smoking cessation intervention that is specific to this highly vulnerable population, to identify the optimal type of treatment in specific clinical contexts, to determine the intervention intensity and modality according to comorbid conditions, to develop a better understanding of how to integrate smoking and comorbid conditions treatment, and to promote the treatment of tobacco dependence among these patients.

In conclusion, in this case as in others, smokers with comorbid conditions like physical diseases including cancer or cardiovascular pathologies and with associated depression can benefit from a psychological intervention to quit smoking to the same extent as smokers without this type of symptomatology and/or physical conditions, achieving a clear improvement not only in physical health but also in psychological health and quality of life.

Declaration of Conflicting Interests

Funding

References

Beck, A., Steer, R. A., & Brown, G. K. (1996). *BDI-II. Beck Depression Inventory–Second Edition. Manual*. San Antonio, TX: The Psychological Corporation.

Becoña, E. (1994). Evaluación de la conducta de fumar [Smoking Behavior Questionnaire]. In J. L. Graña (Ed.), *Conductas Adictivas: Teoría, evaluación y tratamiento* [Addictive behavior: Theory, assessment and treatment] (pp. 403-454). Madrid, Spain: Debate.

Becoña, E. (2007). *Programa para dejar de fumar* [Smoking cessation program]. Vigo, Spain: Nova Galicia Edicións.

Becoña, E., & Míguez, M. C. (2008). Group behavior therapy for smoking cessation. *Journal of Groups in Addiction & Recovery*, *3*(1-2), 63-78.

Brodbeck, J., Bachmann, M. S., Brown, A., & Znoj, H. J. (2014). Effects of depressive symptoms on antecedents of lapses during a smoking cessation attempt: An ecological momentary assessment study. *Addiction*, *109*, 1363-1370. doi:10.1111/add.12563

Chang, E. H. E., Braith, A., Hitsman, B., & Schnoll, R. A. (2017). Treating nicotine dependence and preventing smoking relapse in cancer patients. *Expert Review of Quality of Life in Cancer Care*, *2*, 23-29. doi:10.1080/23809000.2017.1271981

Dauchy, S., Dolbeault, S., & Reich, M. (2013). Depression in cancer patients. *European Journal of Cancer Supplements*, *11*, 205-215. doi:10.1016/j.ejcsup.2013.07.006

Derogatis, L. R. (2002). *Symptom Checklist-90—Revised Manual* [Cuestionario de 90 síntomas revisado] (SCL-90-R). San Antonio, TX: Psychological Corporation. (Original work published 1994)

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 and Prevention Biomarkers*, *15*, 2203-2208. doi:10.1158/1055-9965

Fagerström, K. O., Kunze, M., Schoberberger, R., Breslau, N., Hughes, J. R., Hurt, R., . . . Zatonski, W. (1996). Nicotine dependence versus smoking prevalence: Comparison among countries and categories of smokers. *Tobacco Control*, *5*, 52-56. doi:10.1136/tc.5.1.52

Fischer, D. J., Villines, D., Kim, Y. O., Epstein, J. B., & Wilkie, D. J. (2010). Anxiety, depression, and pain: Differences by primary cancer. *Supportive Care in Cancer*, *18*, 801-810. doi:10.1007/s00520-009-0712-5

Hare, D. L., Toukhsati, S. R., Johansson, P., & Jaarsma, T. (2014). Depression and cardiovascular disease: A clinical review. *European Heart Journal*, *35*, 1365-1372. doi:10.1093/eurheartj/eht462

Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., & Fagerström, K. O. (1991). The Fagerström Test for Nicotine Dependence: A revision of the Fagerström Tolerance Questionnaire. *British Journal of Addictions*, *86*, 1119-1127.

Kokkonen, K., Saarto, T., Mäkinen, T., Pohjola, L., Kautio, H., Järvenpää, S., . . . Puustjärvi-Sunabacka, K. (2016). The functional capacity and quality of life of women with advanced breast cancer. *Breast Cancer*, *24*, 128-136. doi:101007s12282-1-1-1-110109016

Krebber, A. M. H., Buffart, L. M., Kleijn, G., Riepma, I. C., Bree, R., Leemans, C. R., . . . Leeuw, I. M. (2014). Prevalence of depression in cancer patients: A meta-analysis of diagnostic interviews and self-report instruments. *Psycho-Oncology*, *23*, 121-130. doi:10.1002/pon.3409

López-Durán, A. L., & del Río, E. F. (2011). Treatment of a smoker with an obsessive compulsive disorder of personality. *Annals of Psychology*, *27*(1), 7-16.

Mathew, A. R., Robinson, J. D., Norton, P. J., Cinciripini, P. M., Brown, R. A., & Blalock, J. A. (2013). Affective trajectories before and after a quit attempt in smokers with current depressive disorders. *Nicotine & Tobacco Research*, *15*, 1807-1815. doi:10.1093/ntr/ntt036

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.

McConnaughy, E. A., Prochaska, J. O., & Velicer, W. F. (1983). Stages of change in psychotherapy: Measurement and sample profiles. *Psychotherapy: Theory, Research, and Practice*, *20*, 368-375.

Messner, B., & Bernhard, D. (2014). Smoking and cardiovascular disease: mechanisms of endothelial dysfunction and early atherogenesis. *Arteriosclerosis, Thrombosis, and Vascular Biology*, *34*, 509-515. doi:10.1161/ATVBAHA.113.300156

Piñeiro, B., & Becoña, E. (2012). Tratamiento de la dependencia del tabaco en un fumador que ha tenido un cáncer de pulmón [Tobacco dependence treatment in a smoker who has had lung cancer]. *Psicooncología*, *9*(2/3), 415.

Rodríguez-Cano, R., López-Durán, A., Fernández del Río, E., Martínez-Vispo, C., Martínez, Ú., & Becoña, E. (2016). Smoking cessation and depressive symptoms at 1-, 3-, 6-, and 12-months follow-up. *Journal of Affective Disorders*, *191*, 94-99. doi:10.1016/j.jad.2015.11.042

Rojewski, A. M., Baldassarri, S., Cooperman, N. A., Gritz, E. R. L., eone, F. T., Piper, M. E., . . . Warren, G. W. (2016). Exploring issues of comorbid conditions in people who smoke. *Nicotine & Tobacco Research*, *18*, 1684-1696. doi:10.1093/ntr/ntw016

Sanz, J., & Vázquez, C. (2011). *BDI-II: Inventario de Depresión de Beck-II: Manual*. Madrid, Spain: Pearson.

Spielberger, C. D., Gorsuch, R. L., Lushene, P. R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory* [Cuestionario de Ansiedad Estado-Rasgo: Manual]. Mountain View, CA: Consulting Psychologists Press.

Taylor, G., McNeill, A., Girling, A., Farley, A., Lindson-Hawley, N., & Aveyard, P. (2014). Change in mental health after smoking cessation: Systematic review and meta-analysis. *British Medical Journal*, *348*, 1151. doi:10.1136/bmj.g1151

Tofler, G. H., May, R., Bartrop, R., Kirkness, A., Glinatsis, H., & de Burgh, S. (2015). Acute coronary syndrome as a teachable moment for smoking cessation. *Journal of Smoking Cessation*, *10*, 5-11. doi:10.1017/jsc.2013.35

Underwood, J. M., Townsend, J. S., Tai, E., White, A., Davis, S. P., & Fairley, T. L. (2012). Persistent cigarette smoking and other tobacco use after a tobacco-related cancer diagnosis.

Journal of Cancer Survivorship, *6*, 333-344. doi:10.1007/s11764-012-0230-1

U.S. Department of Health and Human Services. (2014). *The health consequences of smoking—50 years of progress. A report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Services, Office of the Surgeon General.

Van der Meer, R. M., Willemsen, M. C., Smit, F., & Cuijpers, P. (2013). Smoking cessation interventions for smokers with current or past depression. *Cochrane Database Systematic Review*, (Issue 8). doi:10.1002/14651858.CD006102

Velicer, W. F., DiClemente, C. C., Rossi, J. S., & Prochaska, J. O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors*, *15*, 271-283.

West, R., Hajek, P., Stead, L., & Stapleton, J. (2005). Outcome criteria in smoking cessation trials: Proposal for a common standard. *Addiction*, *100*, 299-303. doi:10.1111/j.1360-0443.2004.00995.x

World Health Organization. (2015). *WHO factsheet on tobacco epidemic*. Retrieved from http://www.who.int/mediacentre/factsheets/fs339/es/

Author Biographies

Carmela Martínez-Vispo PhD student in Neuroscience and Clinical Psychology, University of Santiago de Compostela, and therapist of the Smoking Cessation and Adictive Disorders Unit (University of Santiago de Compostela).

Elisardo Becoña, PhD, professor in University of Santiago de Compostela, and director of the Smoking Cessation and Adictive Disorders Unit (University of Santiago de Compostela).