Evaluating the outcome of a health plan's diabetes management program: impact of social determinants of health

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BACKGROUND

- The World Health Organization identifies social determinants of health as economic stability, education level, physical environment, social support networks, and access to health services. Amongst these, poverty status (a component of economic stability) and education level have been shown to be strong predictors of mortality risk for adults diagnosed with diabetes.[1,2]
- Disease management programs combined with value-based insurance design (V-BID) provide education and patient cost-share reduction incentives aimed at improving glycemic control and medication adherence.[3]
- The studied health plan offers a diabetes management program called Care Coordination (CC). Members enrolled in CC are eligible to receive discounts on certain diabetes medications.

OBJECTIVES

- To evaluate the effect of CC on glycemic control in health plan members stratified by poverty status and education level.
- To evaluate the effect of CC on medication adherence in health plan members stratified by poverty status and education level.

METHODS

- Members continuously enrolled in the plan 1/1/2017-12/31/2017 having ≥1 ICD-10 Type 2 diabetes mellitus code were identified (n=2,284).
- Members were included in the CC group (n=510) if ≥3 care coordination appointments were attended, the non-CC group (n=1,754) if 0 appointments were attended, or excluded (n=20) if 1-2 appointments were attended. Only members with pre-A1c of >6.5% and IBM Watson Health's risk category of >1 were included in this study (CC=389, non-CC=1,164).
- Status of 'Poverty' was assigned if the member's address belonged to a United States Census Bureau tract number with a poverty rate of >20%.
- Education level of '≤ High School Degree' was assigned if the member's address belonged to a United States Census Bureau tract number with >50% households reporting high school degree or less.
- Glycemic control was assessed by comparing the most recent A1c values on or following 1/1/2017 (post-A1c) to the most recent A1c values prior to 1/1/2017 (pre-A1c).
- Medication adherence was measured by calculating proportion of days covered (PDC) for metformin claims over the study time period.

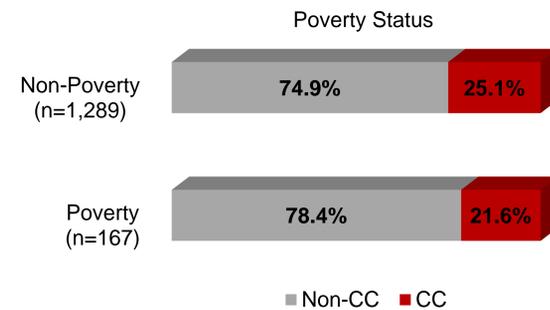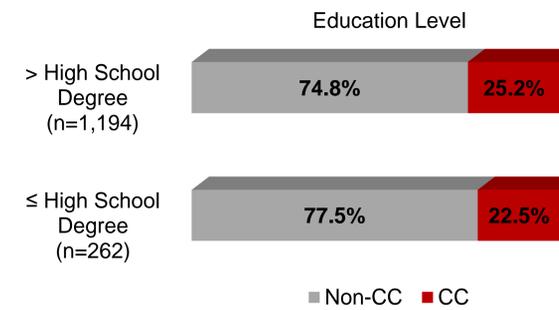## RESULTS

Figure 1. Enrollment in CC (%)

Poverty Status

Non-Poverty (n=1,289): Non-CC 74.9%, CC 25.1%
Poverty (n=167): Non-CC 78.4%, CC 21.6%

■ Non-CC ■ CC

Figure 2. Enrollment in CC (%)

Education Level

> High School Degree (n=1,194): Non-CC 74.8%, CC 25.2%
≤ High School Degree (n=262): Non-CC 77.5%, CC 22.5%

■ Non-CC ■ CC

Table 1. Difference in Mean A1C

Non-Poverty	n	Pre-A1c (%)	Post-A1c (%)	A1c Difference
Non-CC	611	7.91	7.60	-0.31*
CC	270	7.91	7.62	-0.29*
Poverty	n	Pre-A1c (%)	Post-A1c (%)	A1c Difference
Non-CC	86	8.27	8.26	-0.01
CC	34	8.35	7.85	-0.50*
> High School Degree	n	Pre-A1c (%)	Post-A1c (%)	A1c Difference
Non-CC	589	7.90	7.60	-0.30*
CC	256	7.89	7.58	-0.31*
≤ High School Degree	n	Pre-A1c (%)	Post-A1c (%)	A1c Difference
Non-CC	108	8.29	8.10	-0.19
CC	48	8.36	8.00	-0.36

*p<0.05

Figure 3. Mean Metformin PDC

Poverty Status

Non-Poverty (n=633): Non-CC 79.0%, CC 87.9%
Poverty (n=73): Non-CC 75.4%, CC 89.0%

■ Non-CC ■ CC

Figure 4. Mean Metformin PDC

Education Level

> High School Degree (n=595): Non-CC 79.3%, CC 88.4%
≤ High School Degree (n=111): Non-CC 74.9%, CC 85.4%

■ Non-CC ■ CC

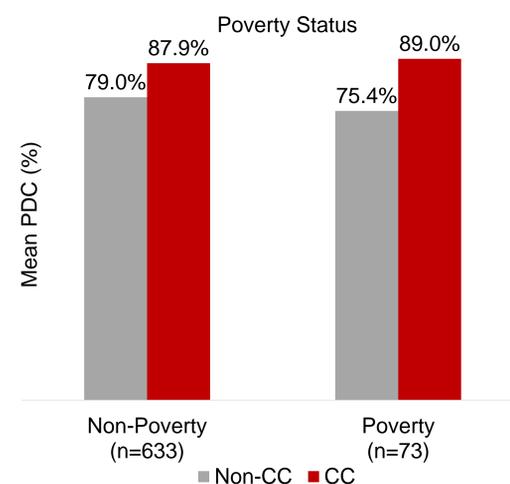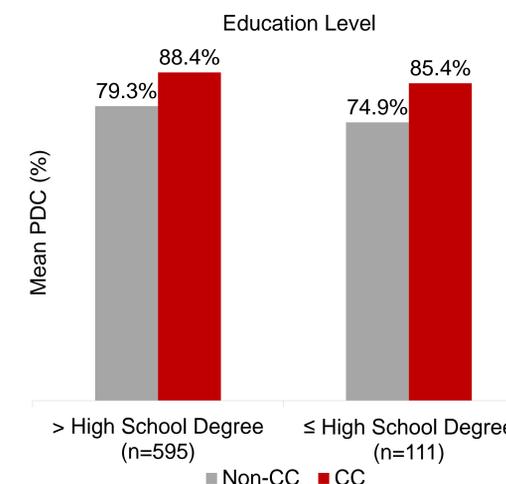## DISCUSSION

- Although the differences were not statistically significant, a smaller percentage of members in the poverty group and the ≤ high school degree group were enrolled in CC. Possible explanations could be lack of knowledge or accessibility to the program. [Figures 1 & 2]
- There was an overall decreasing trend in A1c for all study groups, independent of CC enrollment. This could be attributed to other health initiatives offered by the health system that were not addressed in this study. [Table 1]
- The poverty group had a higher pre-A1c (8.29) than that of the non-poverty group (7.91), with the greatest A1c reduction found in the CC poverty group (-0.50). This indicates that members who live in higher poverty areas may have the most glycemic benefit from CC cost savings. [Table 1]
- The ≤ high school degree group had a higher pre-A1c (8.31) compared to the > high school degree group (7.89), with greater A1c reductions if they were enrolled in CC (-0.36) compared to non-CC (-0.19). Although the A1c difference between the CC and non-CC group was not statistically significant, CC is expected to improve glycemic outcomes by addressing disparities in diabetes education. [Table 1]
- All CC groups, independent of poverty status or education level, had significantly higher PDC values than those in non-CC groups. There was a greater PDC difference between CC vs. non-CC in the poverty group (13.6%) than that in the non-poverty group (8.9%) as expected. Similarly, there was a greater PDC difference between CC vs. non-CC in the ≤ high school degree group (10.5%) than that in the > high school degree group (9.1%). [Figures 3 & 4]

LIMITATIONS

- Pre-A1c values were obtained from the most recent values available prior to study period, not prior to CC enrollment.
- PDC was evaluated using only metformin claims.
- Household income and education data were not available.

CONCLUSIONS

- CC had a more profound impact on glycemic control and medication adherence in members who lived in areas with higher poverty rates and lower education levels.
- Future outreach efforts targeted to these groups may improve glycemic control and medication adherence.

REFERENCES

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2. Saydah SH, Imperatore G, Beckles GL. Socioeconomic status and mortality: contribution of health care access and psychological distress among U.S. adults with diagnosed diabetes. Diabetes Care. 2013; 36(1): 49-55.
3. Gibson T, Mahoney J, Ranghell K, Cherney B, McElwee N. Value-based insurance plus disease management increased medication use and produced savings. Health Aff. 30(1):100-8.