Outcomes of Patients with Diabetes and Myocardial Infarction in Urban Hospitals: EHR Interrogation

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BACKGROUND

* Electronic Electronic health records (EHRs) provide vast opportunities to improve patients' care as they integrate quality of care in clinical practice to enhance clinical research.

* However, many challenges still exist and may hinder efforts for multi-center collaborations and comparative studies.

* However, it is imperative to note that leveraging EHRs to counterbalance these challenges is an area of intense interest and data sharing from hospitals may enable clinical research with large samples for a moderate or large effect size.

* To inform this issue, we worked across institutions with data extracted from different systems, for patients diagnosed with diabetes and myocardial infarction, in the year 2013.

METHODS

* Using ICD 9 codes for diabetes (25000) and myocardial infarction (41000), data were extracted from urban hospitals.

* The data were then cleaned, merged using common fields, and analyzed. Descriptive statistics were used to summarize the data and ANOVA to compare differences in means of specific clinical outcomes between the urban hospitals.

* Logistic regression analyses was performed to examine mortality across the three groups. All the analyses were conducted using IBM SPSS software (version 25.0, IBM SPSS).

Tables 1 - 3

Table 1: Patient Demographic Characteristics by Disease Category. Data are mean ± SD or n (%)

VariableMeasures	Diabetes Only (n=2680)	MI Only (n=518)	DM + DMI (n=1051)
Gender			
± Male	1593 (59.4%)	286 (46.2%)	485 (52.50%)
Female	1087 (40.6%)	333 (53.8%)	567 (51.55%)
Age , years	62.48 +/	66.86 +/	67.79 +/
Race			
African American	2307 (86.1%)	367 (59.3%)	577 (69.75%)
Caucasians	189 (7.1%)	241 (38.9%)	455 (27.3%)
Others	184 (6.8%)	10 (1.6%)	20 (2.8%)

Table 2: Patients Variables by Disease Categories (DM, MI, DM+MI) and SignificanceDISEASE CATETOGY

	Disease Category			
VariablesMeasure	**DM**	**MI**	**DM+MI**	**P-value**
Age	59.18±14.79	66.12±13.43	67.61±12.28	< 0.000
BMI	32.05±24.26	29.69±18.92	30.16±15.41	0.012
SBP	132.05±21.58	129.45±21.72	129.75±21.22	0.002
DBP	72.42±12.41	73.14±12.77	72.95±29.84	0.579
LDL	91.27±38.87	92.83±49.03	85.14±41.47	< 0.000
HDL	44.57±16.70	45.39±16.91	44.02±16.21	0.314
Mortality Rate	2.3%	8.9%	10.1%	<0.0001

Table 3: Logistic Regression Analyses of the Effect of Disease Category on Mortality

Variable	OR	95% CI		Sig.
DM	-	--		-
DM+MI	4.211	2.950	6.012	.000
MI	3.799	2.547	5.668	.000
Gender	1.056	.706	1.402	.706
Race	1.200	.263	1.651	.263
Age	1.033	.000	1.044	.000
Constant	.003	.000		.000

RESULTS

* We studied 4350 patients with 2307(86.1%) African American, 2492(57.3%) females with mean age ± SD of 66.2 ±13.3 years. Table 1 presents the demographic and characteristics of the study patients. African American has the highest percentage of all disease categories, with 86.1% of the diabetic patients, 59.3% of the MI patients and 69.75% of both DM+MI patients.

* Comparison of the patients variables and outcome mortality showed that age and LDL have the highest significance ($p < 0.000$), followed by SBP (0.002) and BMI (0.012). However, DBP and HDL were not statistically significant at $p = 0.05$.

* A logistic regression analyses (Table 3) that adjust for disease category, race, gender and age, showed that, compared to DM patients, MI patients were 3.8 times more likely to die whiles in admission (OR = 3.78, CI=2.55-5.67) and 4.2 times in MI+DM patients (OR = 4.21, CI = (2.95-6.01). Race and gender were not significant in the adjusted model.

CONCLUSIONS

* Analysis of multisystem datasets from urban hospitals would enable investigators' to specifically answer pertinent research questions that may lead to using best practices among the hospitals.

* Finally, , the results of this project may be used to guide resource allocation to further enhance the data.