



## Characteristics of smokers with type 2 diabetes

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### ABSTRACT

**Aim:** The purpose of this secondary analysis was to identify the characteristics of smokers with type 2 diabetes, enrolled in a smoking cessation program.

**Background:** The health consequences of smoking are particularly severe for individuals with diabetes who smoke.

**Methods:** The characteristics of 227 smokers with type 2 diabetes were analyzed to determine which traits were more likely to be associated with quit success.

**Results:** Results of the data analysis indicate that smokers with type 2 diabetes were more likely to be abstinent 30 days and 6 months after the quit date if they attended a majority of the program classes and support groups; and used cessation medications. Expressing concerns about the expense of cigarettes was also associated with quit success at 6 months.

**Conclusions:** Although studies have examined compliance with other diabetes care recommendations, few have evaluated the characteristics of individuals with diabetes who smoke.

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### 1. Introduction

Tobacco-related illness is the leading cause of preventable death in the United States, each year killing over 443,000 people (Benjamin, 2010; Centers for Disease Control & Prevention, 2008). Seventy percent of all smokers report a desire to quit smoking and nearly half try annually (Centers for Disease Control and Prevention [CDC], 2009). Although some individuals quit smoking without assistance, the U.S. Public Health Service Guideline for treating tobacco use and dependence (Fiore et al., 2008) suggests that the combination of counseling and medications may double or triple quit success.

Smoking increases an individual's risk for developing cardiovascular disease, cancer, stroke, and lung disease (Benjamin, 2010; CDC, 2008). Studies indicate that smoking may also be related to the development of diabetes (Haire-Joshu, Glasgow, & Tibbs, 1999; Sairenchi et al., 2004; Willi, Bodenmann, Ghali, Faris, & Cornuz, 2007; Zhang, Curhan, Hu, Rimm, & Forman, 2011). In addition, individuals with diabetes who smoke experience increased risk for several health conditions such as microvascular and macrovascular disease, as well as cardiovascular and coronary artery disease (Fagard & Nilsson, 2009).

According to the (CDC, 2011a) diabetes currently affects nearly 26 million adults in the United States. Diabetes is also considered a major cause of heart disease and stroke and the seventh leading cause of death in the nation.

In addition to the numerous health effects related to tobacco use and diabetes, the economic impact of these conditions is enormous as well. Estimates indicate that smoking accounts for 193 billion dollars in direct and indirect health-related economic losses in the United States (CDC, 2008). Nationally, diagnosed diabetes results in 116 billion dollars in direct costs and 58 billion dollars in indirect costs (CDC, 2011a).

In New York State the rate of smoking among adults has decreased from 23.7% in 2001 to 15.2% in 2010 (New York State Department of Health, 2011). However, the prevalence of smoking among adult New Yorkers with diabetes has remained essentially unchanged in the last decade. In 2001, 17.1% of adults with diabetes smoked and in 2010 the rate of smoking in this population was 17.4%. Similarly, nationwide smoking prevalence among those with diabetes has remained stagnant for the past several years (CDC, 2011a).

In this study, nurses and nurse practitioners provided a free evidence-based tobacco cessation program for over 4000 community members at a hospital-affiliated tobacco dependence treatment center. Subjects enrolled in this program with reported type 2 diabetes have not been previously studied, although data from these individuals have been collected and entered into a secure database. With the prevalence of smoking among people with type 2 diabetes unchanged in the past 10 years, understanding the factors that influence the quit success of these individuals has the potential to add to the science of tobacco control, lead to the development of more specific counseling strategies for this vulnerable population, and improve subsequent quit rates.

According to this secondary data analysis, the prevalence of type 2 diabetes among the participants voluntarily enrolled in the program

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from 2002 through 2012 was 5.7% ( $n = 227$ ). The study examined the self-reported characteristics of these individuals. No previous studies have specifically described the characteristics or evaluated the factors related to the quit success of smokers with type 2 diabetes enrolled in a tobacco dependence treatment program.

## 2. Literature review

### 2.1. Smoking and type 2 diabetes

Approximately one of every five deaths in the United States is caused by cigarette smoking (CDC, 2008). In addition to the morbidity and mortality attributed to smoking, smoking increases blood glucose and insulin resistance (Tonstad, 2009). The American Diabetes Association's (ADA) (2012, p. 31) standards of care include the recommendation to "advise all patients not to smoke". The ADA also recommends that smoking cessation counseling be a component of routine diabetes care.

### 2.2. Motivation to quit smoking

Motivation to quit smoking is derived from a variety of sources. Current and future health concerns frequently prompt individuals to make quit attempts (McCaul et al., 2006). Additional reasons often cited for attempting to quit smoking include (a) the cost of cigarettes, (b) concern for exposing children to secondhand smoke, (c) setting a good example for children, (d) advice from a health care provider, (e) pressure from family and friends, (f) cosmetic reasons, (g) illness or death of a friend or relative, and (h) smoke-free work environments (Hyland et al., 2004).

In this study, specific factors associated with quit success among smokers with type 2 diabetes were determined. Smokers with type 2 diabetes were asked to identify their reasons for making a quit smoking attempt. Understanding the motivation to quit among smokers with type 2 diabetes may lead to the development of more customized tobacco dependence treatment plans for this population of smokers at increased risk for smoking-related illness (CDC, 2011b).

### 2.3. Barriers to quitting smoking

When individuals have perceived barriers to quitting smoking, they may be less likely to make quit attempts. In spite of the morbidity and mortality caused by tobacco use, nearly 20% of Americans continue to smoke (CDC, 2008).

In the University of Wisconsin Center for Tobacco Research and Intervention (2003), nearly 8000 adults were asked about barriers to smoking cessation. The most frequently reported obstacles were (a) enjoyment of cigarettes, (b) cravings for cigarettes, (c) loss of a method for stress relief, (d) withdrawal symptoms, (e) potential for weight gain, (f) cost of cessation medication, (g) fear of failure, (h) discouragement resulting from previous quit attempts, and (i) disruption of social relationships. Environmental factors, such as living with a smoker and exposure to smokers in other settings were also perceived as barriers to quitting smoking.

New York smokers were surveyed about their perceived barriers with regard to the use of a telephone-based smoking cessation program (Czarnecki, Vichinsky, Ellis, & Perl, 2010). The perceived barriers to enrolling in the program included (a) not being ready to quit smoking, (b) concerns about using nicotine patches, (c) enjoyment of smoking, and (d) not believing that they were addicted to cigarettes or in need of help to quit smoking.

Studies have cited smokers' concerns about possible weight gain before quitting smoking and actual weight gain after quitting smoking as significant barriers for individuals with diabetes and for those at increased risk of developing diabetes (Audrain-McGovern & Beno-

witz, 2011; Parsons, Shraim, Inglis, Aveyard, & Hajek, 2009). Quitting smoking with an associated weight gain may be a short-term risk factor for developing diabetes (Yeh, Duncan, Schmidt, Wang, & Brancati, 2010). In addition, if weight gain does occur after cessation diabetes may be more difficult to control (Haire-Joshu et al., 1999).

The prevalence of depression among individuals with diabetes is estimated to be four to five times higher than in the general population (Anderson, Freedland, Clouse, & Lustman, 2001; Haire-Joshu et al., 1999; Sherman, 2005). One study (Solberg, Desai, O'Connor, Bishop, & Devlin, 2004) found that 60% of smokers with diabetes reported feelings of sadness and depression. Counseling and treatment for diabetes as well as depression may be beneficial in reducing barriers to cessation in this population of smokers.

### 2.4. Assessing quit status

For practical purposes, when face-to-face contact is not possible, many national and international studies (Borland, Partos, Yong, Cummings, & Hyland, 2012; CDC, 2009) as well as quit-line analyses (North American Quitline Consortium, 2009) rely on self-report data. These types of studies collect information about smoking and quitting prevalence via phone, mail or Internet communication.

Biochemical laboratory tests and testing equipment can be expensive and inconvenient to use in some studies and settings. In spite of the challenges biochemical validation presents, Benowitz et al. (2002) at the Society for Research on Nicotine and Tobacco recommend that biochemical verification be done in most settings to ensure self-report accuracy. Biochemical validation is specifically recommended in certain populations where self-reported data have been found to be unreliable. These groups include adolescents (Carballo, Giovino, & Pechacek, 2004) and pregnant women (Britton, Brinthaup, Stehle, & James, 2004).

Self-report of smoking status in clinical smoking cessation programs, with frequent counseling sessions, may be an acceptable means of collecting quit success rates (Velicer, Prochaska, Rossi, & Snow, 1992). Participants in clinically provided smoking cessation programs are not considered at high risk for incorrectly reporting smoking status (Joseph et al., 2011). For this study, self-report and, when feasible, carbon monoxide levels were used to determine quit status.

## 3. Conceptual framework

DiClemente and Prochaska's (1998) Transtheoretical Model of Change is this study's conceptual framework. This model, one of the theories of planned change, has been used as the foundation for developing successful interventions in behavior change for health promotion. The model includes "the stages, processes, and levels of change through which individuals progress when changing behaviors" (Geraci, 2004, p. 325). Individuals who smoke may experience any or all of the model's five stages of change, including precontemplation, contemplation, preparation, action, and maintenance (Geraci, 2004).

For over 30 years, the stages of change have been applied to smokers to determine their readiness to quit smoking (DiClemente et al., 1991; Prochaska, DiClemente, & Norcross, 1992; Prochaska & DiClemente, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988; Prochaska, DiClemente, Velicer, & Rossi, 1993). In this study, participants self-reported their perceived readiness to quit smoking, prior to program initiation. Smokers who enroll in an action-oriented program are often considered to be in the preparation stage of change (Pender, Murdaugh, & Parsons, 2006). In this study information about the participants' reasons or motivation for their quit attempt as well as perceived barriers to quitting smoking was collected. This information may assist practitioners in recognizing the factors

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