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A Comparison of A1c between the PGY2 Ambulatory Care Pharmacy Resident Led DM Management versus Usual Care

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INTRODUCTION

- Clinical pharmacists are core members of the primary care team and have been shown to improve patient outcomes and reduce healthcare-related costs.[1]
- The Association of American Medical Colleges estimated that there will be a shortage of up to 48,000 primary care providers (PCPs) by 2034[2], therefore, postgraduate year two (PGY2) ambulatory care pharmacy residents could be a valuable resource to assist PCPs with managing chronic disease states such as diabetes, thereby increasing PCPs availability and reducing PCPs workload.
- In our study, we evaluated the impact of a PGY2 ambulatory care pharmacy resident in providing Type 2 Diabetes Mellitus (T2DM) care, through remote precepting, compared to the usual care provided by PCPs.

OBJECTIVE

To evaluate the difference in A1c changes between the PGY2 resident-led intervention group versus the usual care group followed solely by the PCP.

METHODS

Study Type	Retrospective chart review
Location	Los Angeles General - Meds + Peds Primary Clinic
Timeframe	July 2021 to May 2022
Study Groups	1. **Intervention**: Patients seen by PGY2 pharmacy resident and PCP 2. **Control**: Patients seen solely by PCP
Study Population	1. **Inclusion criteria**: Adult patients with T2DM 2. **Exclusion criteria**: Patients with less than two A1c levels, followed by endocrinologists, active cancer treatments, and/or pregnant
Control Pre & Post A1c Determination	• **Pre A1c**: The level measured closest to the resident's start date (July or August 2021) • **Post A1c**: The level measured closest to resident's end date (May 2022 cutoff)
Endpoints	1. **Primary**: Change in A1c levels from baseline within the study period 2. **Secondary**: T2DM pharmacologic modifications and non-pharmacologic interventions
Statistical Analysis	• Descriptive statistics for baseline characteristics: -Mean with standard deviations for continuous variables -Frequency percentages for categorical variables • T-test: Two sample assuming equal variances

RESULTS

Table 1. Demographics

Mean ± SD, Range or N (%)	Resident care N=44	Control (usual care) N=77
Age, Mean ± SD, (Range)	48 ± 12.3 (21-70)	51 ± 12.2, (21-78)
Female, no. (%)	26 (59)	52 (68)
Ethnicity, no. (%)		
Hispanic	39 (89)	37 (48)
Non-Hispanic	5 (11)	38 (49)
No data	0 (0)	2 (3)
Body Mass Index, Mean ± SD	33 ± 6.8	32 ± 6.5
Comorbidities*, no. (%)		
Dyslipidemia	32 (73)	31 (40)
HTN	25 (57)	40 (52)
Obesity	30 (68)	46 (60)
Medications*, no. (%)		
Metformin	41 (93)	63 (82)
SFU	11 (25)	15 (19)
TZD	1 (2)	0 (0)
SGLT2-I	6 (14)	4 (5)
DPP4-I	0 (0)	2 (3)
GLP-1 RA	3 (7)	0 (0)
Basal Insulin	28 (64)	27 (35)
Bolus Insulin	17 (39)	21 (27)

*Comorbidities and Medications categories are not exclusive of one another.

Table 2. Baseline vs. Post-Intervention A1c Comparison (Baseline Imbalanced)

	Pre A1c mean (ranges)	Post A1c mean (ranges)	P value
Resident care N=44	10.3% (7.5% - 6.6%)	8.8% (6.1% - 2.3%)	**P < 0.05** **P = 0.00023**
Usual care N=77	7.8% (4.9% - 2.6%)	7.7% (5.3% - 4.7%)	P > 0.05 P = 0.73

Table 3. Comparison of A1c Change in Patients with Baseline A1c ≥ 9% (Baseline Balanced)

	Pre A1c ≥ 9% mean (ranges)	Post A1c mean (ranges)	P value
Resident care N=31	11.2% (9% - 16.6%)	9.1 % (6% - 12.3%)	**P < 0.05** **P = 1.09E-05**
Usual care N=19	10.2% (9.1% - 2.3%)	8.9% (6.6% - 0.9%)	**P < 0.05** **P = 0.0022**

Figure 1. Baseline vs. Post-Intervention A1c Comparison

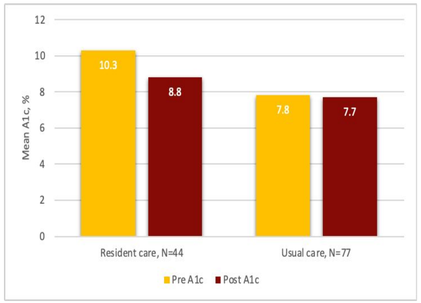

Figure 2. Comparison of Post-Intervention A1c in Patients with Baseline A1c ≥ 9%

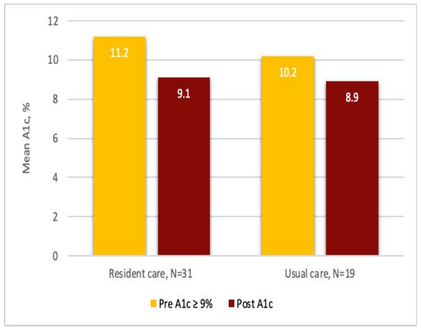

Table 4. Magnitude of A1c Change in Relation to Baseline in Resident Care vs. Usual Care

	Resident care N=44	Usual care N=77	P value
Magnitude of A1c change in all patients	-1.5%	- 0.1%	**P < 0.05** **P = 0.00034**
	Resident care N= 31	**Usual care N=19**	**P value**
Magnitude of A1c change in patients with baseline A1c ≥ 9%	-2.1%	-1.3%	P > 0.05 P = 0.2

Figure 3. Comparison of A1c Status Post Resident Care (N=44) and Usual Care (N=77)

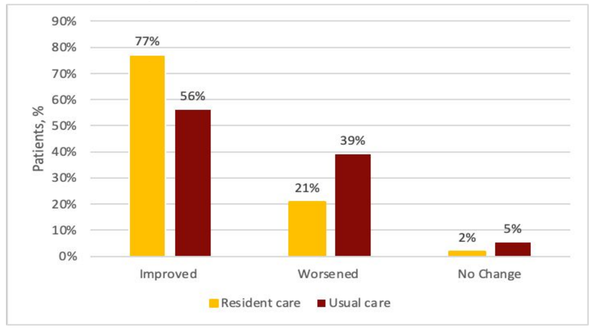

Table 5. DM Pharmacologic Interventions (visit data)

	Resident Care 131 visits total, N=44	Usual Care 294 visits total, N=77
New medications started, no. (%)*	24 (18)	29 (10)
Dose modification (decrease or increase), no. (%)*	87 (66)	42 (14)
Medication discontinuation, no. (%)*	15 (11)	17 (6)
No medication changes, no. (%)*	25 (19)	218 (74)

*categories are not exclusive of one another.

Table 6. Non-pharmacologic interventions (visit data)

	Resident Care 131 visits total, N=44	Usual Care 294 visits total, N=77
Lifestyle modifications discussed, no. (%)*	107 (82)	146 (50)
Educated patient on A1c and/or SMBG goals, no. (%)*	83 (63)	39 (13)
Educated pt on complications of uncontrolled DM, no. (%)*	57 (44)	9 (3)
Adherence to meds discussed, no. (%)*	61 (47)	25 (9)
Educated pt on DM medications (MOA, PK, ADRs, etc)*	59 (45)	10 (3)

*categories are not exclusive of one another.

DISCUSSION

- The resident care group achieved a statistically significant reduction in A1c levels. [Table 2]
- The resident care group achieved a greater reduction in A1c level than the usual care group. [Table 4]
- In subgroup of patients with baseline A1c ≥ 9:
  - A1c reduction in both resident and usual care group were significant. [Table 3]
  - The greater A1c reduction in resident group compared to usual care group was insignificant. [Table 4]
- The resident care group had higher number of pharmacologic and non-pharmacologic interventions made per visit than the usual care group. [Table 5 & 6]

CONCLUSION

- PGY2 resident has promising capability to be a reliable resource to manage T2DM.
- The resident group had a higher number of interventions made per visit, which could potentially explain the greater reduction in A1c levels, further regression analysis is warranted.

LIMITATIONS

- The control group selection was not matched with propensity scores, therefore, the groups may have different characteristics.
- Large portion of patients had only one A1c level, likely due to short study period (11 months). Further research needed.
- This was a retrospective study and therefore only looking at one point in time, which has bias potential.
- This study is a single-site study and, therefore, cannot be generalized to other sites.

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