Effective Smoking Cessation Methods among

Smokers with Diabetes in NV

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Abstract

Smoking and diabetes could both be prevented if individuals would abstain from smoking, eat healthy, and exercise regularly. Smokers with diabetes have an increased risk of serious health outcomes, hence effective smoking cessation interventions are critical. The transtheoretical model was used in this quantitative study analyzing secondary data from the state of Nevada Quitline to examine the relationships between smoking cessation method (counseling versus counseling and medication) and quitting smoking for 720 smokers with/without diabetes. Participants were Nevada residents, ages 18+, men and women, English or Spanish speakers. Descriptive statistics, logistic regression, and a test of two proportions were conducted. The majority of the participants had not quit (67.5%). Quit rates did not differ between smokers with/without diabetes, however, individuals who received counseling and medication were 1.94 times as likely to quit compared to those who received counseling alone. Among diabetes smokers, age was significantly related to quit status; for every 1 year, the likelihood of quitting increased by 1.03 times; and Hispanics were 7.50 times more likely to quit smoking compared to Caucasians. Findings from this study could help healthcare providers, public health practitioners, and scholars develop effective smoking cessation programs to meet the needs of smokers with diabetes.

Keywords:
Smoking, diabetes, Nevada, interventions.

Introduction

Smoking is one of the most preventable causes of disease and premature death in the United States, killing 480,000 people each year (Centers for Disease and Prevention [CDC], 2012a; U. S. Department of Health and Human Resources, [USDHHS], 2014). While it could be prevented, diabetes, is the seventh leading cause of death in the United States that results in long term chronic disease consequences (CDC, 2014b). Smokers with diabetes are said to be less active compared to smokers without diabetes (Tonstand, 2009; Solberg, Desai, O'Connor, Bishop, & Devlin, 2004). The prevalence of smoking as well as that of diabetes is expected to grow within the next two decades (Will et al., 2007). As of 2010, diabetes has been reported to affect 25.8 million people or 8.3% of the U.S. population (CDC, 2011c). By the year 2030, tobacco dependence will be the cause of 8 million deaths, directly or indirectly (World Health Organization [WHO], 2012). According to the CDC, over 100 million people have died as a result of tobacco use during the 20th century and an estimate of 1 billion people could be killed in the 21st century (CDC, 2011d).

In this study, the researchers examined quit rates among smokers with diabetes in comparison to those without diabetes and identified the most effective smoking cessation method utilized by the study population. This study intends to promote positive social change by helping healthcare providers, public health practitioners, and scholars develop effective smoking cessation programs for smokers with and without diabetes. According to the American Chemical Society ([ACS], 2011), smokers with diabetes have a higher level of hemoglobin A1c (HbA1c), which is the gold standard for monitoring long-term blood sugar levels in people with diabetes. Therefore, people with diabetes may respond differently to smoking cessation programs from people without diabetes; both genetically and psychologically (ACS, 2011). Psychologically, those who developed diabetes as a result of their smoking may be more likely to quit due to more serious consequences from smoking than others.

The number of individuals with diabetes continues to grow as a result of the increase in population, urbanization, aging, and other risk factors such as obesity and lack of physical activities (Wild, Roglic, Green, Sicree, & King, 2004). Smokers with diabetes are less motivated to quit when compared to the general population (Selby, 2008) and many times this group of individuals lacks the knowledge,

awareness, and understanding of smoking cessation options such as counseling and medications (Gill, 2005). Sherman (2005) recommended that clinicians should identify and provide combination therapy (i.e., counseling and medication) options to smokers with diabetes. The goal of this study was to: (a). compare quit rates among smokers with or without diabetes and (b). identify the most effective smoking cessation method utilized by smokers with or without diabetes. The potential positive social change aspect of this study is that it may provide smokers with diabetes as well as healthcare professionals with information about effective smoking cessation methods, specifically concerning what role counseling alone or a combination of counseling and medication plays in helping individuals quit. If they quit, smokers with diabetes will reduce the risk for heart attack, stroke, nerve damage, and kidney damage while their blood pressure, blood circulation, and blood cholesterol could improve (Selby, 2008; Sherman, 2005; Steinberg et al., 2008).

Purpose of the Study

The purpose of this study is to investigate (a) quit rates among smokers with diabetes compared to smokers without diabetes (b) the association between quitting smoking and the type of smoking cessation method used. This quantitative study used secondary data from the state of Nevada Quitline (also known as the Nevada Tobacco Users Helpline [NTUH]) that was previously collected for counseling and treatment services. The study described and compared the effectiveness of each method (e.g., counseling alone [Level II] or a combination of counseling and medications [Level III]). The dependent variable was quit status during the last follow up. The independent variables were: counseling and a combination of counseling and medications used.

Theoretical Foundation

This research project tested the effectiveness of counseling, and a combination of counseling and medications. The transtheoretical model (TTM) was used. This model presents five stages that are: precontemplation, contemplation, preparation, action, and maintenance (Prochaska & Goldstein, 1991). TTM is useful for identifying positive social change and a stage that an individual is in the change process (Zimmerman, Olsen, & Bosworth, 2000). Also, TTM allows programs to monitor interventions and provide constructive feedback that will prevent the subjects from rushing through the process or moving too slow. Using the TTM stage-matched, patient-centered approach can help physicians as well as healthcare professionals design more effective treatment or

counseling interventions, which reduces treatment resistance and increase treatment compliance (Martin, Williams, Haskard, & Di Matteo, 2005; Prochaska & Goldstein, 1991).

Counseling

For many years, diabetes patients continue to smoke despite its negative impact on their health. Diabetes is registered next to other co-morbid health conditions as a target factor for smoking cessation treatment as a result of greater risks connected with this disease and smoking (Tonstand, 2009). The prevalence of smoking is almost the same among those with diabetes (27.4%) and those without diabetes (25.9%; American Diabetes Association [ADA], 2004; Haire-Joshu et al., 1999; Sherman, 2005; Tonstand, 2009). Most cigarette smokers want to quit; however, it is hard for them without proper support and understanding of the existing options that they have (Steinberg et al., 2008). The role of counseling is important when it comes to smoking cessation as cigarette smoking may result in poor health outcomes especially for persons with diabetes (Canga et al. 2000; Selby 2008). Therefore, counseling is thought to be one of the most effective public health interventions when it comes to smoking cessation and prevention efforts and this intervention approach has made a difference in the lives of many smokers (Selby, 2008).

Medication

Smoking cessation medications increase the odds of successful quitting as compared to non-medication cessation efforts (Selby, 2008). The first seven recommended medications that increase the chances of long-term abstinence rates are: Nicotine gum, Bupropion, Nicotine lozenge, Nicotine inhaler, Nicotine patch, Nicotine nasal spray, and Varenicline (CDC, n.d; Fiore, Bailey, Cohen, Dorfman, Goldstein, & Gritz, 2008; Steinberg, et al., 2008; Tonstand, 2009). A combination of medications is also recommended just as counseling and medication is recommended over either method alone (CDC, n.d.; Selby, 2008; Sherman, 2005; Steinberg, et al., 2008). A combination of lozenges and gum is recommended for smokers with diabetes for a period of up to 12 weeks (Tonstand, 2009). There is limited data pertaining to the effectiveness of smoking cessation medications among persons with diabetes (Tonstand, 2009). Many times smokers with diabetes have poor performance in terms of knowledge, awareness, and understanding of smoking cessation medications (Gill, Morgan, & MacFarlane, 2005). The state of Nevada Quitline uses over the counter medications: Gum, Lozenge, and Patches for light smokers (those who smoke less than 20 cigarettes per

day), and prescription medication: Nicotine inhaler, Bupropion, and Varenicline for heavy smokers (those who smoke a pack a day or higher; NTUH, n.d.). For light smokers who were in the contemplation or pre-contemplation stage of change, without a projected quit date or with a projected quit date farther than 90 days, were recommended counseling and over the counter medications. For heavy smokers who were in the preparation stage of change, with a projected quit date within the next 90 days, were recommended counseling and prescription medications.

Methods

Data Collection

This study used secondary data from the state of Nevada Quitline that was previously collected for service purposes from January 1, 2010 to September 1, 2011 for intake and from July 1, 2010 to March 1, 2012 for the 6 months evaluation follow-up. The data used were a portion of a larger dataset of 3,500 quitline callers. However, when data was cleaned and tested, the final sample size for this research study was 720 callers, of which 613 had completed every question used for this study. Using a quasi-experimental study design, this study controlled the assignment to the treatment groups by separating the data for those who received counseling only (Level II) versus those who received a combination of counseling and medication (Level III).

Data was retrieved after an Institutional Review Board (IRB) approval from Walden University (#08-14-13-0137985). No identifying information was gathered. The data collection instrument consisted of intake information and evaluation follow-up questions at 6 months. Ethical guidelines were followed that included: respect of human subject rights, understanding of their needs, values, and their desire to participate in the study (Creswell, 2009, p.198). In order to guarantee the highest level of confidentiality, all Quitline data collected is protected under confidentiality laws, including the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and the Nevada Revised Statues (NRS). All data collected from Quitline callers is stored in a secured web application (NTUH, n.d.).

Eligibility

The sample population consisted of Nevada residents, ages 18 years and older, men and women, English or Spanish speakers, who were enrolled during the study time frame for free smoking cessation services from the state of Nevada Quitline

program. Participants had to be current or discharged smokers (those who have quit and completed the program) who received Level II or Level III free Quitline services during the time of their enrollment. Since the Quitline provides services in English and Spanish languages, data from study participants who spoke either or both of the two languages were included.

Analysis

We used SPSS 22.0 statistical package for data analysis, including descriptive statistics, logistic regression, and a test of two proportions in order to answer the research questions. The *p*-value significance level was set at 0.05 and all values that were equal to or less than 0.05 were considered as statistically significant. Specifically, the dependent variable is quit status at last follow up and the independent variables are the types of smoking cessation methods utilized. Additional descriptive variables are also included. The following steps were used: data preparation, descriptive statistics, and statistical analyses - as recommended by Trochim and Donnelly (2008, p. 252). Finally, statistical analyses of logistic regression, and the test of two proportions were done in order to test hypotheses and find answers to the research questions.

Results

Descriptive Statistics

The frequencies and percentages for the categorical demographic variables are displayed in *Table - Appendix A*. More participants were female (56.8%) than were male (43.2%). The majority of the participants were Caucasian (66.1%), followed by African American (15.8%), and Hispanics (14.4%). Most of the participants intended to quit smoking within 30 days (94.1%). Only 15.1% of participants reported calling due to the advice of a physician. Approximately 60% of participants received counseling only (61.1%) compared to 38.9% who received both counseling and medication. Finally, 16.9% of participants reported having diabetes. The mean age was 47.69 years (*SD* = 13.48) with a minimum of 18 years and a maximum of 83 years.

Dependent Variables

The majority of the study participants indicated "no" to Quitting (67.5%) as compared to those who indicated "Yes" to Quitting (32.5%).

Research Question 1

Crosstab analyses using Pearson's chi-square and Cramer's V tests were conducted to examine the relationships between diabetes and quit

status. The relationship between quit status and diabetes was not significant, $p = .618$. The proportion of those with diabetes who had quit was 34.4%, which was not significantly different than the 32.1% of those without diabetes who quit.

Research Question 2

A logistic regression analysis was conducted to predict quit status from the type of smoking cessation method used, diabetes status, and covariates, *Table 2- Appendix B*. Level of service and diabetes status was entered as block 1 and the other demographics were added as block 2. Overall, block 1 was significant, $p < .001$, Nagelkerke $R^2 = .035$. Level of service was a significant predictor, $p < .001$, and had a significant odds ratio of 2.015 indicating that those who got counseling and medication were about twice as likely to quit compared to those who got counseling only. Although overall block 2 was significant with level of service, diabetes, and the covariates, $p = .021$, Nagelkerke $R^2 = .047$, the model change was not statistically significant, $p = .819$, Nagelkerke $R^2 = .012$.

When the predictors in block 2 were examined solely for the purpose of better understanding the model, level of service was still a significant predictor, $p < .001$, and had an odds ratio of 1.94. This is very similar to the odds ratio revealed in block 1. In addition, none of the remaining predictors (e.g., age, ethnicity, physician advice, or the readiness to quit assessment questions) were significant predictors of quit status ($ps > .05$) providing further evidence that block 1 should be used to evaluate hypotheses 2.

Discussion

The relationship between quit status and diabetes was not significant and this implies that quit rates were not any different between smokers with diabetes versus smokers without diabetes. These findings are supported by the literature whereby Schauer et al. (2008) and Sherman (2005) reported that there were no major differences when it comes to quit rates for those with and without diabetes. The level of service that smokers received was a significant predictor of quit status, indicating that those who got counseling and medication were about twice as likely to quit compared to those who got counseling only. Even though many variables were included into the model, the explained variance in quitting was minimal at 3.5 to 4.7%. This model explains very little of the variance in quitting because there are other factors at work and also because the

quit rates were very similar. Only level of service was significant for both blocks.

As presented in the literature, clinicians should provide combination therapy (e.g., counseling and medication) and offer these options to smokers with diabetes (Millett, 2007; Sherman, 2005). A combination of counseling and medication was more effective than counseling alone in reducing the prevalence of smoking among diabetics and non-diabetics represented in this study and hence could reduce the risk of complications for smokers with diabetes who quit (Millett, 2007; MacAller et al., 2011; Sherman, 2005; Steinberg et al., 2008). This study supports that diabetics do not respond differently to smoking cessation programs than non-diabetics; however, smoking cessation is still crucial for this population as they experience by far poorer health outcomes that result in shorter life expectancy as compared to the general population (Millett et al., 2007; Will et al., 2007).

Study Limitations

First, data was strictly self-reported and hence recall bias could have influenced the final reported information. In this study, participants might have over or under estimated information about their diabetes status, quit status, smoking cessation method used, and whether or not they received physician advice to quit. Secondly, the study time frame was relatively short, covering only a total 21 months worth of data with just one follow-up evaluation at 6 months. Thus, longer study duration with multiple follow-up evaluations would potentially be beneficial in identifying statistically significant associations. Third, data were only used from one study site and hence this dataset may not be a true representative of the demographics of the entire state. For example, not all of the Nevada residents are smokers and not all of the Nevada residents who smoke actually call the Quitline. Additional research opportunities that will collect data or conduct a review of secondary data from multiple settings are highly encouraged.

Conclusion

This study was conducted to evaluate the effectiveness of interventions for smoking cessation among people with diabetes. Healthcare providers have an opportunity to address and assess for tobacco use among their diabetes patients during routine medical care. Healthcare visits should provide teachable moments when a patient's worries and concerns about tobacco use are answered during their routine medical care (Fiore, Goplerud, & Schroeder, 2012). Research shows that, smokers with diabetes are less active and often depressed as compared to

smokers without diabetes, and therefore this population requires constant monitoring and encouragement of their smoking cessation efforts (Solberg, 2004; Tonstand, 2009). In January of 2012, the Joint Commission's new requirements for addressing tobacco use in Hospital facilities were officially launched in the hopes of improving smoking cessation interventions (Fiore et al., 2012). The question to whether each and every hospital follows this rule has yet to be explored; however, many hospitals are making efforts in training their employees on how to address tobacco use and referring their patients to a resource such as their state Quitline.

Therefore, this study could contribute to the knowledge that healthcare providers need in order to create and enforce policies surrounding smoking cessation specifically among people with chronic conditions such as smokers with diabetes. Findings from this research could help healthcare providers, facilities, hospitals, and organizations improve their routine practices, thus resulting in the reduction of the prevalence of smoking among persons with diabetes. Also, a combination of counseling and medication was significantly more effective than counseling alone and therefore, health care providers should emphasize this method in order to help smokers with diabetes quit. Overall, this study provides useful information pertaining to the most effective smoking cessation methods among smokers with diabetes. These changes could improve the quality and quantity of their lives enriching them, their families as well as their communities.

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Appendices

Appendix A

Table 1

Frequencies and Percentages for categorical demographic variables

_____

	n	%
Gender		
Male	310	43.2
Female	408	56.8
Race/Ethnicity		
Hispanic	104	14.4
African American	114	15.8
Caucasian	476	66.1
Other	26	3.6
Intent to Quit within 30 Days (from Intake)		
Yes	656	94.1
No	6	.9
Unsure	35	5.0
Physician Advice		
Yes	109	15.1
No	611	84.9
Smoking Cessation Method		
Level II: Counseling Only	440	61.1
Level III: Counseling and Medication	280	38.9
Diabetes		
No	598	83.1
Yes	122	16.9

Note. Frequencies not summing to $N = 720$ reflect missing data.

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Appendix B

Table 2

Logistic regression predicting quit status from smoking cessation method, diabetes, and covariates

	B	SE	Wald	OR	p
Block 1					
Level III: Counseling and Medication[a]	.701	.17	17.71	2.016	< .001
Diabetes[b]	.205	.22	.90	1.228	.342
Block 2					
Level III: Counseling and Medication[a]	.661	.17	15.39	1.938	< .001
Diabetes[b]	.175	.22	.64	1.191	.424
Age	.008	.01	1.49	1.008	.223
Hispanic[c]	.060	.24	.06	1.062	.807
African American[c]	.240	.23	1.12	1.271	.290
Other Ethnicity[c]	.025	.48	.00	1.025	.959
Physician Advice[d]	-.268	.24	1.26	.765	.261
How important is it that you quit using tobacco? [e]	-.001	.21	.00	.999	.997
How sure are you that you will be able to quit using tobacco even in stressful situations? [e]	.001	.21	.00	1.001	.996
How sure are you that you will be able to quit tobacco, using our program? [e]	.081	.19	.19	1.085	.660
How committed are you to quit using tobacco? [e]	-.229	.18	1.64	.795	.201
How confident are you that you will be able to quit tobacco this time? [e]	.135	.19	.50	1.145	.481

Note. Block 1: $\chi^2 (2) = 17.98$, $p < .001$, Nagelkerke $R^2 = .035$. Block 2: $\chi^2 (12) = 23.94$, $p = .021$, Nagelkerke $R^2 = .047$. Model change: $\chi^2 (10) = 5.96$, $p = .819$, Nagelkerke $R^2 = .012$. [a]compared to counseling only; [b]compared to no diabetes; [c]compared to Caucasian; [d]compared to no physician advise; [e]somewhat/very compared to not at all/not very/not sure.