



Incremental Cost of Cardiovascular Disease, Hypertension and Pain for Patients with Diabetes Mellitus



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Background

Cost of diabetes in United States (US) was \$245b in 2012, much of which resulted from adverse cardiovascular events.

The added cost of pain is unknown.

Objective

The purpose of this study is to examine the incremental cost of comorbid cardiovascular disease, hypertension, and pain for patients with diabetes mellitus

Methods

This retrospective observational study of Medical Expenditure Panel Survey data (2007-2014) examined how cardiovascular disease and pain increases costs for patients with diabetes mellitus in US (n=71,280).

Included adults with diabetes, who filled at least one anti-diabetic medication prescription.

Chronic condition flags for coronary heart disease (CHD), stroke, acute myocardial infarction (AMI), and hypertension were provided in the data set. It is identified through: 1) condition flags (angina, non-specific chest pain, abdominal pain); 2) self report (Does pain interfere with your normal work? "moderately," "a lot," or "extremely").

Table 1. Patient characteristics related to pain

	Pain (n=4,055)	No pain (n=3,294)	P-value
Age (SE)	61.6 (.26)	57.5 (.39)	<.001
Female (%)	54.1	46.0	<.001
Education			<.001
< High school grad	21.5	15.5	
High school grad	44.8	43.9	
College grad	15.9	18.6	
Graduate school	17.8	22.0	
Race/ethnicity			<.001
White	77.0	75.5	
African American	16.4	16.3	
American Indian	1.4	1.0	
Asian Indian	1.0	1.4	
Chinese	0.7	0.9	
Filipino	1.2	1.7	
Other Asian	1.4	2.1	
Other race	0.2	0.4	
Multiple	0.7	0.4	
Hispanic	29.5	28.2	<.001
Region			.11
East	16.8	18.2	
Midwest	21.2	21.5	
South	42.5	38.9	
West	19.5	21.4	

Figure 1. Cardiovascular Disease Associated with Total Costs of Care, Adjusted

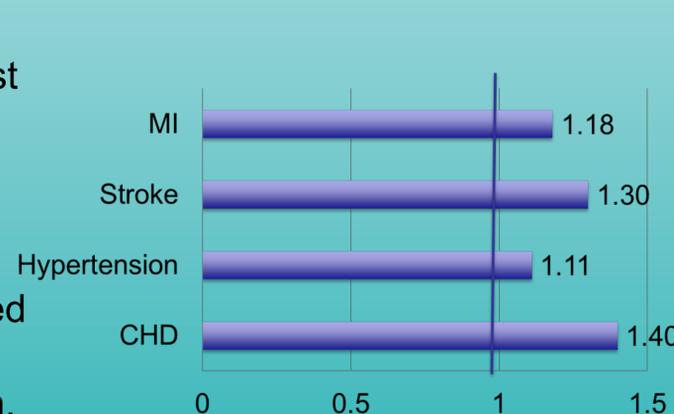
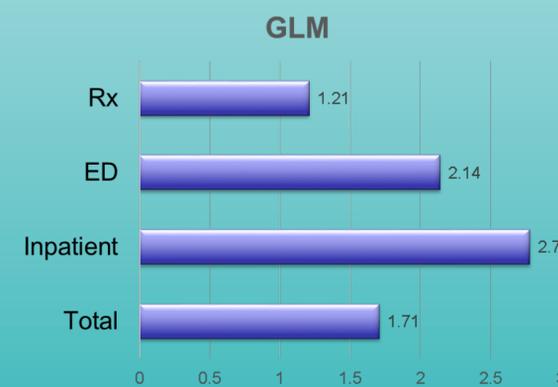


Figure 2. Pain Associated with Costs of Care by Category, Adjusted



Result

Approximately 29.5% of patients with diabetes experienced pain. Pain differed significantly by age, gender, education, and race/ethnicity.

Total costs of care were significantly associated with CHD [rate ratio (RR): 1.45, 95% CI (1.35, 1.55)], stroke [RR: 1.38, 95% CI (1.28, 1.48)], AMI [RR: 1.32, 95% CI (1.19, 1.45)], and hypertension [RR: 1.48, 95% CI (1.41, 1.55)].

After adjusting for patient characteristics, cardiovascular disease and hypertension, pain approximately doubled costs:

Total [RR: 2.08, 95% CI (1.96, 2.20)]

Inpatient [RR: 2.62, 95% CI (2.28, 3.02)]

Emergency department [RR: 2.24, 95% CI (2.07, 2.41)]

Prescription drug [RR: 2.00, 95% CI (1.86, 2.16)]

Conclusion

For patients with diabetes, cardiovascular disease increased costs by 30-50%, while pain approximately doubled costs. Further research is needed to determine which types of pain are most costly in patients with complex chronic diseases.

Conflicts of & Acknowledgements