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The purpose of this study was to determine whether gender influences the utilization of secondary preventative health practices for diabetes. Data from the Texas Behavioral Risk Factor Surveillance System (BRFSS) for the year 2000 was used to examine possible differences between men and women. The questions examined regarded foot care, glucose monitoring, HbA1c checks, eye examinations, doctor visits, diabetes classes, flu and pneumonia vaccinations, diet, exercise, and smoking. There were 135 men and 170 women for a total of 305 respondents in this study. This study found that women exhibited marginally better prevention behaviors across most of the questions examined, but in general there was little difference in behaviors by gender. A statistically significant gender difference was found in that women more often visited the doctor in the previous year than men. This difference was also found when the data were stratified by age and race/ethnicity.

SECONDARY PREVENTION BEHAVIOR AMONG

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IN TEXAS

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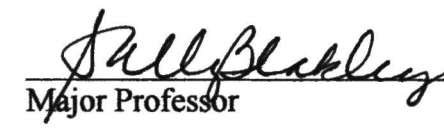

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SECONDARY PREVENTION BEHAVIOR AMONG MEN AND WOMEN WITH DIABETES IN TEXAS

THESIS

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Secondary Prevention Behavior Among Men and Women with Diabetes in Texas

Study Objective

Diabetes is a common chronic condition among adults in the United States and has numerous disabling and often fatal complications. The purpose of this study is to determine whether gender influences the utilization of secondary preventative health practices for diabetes. Identification of factors, such as gender, which could be used to refine educational and other secondary prevention interventions among persons with diabetes would be beneficial to improving the public's health.

Background

Diabetes is caused by the lack of, or the inability of the body to use, insulin to convert glucose into energy (American Diabetes Association [ADA], n.d.). It occurs in several unique forms. Type I diabetes usually strikes children and adolescents and results from a total lack of insulin production. It is believed to be caused by an autoimmune disorder and occurs in approximately 5-10% of the diagnosed cases of diabetes (Texas Diabetes Council/Program [TDC], 2001). Gestational diabetes is usually a transient condition that occurs in 2-5% of all pregnancies; however, a previous history of gestational diabetes has been linked to developing Type II diabetes in advanced age (ADA, n.d.). Some studies have shown that approximately 40% of women with gestational diabetes may go on to develop Type II diabetes (TDC, 2001).

Type II diabetes accounts for the vast majority of diabetes cases. It is believed that 90-95% of diabetes cases are Type II (ADA, n.d.). The cause is unknown, but many risk factors have been identified (ADA, n.d.). Obesity and a lack of physical activity are two controllable factors that have been linked to diabetes (Centers for Disease Control and Prevention [CDC], 2001a). Advanced age, race/ethnicity, genetic predisposition, and impaired glucose tolerance are other known risk factors (TDC, 2001).

Diabetes is a chronic disease that is often called "the silent killer" due to the subtle nature of its symptoms (ADA, n.d.). These symptoms often do not manifest until the patient has a life-threatening complication such as, diabetic neuropathy, kidney disease, or cardiovascular disease (ADA, n.d.). Diabetes causes more new cases of blindness in people over the age of 20 than any other disease (TDC, 2001). Over half of all lower limb amputations in the U.S. are a result of diabetes, and it accounts for 40% of the new cases of end-stage kidney disease, making diabetes the number one cause of renal failure (TDC, 2001).

Diabetes is the seventh leading cause of death in the United States, (ADA, n.d.) and the sixth leading cause of death in Texas (TDC, 2001). Diabetes affects some 15.7 million people in the United States and costs an estimated $98 billion in medical care and lost productivity every year (ADA, n.d.).

The overall prevalence of diabetes in the U.S. adult population is 8.2% and is similar in men and women (CDC, 1998). According to CDC, in 1996, Texas ranked ninth in the age-adjusted prevalence of diabetes. In Texas, the age-adjusted prevalence of

diabetes for ages 18 and older is almost identical for men and women (6.26% and 6.20%, respectively) (TDC, 2001).

In contrast to the lack of gender difference in the prevalence of diabetes, men have a higher mortality rate from the disease (CDC, 2001b). In 1999, white men had a mortality rate of 65 per 100,000 compared to 50 per 100,000 for white women (CDC, 1999). In a recent cohort study, male sex was a significant predictor of all-cause mortality in patients with insulin-dependent diabetes. This sex difference was not observed for cardiovascular disease-specific mortality, however (Rossing, Hougaard, Borch-Johnsen, and Parving, 1996). In a report released by the Centers for Disease Control (2000b), it was noted that women with diabetes live an average of seven years longer than men, but have, overall, higher rates of morbidity. These findings suggest the possibility that men utilize secondary prevention measures less often or less effectively for their diabetes than women. Studies of such differences in the sexes have not had consistent findings, however.

There is no question that some of diabetes most severe complications can be delayed or prevented entirely if certain behaviors are adopted. One of the easiest prevention strategies is being vaccinated yearly for influenza and, at least once, for pneumococcal pneumonia. People with diabetes have a three-fold increase in death from flu and pneumonia (CDC, 2001a). One study found infection-related mortality rates were significantly higher (4.7 vs. 1.5 per 1,000 person-years) in people with diabetes than in those without diabetes (Bertoni, Saydah, and Brancati, 2001). Diabetes deaths have been

shown to rise 5-15% during influenza epidemics (Diepersloot, Bouter, and Hoekstra, 1990).

Ninety percent of blindness due to diabetes could be prevented with proper screening and care (CDC, 2001a). In a study of 1,135 Rochester, Minnesota residents with diabetes, it was found that "by 20 years after diagnosis of diabetes, the cumulative incidence of retinopathy approached 70% among IDDM (insulin-dependent diabetes mellitus) subjects and was 30% and 36%, respectively, among the obese and non-obese NIDDM (non insulin-dependent diabetes mellitus) residents" (Dwyer et al., 1985, p. 320). A yearly dilated ophthalmoscopic examination is recommended for all diabetes patients over the age of 18 (ADA, 1997).

It is estimated that diabetes accounts for 86,000 cases of lower limb amputations a year (CDC, 2001a). Diabetes accounts for over half of the lower limb amputations in the United States (Reiber, Boyko, and Smith, n.d.). Approximately 85% of nontraumatic lower limb amputations in people with diabetes are preceded by a foot ulcer (Reiber et al., n.d.). Men are more likely to suffer foot ulcers than women (10.3 per 1,000 vs. 6.4 per 1,000) (Reiber et al., n.d.). "Over half of these amputations could be prevented with regular foot examinations and patient education" (CDC, 2001a). A study done in a Veterans Administration hospital in Tucson, Arizona showed that the group which received a 1-hour class on foot care was three times less likely to have foot ulcers and amputations one year later than the group that received no education (Reiber et al, n.d.). The American Diabetes Association (1998b) recommends daily foot care as well as an

annual foot exam by a physician. More frequent physician foot exams are recommended in high-risk patients.

People with diabetes who smoke are 2 to 4 times more likely to develop cardiovascular disease than those who do not smoke, and smoking increases the risk of stroke by 50% in people with diabetes (Glasgow and Haire-Joshu, 2000). Smoking also increases the risk of developing neuropathy and nephropathy (Glasgow and Haire-Joshu, 2000). Not only does smoking increase the risk of many of the complications of diabetes, but studies are now finding that smoking increases the likelihood of developing Type 2 diabetes. In a prospective study of 41,810 male health professionals, for those who smoked 25 or more cigarettes per day compared to non-smokers, the relative risk of diabetes was 1.94 after 6 years of follow-up (Rimm, Chan, Stampfer, Colditz, and Willett, 1995).

Obesity is one of the major risk factors for Type 2 diabetes (Cowie and Harris, n.d.). A body mass index (BMI) of 30 or higher increases a person's risk of diabetes by 5 times that of a person with a normal BMI of 25 or lower (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2001). An estimated 61% of adults in the United States report being either overweight or obese (BMI over 25) (CDC, n.d.). Among those with Type 2 diabetes, women report a greater frequency of obesity (46.6%) than men (20.9%) (Cowie and Harris, n.d.). In a clinical trial conducted by the Diabetes Prevention Program (DPP), which looked at the effects of diet and exercise on people with impaired glucose tolerance compared to those treated with the diabetes drug, metformin, researchers found that the diet and exercise group reduced their risk of getting

Type 2 diabetes by 58%; whereas, participants treated with metformin lowered their risk by 31% (NIDDK, 2001).

There is no minimum standard for the self-monitoring of blood glucose in patients with Type 2 diabetes; however, those who use insulin are advised to monitor blood glucose daily (ADA, 1998c). The goal of self-monitoring is to stabilize the glucose levels to between 80 and 120 mg/dl before meals and between 100 and 140 mg/dl at bedtime (ADA, 1998c). Hemoglobin A1c testing is used by physicians to determine a patient's mean glycemia over the previous 2 to 3 months and helps to determine whether a patient's diabetes is under control (ADA, 1998c). Patients who have stable glycemic levels should have their HbA1c checked at least two times per year. Those individuals who are not stable or who have changed their treatment regimen should be tested up to four times per year (ADA, 1998c).

The Diabetes Control and Complications Trial (DCCT) demonstrated that strict control of blood glucose, specifically avoiding hyperglycemia, can reduce complications such as, retinopathy, neuropathy, and nephropathy by 50-75% (Harris, 1995). Therefore, control of glucose levels in persons with diabetes is an important secondary prevention practice. Weight reduction through dietary restrictions and exercise have been shown as means to control glucose levels among persons with diabetes and therefore promoted as diabetes management practices by health care providers. In a study done among the Zuni Indians of New Mexico (Heath, Leonard, Wilson, Kendrick and Powell, 1987), participants in an exercise program had a mean drop of 43 mg/dl in their fasting blood glucose levels compared to a mean drop of only 2 mg/dl in non-participants. Participants

were also significantly more likely to either reduce their need for medication or stop it altogether. Another study showed a higher rate of glycemic control with fewer medications and a 15.6% drop in death rates due to diabetes in those patients who were educated on diet and exercise (Hanefeld et al., 1991).

Several studies have examined gender differences in management of diabetes and in preventive health practices in general. The studies have not, however, shown a consistent difference between the sexes with respect to their health behaviors.

A study undertaken in Starr County, Texas (Brown et al., 2000) looked at gender differences in behaviors and beliefs among Mexican Americans with diabetes and found very few statistically significant differences between men and women. Women were found to have slightly more knowledge about diabetes than men; whereas, men felt they had more control over their diabetes than women; however, neither of these differences was statistically significant. Men did express a significantly stronger perception of social support for dietary control practices than women did. Findings in this study were sufficient to lead the investigators to conclude that the "impact of gender differences on ability to integrate diabetes self-care and on effectiveness of diabetes programs . . . should be considered in future research." (Brown et al., 2000, p. 427).

Significant differences have been found among adolescent males and females with diabetes. Adolescent females were more likely to report diabetes mismanagement than adolescent males. Approximately 75% of females were guilty of missing meals and eating inappropriate foods compared to about 50% of the males surveyed (Hanna and Guthrie, 1999). Cohn and colleagues (1997) looked at the differences in hospitalizations

due to Type I diabetes among adolescent boys and girls. They found that girls, where diabetes was the principal diagnosis, had 40% more hospitalizations and 44% more repeated hospitalizations than boys, and significantly higher rates of hospitalizations: 50 vs. 38 per 100,000 for ages 10-14 years and 68 vs. 29 per 100,000 for ages 15- 18 years. It is unclear whether these findings were due to biological or behavioral factors.

In a study done by CDC in Utah (1995), it was observed that 35% of women with diabetes led a sedentary lifestyle compared to 26.6% of men with diabetes. Moreover, women with diabetes were more likely to report being obese than men (42.7% versus 38.5%).

In terms of prevention practices in general, women seem to be more conscientious about these practices only for selected behaviors. The CDC (2000) did a study on the sex-specific prevalence of health behaviors using Behavioral Risk Factor Surveillance System (BRFSS) data from all fifty states for the years 1996 and 1997. In this study, men (approximately 61%) were more likely than women (approximately 45%) to be overweight in both the years surveyed; however, men were more likely to engage in leisure-time physical activity. According to this same study, women (76.7%) were slightly more likely than men (70.8%) to have had their cholesterol level tested, as well as, to have had an influenza vaccination (67.9% versus 65.5%). The biggest gender gap was in the use of seatbelts. Women were much more likely to report that they always wore a seatbelt than men (74.8% versus 61.9%). In fact, the only category in which men did better than women was in having had a sigmoidoscopy (45.3% versus 37.7%), and this was only observed to be significant in men 50 years of age and older (CDC, 2000).

The utilization of health care services by men and women was the subject of a study done in Manitoba, Canada (Mustard, Kaufert, Kozyrskyj, and Mayer, 1998). The study focused on the population that was registered with an insurance agency and consisted of 1,140,200 participants. It should be noted that Canada has universal health care coverage for its residents. The study found that women accounted for $1,164 per year of the per capita health care resources and men accounted for $918. However, 22% of the women's expenditures were due to pregnancy and childbirth. Fourteen percent of the men's expenditures were used during the last year of life as compared to 10% for women. Taking this into consideration, it was determined that there was little difference between men and women in expenditures for health care (Mustard et al, 1998).

Gallant and Dorn (2001) found differences in preventive health behaviors among men and women in a sample of 1,266 older adults and examined potential explanations for these differences. Women smoked fewer cigarettes than men and consumed less alcohol, but were less likely to engage in physical activity. Overall, this study found that gender was related to cigarette smoking and weight maintenance behaviors but not of healthy sleep habits. It was shown that there may different influences in motivating health behaviors in men and women. For example, they found that concern over health status influenced smoking behavior among males while social network characteristics influenced smoking behavior among women. In fact, in general, women were much more likely than men to be influenced by social network variables in terms of their health behaviors (Gallant and Dorn, 2001).

Methods

Participants

The participants in the BRFSS utilized in this study are randomly selected non-institutionalized adult Texans, age 18 and over, in the year 2000. This survey is conducted over the telephone; therefore, eliminating that portion of the population without phones (Texas Department of Health [TDH], n.d.). The original survey sample consisted of 5,018 respondents. For the purposes of this study, the survey sample was limited to the adult population who reported they had been told by a health care professional that they had diabetes. The sample was further restricted to exclude women who only reported having been diagnosed with gestational diabetes (n =49). The final sample for this study consisted of 305 respondents, of whom 135 (44.3%) were men and 170 were (55.7%) were women.

Data

The data used in this study came from the year 2000 BRFSS for the state of Texas and was obtained from the Texas Diabetes Program/Council, under the Texas Department of Health. The BRFSS is a federally funded survey that is conducted by telephone in all 50 states (CDC, 2001c). The BRFSS is the primary source of information on major health risk behaviors among Americans (CDC, 2001c). It was developed to address the following:

1. Determine priority health issues and identify populations at highest risk.

2. Develop strategic plans and target prevention programs.
3. Monitor the effectiveness of intervention strategies and progress toward achieving prevention goals.
4. Educate the public, the health community, and policy makers about disease prevention.
5. Support community policies that promote health and prevent disease (CDC,2001c).

In Texas, the survey is administered with the assistance of Clearwater Research, Inc. (TDH, n.d.). The survey is an ongoing project that interviews approximately 1,500 randomly selected Texans over the age of 18. The core of the questionnaire is supplied by CDC and contains 75 questions. Each individual state has the option of adding its own questions, provided they are approved by CDC (TDH, n.d.). The participants in the survey remain completely anonymous and no personal identifiers are included in the data set (CDC, 2001c). The data is available for public use through CDC.

This study examined responses to 11 questions from the BRFSS survey which are relevant to the health behaviors of persons with the diabetes. The questions are as follows:

1. How often do you check your blood glucose level?
2. How many times in the last 12 months have you seen a health care professional about your diabetes?

3. How many times in the past 12 months have you had your HbA1c level checked?
4. About how often do you check your feet for sores or irritations?
5. When was your last eye exam in which your pupils were dilated?
6. Have you ever taken a course in how to manage your diabetes yourself?
7. Are you eating fewer calories or less fat to lose weight?
8. Are you using physical activity or exercise to lose weight?
9. During the past 12 months, have you had a flu shot?
10. Have you ever had a pneumonia vaccination?
11. Do you now smoke cigarettes every day, some days, or not at all?

Analyses of the questions on weight management through dietary control and physical activity were restricted to respondents who reported that they had been advised by a health care professional to lose weight (n=98, 63 females and 35 males). Respondents who had never heard of HbA1c testing (n= 16, 10 females and 6 males) were excluded from the analyses of the HbA1c testing question. The analyses of responses to the frequency of checking blood glucose levels was restricted to those respondents who reported taking insulin (n=80, 30 males and 50 males). This restriction was introduced for interpretability of results as the only standard for checking blood glucose applies to persons who use insulin. The standard recommends daily monitoring (ADA, 1998c). Consequently, the frequency of blood glucose monitoring was categorized as daily or less than daily for the purposes of this analysis.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) was used to manage and analyze all data. Cross-tabulations by sex were produced for responses to each of the 11 survey questions that were of interest on health behaviors of persons with diabetes. Chi-square tests were used to identify statistically significant differences between the sexes. The significance of the two-tailed tests was set at $p< 0.05$. Whenever the assumptions of the chi-square tests were violated, the likelihood ratio test was used. Stratified analyses were used to examine potential confounding factors.

Results

Table 1 presents characteristics of the participants in this study by gender. The majority (51.8%) of the participants were in the 45-64 age range and were Caucasian (56.1%). Some 45% had education beyond high school, and men were almost twice as likely to be a college graduate than women (31% versus 16%). This finding was statistically significant ($p = 0.01$). Almost all participants (89.4%) had had some form of health care coverage in the previous twelve months. Only 26.6% were insulin-dependent, with women being slightly more likely to use insulin.

Table 2 presents the frequency distributions by sex of responses to selected survey questions about health behaviors and their respective p-values. In general, there was little difference between men and women in the health behaviors to manage their diabetes. Women slightly more often had their HBAlc checked, checked their glucose on a daily basis, attended diabetes management classes, had flu and pneumonia vaccinations, and exercised to lose weight. Men were slightly more likely to have had an eye exam in the past year, to report eating less to lose weight, and smoked less frequently. None of these differences, however, were statistically significant.

The only statistically significant difference between men and women was with respect to the number of doctor visits for diabetes care made in the past 12 months. Women made more visits to the doctor than men. Almost two-thirds of women made

Table 1.

Characteristics of Persons with Diabetes by Gender, BRFSS, Texas, 2000.

	Males		Females		Total		p-value
	#	%	#	%	#	%	
Age							
18-24	2	1.5	4	2.4	6	2.0	
25-44	20	14.8	33	19.4	53	17.4	
45-64	70	51.9	88	51.8	158	51.8	
65+	43	31.9	45	26.5	88	28.9	0.58
Race/Ethnicity							
Caucasian	87	64.9	83	49.1	170	56.1	
African-American	13	9.7	21	12.4	34	11.2	
Hispanic	29	21.6	55	32.5	84	27.7	
Other	5	3.7	10	5.9	15	5.0	0.05
Education Completed							
8th grade or less	15	11.1	29	17.1	44	14.4	
High school or less	49	36.3	76	44.7	125	41.0	
Some college	29	21.5	38	22.4	67	22.0	
College graduate	42	31.1	27	15.9	69	22.6	0.01

Table 1.

Continued

	Males		Females		Total		p-value
	#	%	#	%	#	%	
Health Insurance							
Yes	62	87.3	81	91.0	143	89.4	
No	9	12.7	8	9.0	17	10.6	0.45
Insulin Dependent							
Yes	30	22.2	51	30.0	81	26.6	
No	105	77.8	119	70.0	224	73.4	0.13
Diabetes pills							
Yes	85	63.0	111	65.7	196	64.5	
No	50	37.0	58	34.3	108	35.5	0.62

Table 2.

Frequency and Percent Distribution of Health Behaviors by Sex, BRFSS, Texas, 2000

	Males		Females		p-value
	#	%	#	%	
HbA1c Checks per Year[1]					
None	19	14.1	23	13.5	
Once	20	14.8	26	15.3	
Twice	31	23.0	27	15.9	
3 times or more	65	48.1	94	55.3	0.43
Frequency of Glucose Checks[2]					
Daily	21	70.0	39	78.0	
Weekly or less	9	30.0	11	22.0	0.42
Latest Eye Exam					
Never	13	9.7	14	8.2	
2 or more years ago	16	11.9	26	15.3	
Past 2 years	16	11.9	27	15.9	
Past year	89	66.4	103	60.6	0.57
Number of Doctor Visits in Past Year					
None	25	18.5	17	10.0	
Once	18	13.3	18	10.6	
Twice	15	11.1	21	12.4	
3 times	16	11.9	7	4.1	
4 or more times	61	45.2	107	62.9	.005
Frequency of Checking Feet					
Yearly or never	20	15.6	20	12.3	
Monthly	6	4.7	4	2.5	
Weekly	22	17.2	28	17.2	
Daily	80	62.5	111	68.1	0.58

[1] Includes only those respondents who had heard of HbA1c (n = 254).
[2] Includes only those respondents who were insulin-dependent (n = 80).

Table 2.

Continued

	Males		Females		p-value
	#	%	#	%	
Attended Diabetes Class					
Yes	66	51.6	90	55.2	
No	62	48.4	73	44.8	0.54
Flu Vaccine					
Yes	27	40.9	42	46.2	
No	39	59.1	49	53.8	0.51
Pneumonia Vaccine					
Yes	24	39.3	40	47.1	
No	37	60.7	45	52.9	0.35
Smoking					
Never	58	69.0	42	64.6	
Some days	8	9.5	7	10.8	
Every day	18	21.4	16	24.6	0.85
Eating less[3]					
Yes, fewer calories	8	24.2	7	11.5	
Yes, less fat	8	24.2	24	39.3	
Yes, less fat and calories	13	39.4	22	36.1	
No	4	12.1	8	13.1	0.30
Exercising[3]					
Yes	15	45.5	38	62.3	
No	18	54.5	23	37.7	0.12

[3] Includes only those respondents advised to lose weight (n = 98).

four or more visits, while less than half of men made such frequent visits. Nearly 20% of men reported no doctor visits during the past year as opposed to 10% of women who reported no visits.

Further analysis was undertaken to determine if the difference in frequency of doctor visits between men and women was due to confounding factors. Men and women did not differ substantially in the proportion who were covered by health insurance (87% of males and 91% of females) or who were insulin-dependent (22% of males and 30% of females) (Table 1). Consequently, these two factors could not account for the observed difference.

Stratified analyses were conducted by age and by race/ethnic group as shown in Tables 3 and 4. In each age group, women made more doctor visits than men and this gender difference increased with age (Table 3). In the age group 45 through 64 years, 68% of women saw a doctor four or more times compared to only 49% of men. Some 17% of men in this age group reported not seeing a doctor at all in the past 12 months compared to only 6% of women. The difference in frequency of doctor visits was statistically significant in this age group. Stratified analysis by age seems to indicate that differences between men and women regarding the number of times they visit a doctor is consistent across the age groups and reaches statistical significance in the age group 45 through 64.

Table 4 shows the number of doctor visits by sex stratified by racial/ethnic group. Other races were excluded due to the small number of respondents in this category. While this analysis was hampered by the small counts in the cross-

Table 3.

Distribution of Number of Doctor Visits by Sex and Age, BRFSS, Texas, 2000.

	Males		Females		p-value
	#	%	#	%	
Age group/number of visits					
Age 18-44					
0	6	27.3	9	24.3	
1	5	22.7	8	21.6	
2	2	9.1	4	10.8	
3	2	9.1	0	0	
4+	7	31.8	16	43.2	0.42
Age 45-64					
0	12	17.1	5	5.7	
1	8	11.4	6	6.8	
2	8	11.4	12	13.6	
3	8	11.4	5	5.7	
4+	34	48.6	60	68.2	0.04
Age 65+					
0	7	16.3	3	6.7	
1	5	11.6	4	8.9	
2	5	11.6	5	11.1	
3	6	14.0	2	4.4	
4+	20	46.5	31	68.9	0.20

Table 4.

Number of Doctor Visits by Sex and Race/Ethnicity, BRFSS, Texas, 2000.

	Males		Females		p-value
	#	%	#	%	
Race/Ethnicity					
Caucasian					
0-1	27	31.0	18	21.7	
2-3	22	25.3	16	19.3	
4+	38	43.7	49	59.0	0.13
African-American					
0-1	1	7.7	1	4.8	
2-3	3	23.1	2	9.5	
4+	9	69.2	18	85.7	0.50
Hispanic					
0-1	14	48.3	13	23.6	
2-3	4	13.8	8	14.5	
4+	11	37.9	34	61.8	0.06

classifications, as with age, the general pattern is that within all three racial/ethnic groups women generally make more frequent visits to the doctor than men. The differential was greatest among Hispanics.

Discussion

While the results of this study showed few statistically significant differences between men and women's secondary prevention behavior as it applies to diabetes, women exhibited marginally better prevention behaviors across many of the questions examined. The only statistically significant difference was found among men and women as to how many times they had seen a healthcare professional about their diabetes in the past year. Women reported visiting the doctor with greater frequency than men. This pattern was consistent when controlled for age and race/ethnicity.

The variables that were expected to show significant differences between the sexes, such as the two regarding weight loss and the smoking variable were not greatly affected by sex. From the findings of the CDC study done in Utah (1995), it was expected that men would report exercising more often and have a greater prevalence of smoking; however, this was not the case. In fact, the percentage of women who smoked was higher than men, as was the percentage of women who exercised.

This study contradicts the findings of the Canadian study (Mustard et al, 1998) that women and men utilize health care about the same; however, it should be noted that the Canadian sample was made up of only people covered by health insurance. It is uncertain whether the results would have been different with a more diverse sample.

It is interesting that the Gallant and Dorn (2001) study found women's health behaviors to be positively influenced by social network characteristics. Visiting the doctor could be described as a social occasion, thus giving one possible explanation to why women visit the doctor more frequently.

Limitations

One of the major limitations of the BRFSS data is that interviews are conducted over the telephone. This eliminates those without telephones from participating in the survey and leads to selection bias. It seems reasonable to assume that a significant number of people with diabetes may be missed due to this limitation since diabetes tends to be more prevalent among people of low socioeconomic status.

Another limitation of this data source is that it is self-reported. Survey respondents may unknowingly, or even knowingly, misrepresent their answers to survey questions. This survey relies on the ability of respondents to recall past events and behaviors. In addition, certain behaviors that are considered socially unacceptable have a tendency to be under-reported, whereas, behavior that is seen as beneficial may be over-reported, which may have resulted in misclassification.

This study was also limited by the small number of participants in some of the categories. Many groups had no participants or only one, and this made it difficult to draw reliable conclusions about the data. Future research should include larger sample sizes.

While this study found some gender differences in the utilization of secondary preventative health care practices in people with diabetes, the differences were small and only one was statistically significant. Therefore, programs that are designed to target a specific gender may not be warranted. It may be more beneficial for public health professionals to focus on people with diabetes as a whole. One thing that is apparent from this study is the need for an overall improvement in the secondary preventative health care practices of both men and women.

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