Impact of a telehealth diabetes program on changes in A1c and preventative care measures in a low-income, uninsured patient population

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BACKGROUND

- Telehealth services in providing diabetes care[1]
  - Metanalysis of 42 clinical trials in 2019 showed telemedicine is more effective than standard care in managing diabetes
- There are non-financial barriers to consider in serving the low income un-insured population[2]
  - Transportation is an accessibility barrier
- CommunityHealth telehealth services:
  - Provider initial and follow-up appointments
  - Specialty provider appointments
    - Endocrinology, nephrology, cardiology, etc.
  - Pharmacist/nurse appointments
    - Diabetes management
    - Hypertension management
    - Medication management appointments
  - Interpreter services
  - Health education
  - Social work consults
- The Diabetes Care Group initiative at CommunityHealth consists of clinical pharmacists or nurses managing patients with diabetes and A1c≥9% diabetes by telephone or video-based consults (DCH-TH) or on-site clinic appointments (DCG-Onsite)
  - Assess medication adherence
  - Evaluate home blood glucose readings
  - Counsel on lifestyle modifications
  - Coordinate care
  - Evaluate, initiate and/or modify orders
    - Medications, laboratory tests, immunizations
    - Referrals to other services
      - Diabetic eye exam, social services, transportation, dental, health education, foot exams
- Providers are able to refer patients with diabetes and A1c≥ 9% to the DCG-TH or DCG-Onsite program

OBJECTIVES

- To identify the impact of the Diabetes Care Group telehealth program (DCG-TH) on changes in A1c
- To determine the impact of DCG-TH on completion of preventative care recommendations: flu and pneumonia vaccines, diabetic eye exam
- To assess the number of transportation referrals in the DCG-TH group

METHODS

- This study is approved by the University of Illinois at Chicago Institutional Review Board
- Data was collected by retrospective chart review of patients who received telehealth DCG appointments, onsite DCG appointment and primary provider visits between March 1, 2020 and September 30, 2021
- Electronic Medical Records (EMR) were reviewed for patients in three groups
  - PCP group - patients with an A1c≥9% receiving only PCP visits (telehealth and onsite)
  - DCG-TH group - patients enrolled in DCG completing >3 telehealth visits
  - DCG Onsite group- patients enrolled in DCG completing onsite visits in clinic
- Inclusion criteria:
  - Patients who are part of the DCG initiative, as well as patients with diabetes and an A1c≥9%, but refused to participate in the DCG initiative
- Exclusion criteria:
  - Patients without diabetes or patients with diabetes and A1c <9%
  - Patients who have not been seen in clinic by a primary provider in previous 6 months
- Statistical tests used
  - Single factor ANOVA was used to compare variables between the three groups
  - Post-Hoc test with the Bonferroni method was used to compare the difference within the groups
- P<0.05 was defined as statistically significant

RESULTS

Baseline Characteristics	PCP Group (n=116)	DCG-TH Group (n=186)	DCG-Onsite Group (n=45)	P-value
Age (SD)	53.89 (±11.26) Range (25-83)	52.53 (±9.82) Range (26-82)	49.87 (±9.31) Range (36-73)	0.08
Ethnicity Hispanic (%) Non-Hispanic (%)	 101 (87.07) 15 (12.93)	 168 (90.32) 18 (9.68)	 40 (88.89) 5 (11.11)	 0.68
Gender Male (%) Female (%)	 60 (51.72) 56 (48.28)	 90 (48.39) 96 (51.61)	 24 (53.33) 21 (46.67)	 0.72
No. of provider visits (SD)	5.69 (±2.66)	6.89 (±2.89)	2.71 (±1.70)	< 0.0001
Hyperlipidemia Yes (%) No (%)	 102 (87.93) 14 (12.07)	 164 (88.17) 22 (11.83)	 34 (75.56) 11 (24.44)	 0.07
Hypertension Yes (%) No (%)	 80 (68.97) 36 (31.03)	 123 (66.13) 63 (33.87)	 19 (42.22) 26 (57.78)	 0.05
Baseline HbA1c (SD)	10.44 (±1.31)	10.8 (±1.52)	11.44 (±1.64)	0.0006

- The difference in the number of total provider visits was significantly different within the groups
- The baseline A1c was significantly higher in the DCG On-site group than the other two groups
- There was no statistically significant difference in other baseline characteristics between the groups

Immunizations	PCP Group (n=116)	DCG-TH Group (n=186)	DCG-Onsite Group (n=45)	P-value
Influenza (2020-2021) Not Up-to-date (%) Up-to-date (%)	 56 (48.28) 60 (51.72)	 43 (23.12) 143 (76.88)	 35 (77.77) 10 (22.22)	 <0.0001
Pneumococcal Conjugate Not Up-to-date (%) Up-to-date (%)	 24 (20.69) 92 (79.31)	 23 (12.37) 163 (87.63)	 26 (57.78) 19 (42.22)	 <0.0001

- There was a significant difference in immunizations both between and within the groups
- DCG-TH group subjects were more likely to be up-to-date on their influenza, pneumococcal vaccines in comparison to the PCP and DCG-Onsite subjects

Preventative Screenings	PCP Group (n=116)	DCG-TH Group (n=186)	DCG-Onsite Group (n=45)	P-value
Eye Not Up-to-date (%) Up-to-date (%)	 50 (43.10) 66 (56.90)	 69 (37.10) 117 (62.90)	 14 (31.11) 31 (68.89)	 0.32

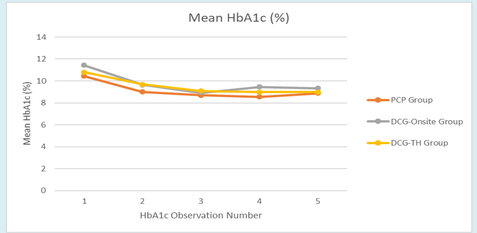
- There was no significant difference in preventative screenings between the groups (specifically eye exam)

Group	Observation (n)	Appointment Type	n	Average Number of Appointments per Patient
PCP Group	116	Provider On-Site Provider Telehealth	308 305	2.66 2.63
DCG-TH Group	186	Provider On-Site Provider Telehealth	610 615	3.28 3.31
DCG-Onsite Group	45	Provider On-Site Provider Telehealth	94 20	2.09 0.44

- It was observed that subjects in the DCG-TH group have a higher number of visits with primary care providers (in-person and telehealth) compared to the other groups

Descriptive Statistics: Mean HbA1c

No. of HbA1c Observation	PCP Group (n=116)		DCG-TH Group (n=186)		DCG-Onsite Group (n=269)	
	No. of pts completing HbA1c	HbA1c (%) Value (±SD)	No. of pts completing HbA1c	HbA1c (%) Value (±SD)	No. of pts completing HbA1c	HbA1c (%) Value (±SD)
1	116	10.44 (± 1.31)	186	10.8 (± 1.52)	45	11.44 (±1.64)
2	83	9.00 (±1.71)	170	9.67 (±1.87)	28	9.65 (±2.08)
3	51	8.70 (± 1.73)	135	9.08 (±2.00)	17	8.91 (±2.42)
4	23	8.55 (± 1.52)	95	8.98 (± 2.26)	7	9.45 (±1.47)
5	7	8.89 (± 1.74)	47	8.97 (±1.76)	4	9.33 (±1.59)



- There is a trend of decreasing HbA1c over time, however the data collection period was not long enough to reach goal HbA1c in any of the groups

HbA1c: Mixed Effect Model Summary

Group	β-Estimate	P-value
PCP Group Linear time trend Quadratic time trend	 -0.36 -1.95	 0.15 0.02
DCG-TH Group Linear time trend Quadratic time trend	 -0.44 -1.61	 0.04 0.01
DCG-Onsite Group Linear time trend Quadratic time trend	 -0.44 -2.41	 0.17 0.07

- The Mixed Effect Model looks at random variance of the trend over time
- The DCG-TH group HbA1c did change over time, and the change was statistically significant

Transportation Referrals	PCP Group (n=116)	DCG-TH Group (n=186)	DCG-Onsite Group (n=45)
Number of Referrals (%)	8 (6.90)	30 (16.13)	2 (4.44)

- DCG-TH group had the greatest number of referrals

CONCLUSIONS

- A telehealth diabetes management program (telephone or video visits) may be a successful method to improve diabetes management by both lowering A1c and improving immunization rates
- A comprehensive telehealth diabetes care model, which includes assessing transportation as a barrier, can lead to better coordination of care and access (more PCP appointments and transportation referrals) in a low income, uninsured population
- Nurses and pharmacists can collaborate to create a telehealth program, such as the DCG-TH model, for primary care providers to refer their patients with uncontrolled diabetes

LIMITATIONS

- Sample size:
  - Baseline A1c unequal between groups
  - Small and unequal groups
- Duration of study was short (18 months)
- The number of telephone in comparison to video telehealth visits were not compared
- Immunizations:
  - Outside immunizations may have been documented for patients in the DCG-TH group and DCG-Onsite group but not in the PCP group
  - Patient denials for vaccines were not assessed
- Patients who had stopped seeking care during the study period were not assessed
- Statistics for transportation referrals were not assessed

REFERENCES

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