

Hospitalization for Heart Attack, Stroke, or Congestive Heart Failure among Persons with Diabetes: 2001 – 2003, NM

Background Information

Cardiovascular disease (CVD) causes serious illness, disability, and death. Over 70 million Americans have some form of cardiovascular disease. Heart disease and stroke combined are responsible for 40% of the deaths in the nation each year and are the first and third leading causes of death, respectively.¹ Similarly, in New Mexico heart disease is the first leading cause of death and stroke the fifth leading cause of death and together they accounted for approximately 27% of the deaths in New Mexico in 2003.²

Heart disease and stroke account for a disproportionately high 65% of deaths among people with diabetes.³ This is believed to be due in part to two major risk factors for CVD, high blood pressure and abnormal blood cholesterol levels, which are more common in people with diabetes. On a population basis, high blood pressure among adults is approximately two times higher among people with diabetes compared to those without when measured directly.⁴ Although total cholesterol is similar between those with and without diabetes, people with diabetes often have elevated triglyceride levels and lowered levels of the ‘good’ cholesterol, HDL (high-density lipoprotein).⁵ In addition to its association with high blood pressure and cholesterol problems, diabetes is also a CVD risk factor in and of itself. A study showed that people with diabetes who have not had a heart attack die at the same rate from heart attack as people without diabetes who have had a previous heart attack.⁶ Consequently, diabetes was designated by the American College of Cardiology (ACC) and the American Heart Association (AHA) as a “coronary artery disease equivalent.” The Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey of adults, asked respondents if a doctor had ever told them they had a stroke, heart attack, or coronary heart disease. Among individuals aged 40 years and over, the percentage reporting these conditions differed by diagnosed diabetes status. Specifically, the rates among those with and without diabetes were 10.5% vs. 5.6% for heart attack, 7.0% vs. 3.1% for stroke, and 8.9% vs. 5.4% for coronary heart disease, respectively.⁷ These complications are not only serious, but also quite costly. Two thirds of the health care costs among people with diabetes are due to cardiovascular complications.⁸

Methods

The term “cardiovascular disease” encompasses a broad range of conditions that affect the heart and the blood vessels by which blood is pumped and circulated through the body. However, those that are most related to diabetes involve atherosclerosis, which is a thickening or “hardening” of the vessels that carry blood away from the heart. Because there is no surveillance database for CVD, hospitalization data were utilized. Heart attack, stroke, and congestive heart failure were chosen to analyze because they are usually related to atherosclerosis and hospitalizations for these diagnoses are discrete events. Only the principle diagnosis was utilized, since it is usually a good representation

of the main reason for hospitalization. Hospital discharge data from 2001- 2003 were analyzed for these selected cardiovascular events. These data were obtained from the New Mexico Health Policy Commission, which maintains data on all non-federal hospital discharges for the state in the Hospital Inpatient Discharge Database (HIDD). For the purpose of this report, selected CVD discharges were defined as including the International Classification of Diseases, Ninth Revision (ICD-9) codes 410.0 – 410.9 (heart attack), 430.0 – 434.9, 436.0 – 437.9 (stroke), or 428.0-428.9 (congestive heart failure) as the principle diagnosis. A diabetes diagnosis was identified by a code of 250.0-250.9 for one of nine potential secondary diagnoses recorded upon discharge from the hospital. A diabetes patient was defined as a hospital in-patient who had at least one diabetes diagnosis at discharge during the calendar year. For comparison purposes, data were also analyzed for patients without diabetes (e.g. those without a diabetes diagnosis at discharge). A rate was then calculated for each year (2001-2003) where the numerator was the number of selected CVD discharges (where one patient could have more than one discharge). The denominator for diabetes patients was the number of adults with diagnosed diabetes in New Mexico. Similarly, the denominator for patients without diabetes was the number of adults without diagnosed diabetes in New Mexico. Both denominators were estimated using BRFSS data.

Scope of the Problem

Diabetes Patients

Patients from the HIDD (2001-2003) with diabetes had more hospitalizations (for any reason) than those without diabetes. Each individual diabetes patient had 1.7 discharges on average over the 3-year period whereas individuals without a diagnosis of diabetes had 1.3 per year.

The overall rate for selected CVD discharges from 2001 – 2003 was 209.8 hospital discharges for heart attack, stroke, or congestive heart failure per 10,000 adults with diagnosed diabetes (Table 1). As age increased, so did the age-specific rates, indicating that the risk for hospitalization for these CVD conditions increases with age. Discharge rates were also examined by sex and race/ethnicity. Males had a statistically higher rate than females (243.2 discharges per 10,000 adults with diagnosed diabetes, 182.6 discharges per 10,000 adults with diagnosed diabetes, respectively). Non-Hispanic whites had the highest rate, followed by Hispanics of any race and American Indians.

From 2001 to 2003, there appears to be an increase in the rate of selected CVD hospitalizations after age standardizing to the US population. However, from 2001 – 2002 there was actually a small decline. For example, in 2001 the rate was 204.3 selected CVD discharges per 10,000 adults with diagnosed diabetes. The rate decreased slightly in 2002 to 199.0 discharges per 10,000 but increased in 2003 to 227.0 discharges per 10,000. Statistically speaking, the 2001 and 2002 rates are not different because of the error margins. However, the rate in 2003 is statistically higher than the rate in 2002 and the rate in 2001. While there is an increase, it is relatively small and additional years of data will be required before this trend can be confirmed.

Table 1. Selected CVD Hospitalization Rates Among Adults with Diagnosed Diabetes (2001-2003)

Group	Population ^{1,2}	Discharges ³	Rates ⁴	Error Margin ⁵ ±
Total	246,667	8,282	209.8	5.4
Age Group				
18-44	43,167	217	50.3	N/A
45-64	110,507	2,521	228.1	N/A
65-74	61,420	2,477	403.3	N/A
75+	31,573	3,067	971.4	N/A
Race/Ethnicity				
Non Hispanic White	95,159	3,514	206.4	9.4
Hispanic, any race	117,066	3,268	194.3	7.8
American Indian	34,999	556	117.5	11.2
Sex				
Males	112,480	4,123	243.2	8.9
Females	134,187	4,152	182.6	6.6
¹ Diabetes Prevalence from the Behavioral Risk Factor Surveillance System (BRFSS) ² Population data from the Bureau of Business and Economic Research, University of New Mexico ³ Hospitalization with any diagnosis of diabetes (includes ICD-9 diagnosis code 250.xx) and principle diagnosis of heart attack, stroke or congestive heart failure (ICD-9 diagnosis codes 410-410.9, 428-428.9, 430.0-434.9, 436.0-437.9) ⁴ Per 10,000 adults with diagnosed diabetes. All rates are age standardized to the U.S. 2000 population (except for age-specific rates) ⁵ Error Margin of the 95% Confidence Interval				

In order to determine which CVD condition contributed the most to the increase, rates were analyzed by year for heart attack, stroke, and congestive heart failure (Table 2). The rates for heart attack and stroke did not increase when error margins were taken into consideration. However, the rate for congestive heart failure did increase, when comparing 2001 to 2003.

Table 2. Heart Attack, Stroke, and Congestive Heart Failure Hospitalization Rates Among Adults with Diagnosed Diabetes¹ (2001-2003)

CVD Condition ⁵	2001	Error Margin ² ±	2002	Error Margin ² ±	2003	Error Margin ² ±
	Rates ^{3,4}					
Heart Attack	69.7	5.9	67.5	5.5	74.8	6.3
Congestive Heart Failure	84.6	5.5	81.2	5.5	98.0	6.4
Stroke	50.0	4.4	50.4	4.5	54.3	4.7
¹ Diabetes Prevalence from the Behavioral Risk Factor Surveillance System (BRFSS) ² Error Margin of the 95% Confidence Interval ³ Hospitalization with any diagnosis of diabetes (ICD-9 codes 250.xx) and principle diagnosis of heart attack (410.0 - 410.9), stroke (430.0-434.9, 436.0-437.9) or congestive heart failure (428.0-428.9) ⁴ Per 10,000 adults with diagnosed diabetes. All rates are age standardized to the U.S. 2000 population ⁵ Population data from the Bureau of Business and Economic Research, University of New Mexico						

Patients without Diabetes

The overall rate of selected CVD during the period was 54.4 per 10,000 adults without diabetes (Table 3). From 2001-2003, the rate of selected CVD hospitalizations among adults without diagnosed diabetes decreased each year, after standardizing to the US population. However, the decrease was relatively small. For example, in 2001 the rate was 56.9 CVD discharges per 10,000 adults without diagnosed diabetes. The rate decreased in 2002 to 54.1 discharges per 10,000 and then decreased again in 2003 to 52.4 discharges per 10,000. Statistically speaking, only the 2003 rate is lower than the 2001 rate. This suggests that among adults without diagnosed diabetes, CVD hospitalizations are decreasing. However, additional years of data will be required before this trend can be confirmed.

Table 3. Selected CVD Hospitalization Rates Among Adults without Diagnosed Diabetes (2001-2003)

Group	Population ^{1,2}	Discharges ³	Rates ⁴	Error Margin ⁵ ±
Total	3,834,932	17,566	54.4	0.8
By Year				
2001	1,251,042	5,978	56.9	1.3
2002	1,277,419	5,832	54.1	1.3
2003	1,306,471	5,756	52.4	1.3

¹Prevalence without diabetes from the Behavioral Risk Factor Surveillance System (BRFSS)

²Population data from the Bureau of Business and Economic Research, University of New Mexico

³Hospitalization with absence of diabetes diagnosis (ICD-9 diagnosis code 250.xx) and presence of principle diagnosis of heart attack, stroke or congestive heart failure (ICD-9 diagnosis codes 410-410.9, 428-428.9, 430.0-434.9, 436.0-437.9)

⁴Per 10,000 adults without diagnosed diabetes. All rates are age standardized to the U.S. 2000 population (except for age-specific rates)

⁵Error Margin of the 95% Confidence Interval

Implications

The data from 2001-2003 suggest that the rate of hospitalization for heart attack, stroke or congestive heart failure among adults with diagnosed diabetes in New Mexico is increasing slightly whereas the rate among those without diagnosed diabetes appears to be decreasing. In particular, the rate of hospitalization for congestive heart failure among adults with diagnosed diabetes appears to be the primary contributor to this overall increase. In addition, the data indicate that hospitalization for these selected CVD events is occurring about four times more frequently among those with diagnosed diabetes compared to those without diagnosed diabetes. This is consistent with national data that shows the risk of heart attack deaths and strokes to be 2 to 4 times higher in persons with diabetes.³ Although these results are not unexpected, they do underline the need for better management of CVD risk factors and aggressive outpatient management of congestive heart failure among people with diabetes.

The American Diabetes Association (ADA) publishes clinical practice recommendations for diabetes each year. The recommendations are based on the evaluation of evidence in

the scientific literature. For 2005, there are roughly five pages dedicated to the prevention and management of CVD complications.⁹ Cardiovascular disease risk factors are treated as aggressively in diabetes patients with or without established CVD as in non-diabetes patients who have had a prior heart attack.⁶ The ADA recommendations include addressing these CVD risk factors such as high blood pressure, high cholesterol, physical inactivity, and obesity with a combination approach including medication therapy as well as lifestyle/behavioral modification. Clinicians can follow these recommendations and work with patients on medication therapy and to some degree, lifestyle modification. However, part of the challenge with lifestyle modification is that the current environment in the United States makes it very challenging for most people to make changes in their everyday lives. The Surgeon General created national priorities to address overweight and obesity and two of the fifteen activities addressed this challenge. Specifically recommended included 1) creating more opportunities for physical activity at worksites, with employers encouraged to make facilities and opportunities available for physical activity for all employees and 2) making community facilities available and accessible for physical activity for all people, including the elderly.¹⁰

Diabetes is and will continue to be a challenging disease to manage and will take a concerted effort at many different levels to create the changes necessary to decrease CVD. However, by reducing CVD risk factors, there is ample evidence that CVD can either be prevented or the progression slowed.⁹

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