

Impact of a pharmacist-led diabetes program on changes in A1C and immunization rates for diabetic patients in a low income, uninsured population

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BACKGROUND

- 29.1 million people (1 in every 11 people) have diabetes¹
 - 21 million people diagnosed
 - 8.1 million people undiagnosed
- 12.8% of the patients diagnosed are Hispanics¹
- Complications due to being diagnosed with diabetes:¹
 - CV disease death rates were about 1.7 times higher among adults aged 18 years or older
 - 4.2 million (28.5%) of people had diabetic retinopathy
 - 71% had blood pressure $\geq 140/90$ mmHg
 - Other conditions: kidney disease, amputations, periodontal disease, and depression
- Patients who were being managed by a clinical pharmacist have shown to have a higher decrease in A1c compared to usual care²
- The Diabetes Care Group (DCG) initiative at CommunityHealth consists of a clinical pharmacist who provide comprehensive diabetes care to patients. Patients are eligible to be referred to this group if their A1c $\geq 9\%$. Patients meet with the DCG pharmacist in between their standard of care provider visits.
- The DCG pharmacist work collaboratively with providers (physicians, NPs) to make appropriate medication adjustments, discuss the importance of medication adherence, counsel the patient on the disease state, ensure that they are up-to-date with immunizations and preventative care visits (e.g. ophthalmology, dental, and foot exams) as recommended per the American Diabetes Association (ADA), monitor vital laboratory parameters, and suggest lifestyle modifications

OBJECTIVES

- To identify the impact of a pharmacist-led diabetes program on changes in A1C and immunization rates for diabetic patients in a low income, uninsured population compared to a control group
- To identify the impact of a pharmacist-led diabetes program on completion of preventative care visits including: ophthalmology and dental visits compared to a control group

METHODS

- This study is approved by the University of Illinois at Chicago Institutional Review board.
- Electronic Medical Records (EMR) were reviewed for patients enrolled in the DCG group (study group) and were compared to the EMRs of patients with an A1c $\geq 9\%$ who only received standard of care (control group)
- **Inclusion criteria:**
 - Patients whose data from the EMR will be collected to be analyzed include patients with diagnosed diabetes and an A1c $\geq 9\%$ who are part of the DCG initiative. The control group is patients with diabetes and an A1c $\geq 9\%$, but who are not part of the DCG initiative
- **Exclusion criteria:**
 - Patients without diagnosed diabetes, or patients with diagnosed diabetes and A1c $\leq 9\%$
 - Patients who have not been seen in clinic by any provider in previous 6 months.
- Data was collected by retrospective chart review of patients seen between January 1, 2014 and September 30, 2015.
- Statistical tests below were used to compare the study group to the control group
 - T-test: for continuous variables (age, number of provider visits, baseline A1c)
 - Chi Square test: for categorical variables (gender, ethnicity, disease conditions)
 - Mixed Effect Model: to compare A1c over time
- P<0.05 was defined as statistically significant

RESULTS

Baseline Characteristics	Control Group (N=197)	Study Group (N=104)	P value
Age (SD)	52.24 (± 10.70) Range (28-83)	50.54 (± 10.78) Range (28-85)	0.19
Ethnicity			0.05
Hispanic (%)	154 (78.17)	91 (87.50)	
Non-Hispanic (%)	43 (21.83)	13 (12.50)	
Gender			0.07
Male (%)	94 (47.72)	51 (48.05)	
Female (%)	103 (52.28)	53 (51.95)	
No. of provider visits (SD)	13.08 (17.45)	14.39 (12.47)	0.76
Hypertension			0.53
Yes (%)	135 (68.53)	79 (75.96)	
No (%)	62 (31.47)	25 (24.04)	
Baseline HbA1c (SD)	10.51 (± 1.41)	11.04 (± 1.85)	0.01

- The difference in ethnicity is marginally significant in the study group compared to the control group
- The baseline A1c was significantly different in the control group as compared to the study group
- There was no statistically significant difference amongst the other baseline characteristics between the control group and the study group

Immunizations	Control Group (N=197)	Study Group (N=104)	P value
Influenza (2014-2015)			
Not Up-to-date (%)	140 (71.07)	44 (42.31)	
Up-to-date (%)	57 (28.93)	60 (57.69)	<0.0001
Pneumococcal Conjugate			
Not Up-to-date (%)	70 (35.53)	12 (11.54)	
Up-to-date (%)	127 (64.47)	92 (88.46)	<0.0001
Hepatitis B			
Not Up-to-date (%)	190 (96.45)	82 (78.85)	
Up-to-date (%)	7 (3.55)	22 (21.15)	<0.0001
Pending completion (%)	11 (5.59)	22 (21.15)	<0.0001

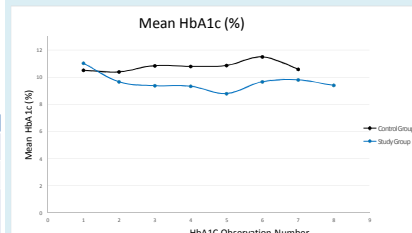
- There was a significant difference in immunizations in between the control group and study group
- Study group subjects were more likely to be up-to-date with their influenza, pneumococcal, and Hepatitis B vaccinations than the control group subjects
- Study group subjects were more likely to have started their Hepatitis B immunization series compared to the control group subjects

Preventative Screenings	Control Group (N=197)	Study Group (N=104)	P value
Dental			
Not Up-to-date (%)	166 (84.26)	57 (54.81)	
Up-to-date (%)	31 (15.74)	47 (45.19)	<0.0001
Eye			
Not Up-to-date (%)	109 (55.33)	25 (23.88)	
Up-to-date (%)	88 (44.67)	79 (76.12)	<0.0001

- There was a significant difference in preventative screenings between groups
- Study group subjects were more likely to be up-to-date with their dental and eye examinations than control group subjects

Descriptive Statistics: Mean HbA1c

Group	Observation (N)	HbA1c Observation Number	N	Mean	Standard Deviation
Control Group	197	1	197	10.51	1.41
		2	109	10.40	1.56
		3	56	10.86	1.52
		4	21	10.80	1.73
		5	9	10.87	1.75
		6	5	11.50	1.86
		7	2	10.60	1.84
		8	0		
Study Group	104	1	104	11.04	1.85
		2	77	9.66	1.69
		3	45	9.38	1.60
		4	31	9.34	1.58
		5	20	8.80	1.19
		6	6	9.57	1.18
		7	2	9.80	0.85
		8	1	9.40	



- There is not enough follow-up data after the first 3 A1C measurements considering the power. So the data after the third A1C is not interpretable

HbA1c Mixed Effect Model Summary

	β Estimate	P value
Control Group		
Linear time trend	0.020	0.000
Quadratic time trend	-0.003	0.000
Study Group		
Linear time trend	-0.352	<0.0001
Quadratic time trend	0.017	<0.0001

- The Mixed Effect Model looks at random variance of the trend over time
- The control group HbA1c did not change over time
- The study group HbA1c did change over time, and the change is statistically significant.

CONCLUSIONS

- A team based approach, with clinical pharmacists taking the lead to manage patients' diabetes, may be a successful method to improve diabetes management by lowering A1c and improving immunization rates
- This approach is one that can be adapted in other settings with a low income, uninsured population to assist in helping patients to achieve a lower A1c and completion of preventative care screenings and immunizations

LIMITATIONS

- Immunizations:
 - Outside immunizations were not able to be assessed for patients in control group, whereas outside immunizations for the study group were documented by the pharmacists for the patients in the DCG
 - Patient denials for vaccines were not assessed in the study group or the control group
- Patients who had stopped seeking care during the study period in the control group were not assessed where as drop out rates were assessed in the study group
- Foot exam data was not able to be collected for this study

REFERENCES

- 1) CDC. 2014 National Diabetes Statistics Report. <http://www.cdc.gov/diabetes/data/statistics/2014statisticsreport.html>.
- 2) Chung N, Rascati K, Lopez D, et al. Impact of a clinical pharmacy program on changes in hemoglobin A1c, diabetes-related hospitalizations, and diabetes-related emergency department visits for patients with diabetes in an underserved population. Journal of Managed Care & Specialty Pharmacy. 2014; 20(9), 914-919.

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