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Impact of Hemoglobin A1c Screening Program Among Medicare Patients

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Introduction

It is estimated that one in three American adults has prediabetes and is unaware (Centers for Disease Control and Prevention [CDC], 2017). Of these, 70% are expected to develop diabetes (Tabák, Herder, Rathmann, Brunner, & Kivimäki, 2013). Diabetes is associated with increased rates of morbidity and mortality as well as an alarming financial burden to the health care system and Medicare (Dall et al., 2014). Lifestyle changes of modest weight loss and 150 minutes of moderate activity per week have demonstrated a statistically significant reduction in the risk of developing diabetes (Diabetes Prevention Program Research Group, 2002, 2009; Lindstrom, Eriksson, et al., 2003; Lindstrom et al., 2006).

Optum's HouseCalls Program is comprised of nurse practitioners who conduct in-home annual wellness visits offered at no charge to patients of select Medicare Advantage plans across the United States. In 2016, HouseCalls, initiated point-of-care hemoglobin A1c (HbA1c) screening for diabetes for one of its Medicare Advantage plans. As part of this screening program, patients with HbA1c in the prediabetic range are provided with brief education about lifestyle changes to decrease their risk of developing diabetes. With current standards recommending a 3-year screening interval (American Diabetes Association, 2017; United States Preventive Services Task Force, 2015), the impact of annual screening in this population has not been evaluated. Thus, there is an opportunity for data collection to contribute to the sparse body of evidence about annual HbA1c changes in those with prediabetes and to evaluate the effectiveness of this intervention.

Methods

A retrospective de-identified data set (N = 34,348) of HouseCalls visits conducted in select counties in Florida and Texas during 2016 and 2017 was obtained to address: (a) compare mean 2017 BMI, after controlling for 2016 (baseline) BMI, in members who received HbA1c screening during the 2016 HouseCalls visit to those who received a 2016 HouseCalls visit only; (b) evaluate mean change in HbA1c from 2016 to 2017 in the HbA1c screening treatment group; and (c) compare mean change in HbA1c from 2016 to 2017 HbA1c in the screening treatment group after controlling for baseline HbA1c group.

Sample. This convenience sample consisted of one health plan's Medicare Advantage patients age 18 years and older who received at least one HouseCalls visit between January 1, 2016 and July 24, 2017. Exclusion criteria included missing state of residency or gender data and diabetes diagnosis noted at the first HouseCalls visit. Because Medicare diagnostic criteria do not recognize HbA1c as diagnostic for diabetes (Delmarva Foundation for Medical Care & Disparities National Coordinating Center, 2013), patients with HbA1c in the diabetic range without prior diagnosis of diabetes were included. The treatment group was comprised of patients who completed HbA1c screening during the HouseCalls 2016 visit (n = 4,442). Patients without HbA1c screening during the 2016 visit constituted the comparison group (n = 18,842).

Data Analysis. Descriptive statistics were used to analyze baseline BMI and HbA1c and baseline demographic characteristics of the samples. Inferential statistics were employed to calculate: (a) the difference in post-test BMI between the treatment and comparison groups after controlling for baseline BMI (analysis of covariance [ANCOVA]), and (b) HbA1c change from 2016 to 2017 among baseline HbA1c groups within the treatment group (paired t-test).

The project protocol was approved by the University of Florida Institutional Review Board-01 (IRB201701729), HouseCalls leadership, and Optum's Privacy Office.

Results

Demographics. Samples were similar in terms of state of residence ($p = .054$), gender ($p = .240$), mean age ($p = .054$), mean BMI ($p = .140$), and mean baseline HbA1c ($p = .053$). The majority (54.1%) of the treatment group had HbA1c results within the normal range, with 45.9% in the prediabetic range, and 4.2% in the diabetic range.

Log Transformed BMI. Assumptions were tested and BMI analysis was found to have violated normality of variance. A log 10 transformation of 2016 BMI and 2017 BMI was conducted and assumptions for the model were tenable. After controlling for baseline log BMI, the difference between mean log 2017 BMI in the treatment group (LSM = 1.438, SEM = .001, 95% CI, 1.437-1.439) and comparison group (LSM = 1.438, SEM < .001, 95% CI, 1.437-1.438) was similar ($F_{1,10707} = .065$, $p = .799$).

HbA1c. Overall, HbA1c means increased ($t = 3.338$, $df = 1319$, $p = .001$) from 2016 ($M = 5.614\%$) to 2017 ($M = 5.669\%$). In the baseline normal range group (HbA1c < 5.7), there was an increase ($t = 10.878$, $df = 721$, $p < .001$) in mean HbA1c from 2016 ($M = 5.255\%$) to 2017 ($M = 5.480\%$). In the baseline prediabetic range group (HbA1c 5.7-6.4), HbA1c means ($t = -5.267$, $df = 544$, $p < .001$) from 2016 ($M = 5.943\%$) to 2017 ($M = 5.832\%$) demonstrated a significant decrease. Individuals in the baseline diabetic range group (HbA1c ≥ 6.5), also demonstrated a significant decrease ($t = -3.547$, $df = 52$, $p = .001$) in HbA1c from 2016 ($M = 7.113\%$) to 2017 ($M = 6.570\%$).

Limitations

Without complete medical records available to the APC, there is the potential that participants diagnosed with diabetes at baseline were not excluded from the analysis. Due to large sample size, medication data were not obtained, limiting the ability to correlate HbA1c and BMI improvements with lifestyle change or subsequent medication prescribed by the primary care physician. In addition, ethnicity or income data were not available, as HouseCalls does not collect this data.

Another limitation of the project was the sampling procedure. Although participant sampling began in January 2016 and ended on July 24, 2017, HbA1c screening wasn't implemented until April 2016. Consequently, there may be unconsidered seasonal factors that impacted the findings. Like HouseCalls participation, HbA1c screening is voluntary. It is possible that those who consented to the visit and HbA1c testing have a greater interest in personal health and willingness to implement behavior changes, which may adversely affect internal and external validity of the findings.

Discussion

Although the overall sample showed a significant increase in mean HbA1c between 2016 and 2017, the novel finding of this project was the significant reduction in 2017 HbA1c means for those with baseline groupings based on 2016 HbA1c results at prediabetic (5.7% to 6.4%) and diabetic (6.5% and greater) levels. While it is estimated that the annual rate for developing diabetes in those with prediabetes is 4-11% (Knowler et al., 2009; Yeboah, Bertoni, Herrington, Post, & Burke, 2011), only 3.8% of patients in the prediabetic range group had a diabetes diagnosis noted during their 2017 HouseCalls visit. Another encouraging finding in the analysis was the overall decrease in BMI for the entire sample, although this did not reach statistical significance or approach the 5-7% weight loss associated with the significant risk reduction for diabetes (Diabetes Prevention Program Research Group, 2002; Lindstrom & Tuomilehto, 2003).

Meaningful future analysis could focus on comparing diabetes progression rates among this health plan along with other providers serving Medicare Advantage patients. Adding diet and exercise variables to the

HouseCalls assessment would enhance data collection and interpretation of results to better identify specific behaviors adopted subsequent to HouseCalls HbA1c screening.

With diabetes now considered a national epidemic (CDC, 2017), it is critical first to identify those with prediabetes. Older age is associated with higher rates of prediabetes (CDC, 2017), but there is an inverse correlation between age and incidence of diabetes when lifestyle changes are implemented (Lindstrom, Louheranta, et al., 2003). Thus, there is an opportunity to prevent or delay the onset of diabetes through screening programs for seniors that incorporate diabetes prevention education. This study suggests that there may be a benefit to annual HbA1c screening to Medicare Advantage patients during the HouseCalls visit.

Title:

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Abstract Summary:

In 2016, HouseCalls began conducting point-of-care hemoglobin A1c screening as part of an annual preventative home visit program for patients covered under one Medicare Advantage health plan. This retrospective study (n = 34,348) evaluated the impact of this intervention on the following year's body mass index and hemoglobin A1c.

Content Outline:

I. Introduction

A. The Diabetes Crisis

1. 1 in 3 US adults has prediabetes (the rate for those 65 years and older is 48%) with 88% are unaware of their condition.¹
2. 70% of people with prediabetes will develop Type 2 diabetes at a rate of 4-11% annually.²
3. Diabetes is the 7th leading cause of death. The diabetes death rate for all causes is 1.5 times greater than people without diabetes.¹

4. 1 in 3 Medicare dollars is spent on diabetes related care.¹

5. Intensive lifestyle modification programs for those at risk for diabetes have demonstrated a 58% risk reduction with sustained results lasting at least 7-10 years.^{1,2}

6. Current recommended diabetes screening interval is every 3 years.^{2,3}

B. Purpose: Evaluate the impact of an annual diabetes screening program using point-of-care hemoglobin A1c (A1c), discussion of results, and diabetes education on A1c results and BMI obtained at a subsequent HouseCalls visit

C. Setting

1. HouseCalls is a free program offered to patients of select Medicare Advantage plans across the nation where advanced practice clinicians, primarily nurse practitioners, conduct in-home annual preventive visits.

2. One health plan provider, which is available in Texas and Florida, implemented annual point-of-care A1c screening for its patients as part of the HouseCalls visit.

II. Methods

A. Sample

1. Convenience sample of the health plan's patients age 18 and over who received at least one HouseCalls visit between January 1, 2016 and July 24, 2017.

2. Exclusion criteria: diabetes diagnosis at time of first HouseCalls visit.

3. Treatment group participants categorized based on 2016 A1c cut points of < 5.7, 5.7-6.4, and 6.5+ into normal range, prediabetic range, and diabetic range. Individuals with A1c in the diabetic range, but no prior diagnosis of diabetes were included since Medicare diagnostic criteria do not recognize A1c as a diagnostic test for diabetes

B. Design

1. Retrospective observational design comparing:

a) pre- and post-intervention A1c in the treatment group

b) BMI of those who had a HouseCalls visit with A1c screening to those who did not

C. Data Analysis

1. The project protocol was approved by the University of Florida Institutional Review Board-01 (IRB201701729). Permission to use the de-identified data set was obtained from HouseCalls leadership and Optum's Privacy Office (HouseCalls parent company).

2. A de-identified data set of 34,348 of the health plan's patients was obtained from HouseCalls and imported into IBM SPSS V. 25 for analysis.

3. Demographic data were analyzed using Chi-Square (categorical variables) and independent t-tests (continuous variables).

4. Difference in post-test BMI between the treatment and comparison groups after controlling for baseline BMI was analyzed using ANCOVA.

5. A1c change from 2016 to 2017 among baseline A1c groups within the treatment group was analyzed using paired t-tests.

III. Results

A. Sample Characteristics Table (sample was similar in state of residence, gender, age, and baseline BMI)

B. After controlling for baseline log BMI, the difference between mean log 2017 BMI in the treatment group and comparison group was not statistically different ($p = .799$).

C. Chart illustrating change in A1c means in 2016 and 2017 overall (significantly increased), and by baseline hemoglobin A1c group: normal-A1c less than 5.7 (significant increase); prediabetes-A1c 5.7-6.4 (significant decrease), and diabetes range-A1c 6.5 or greater (significant decrease).

IV. Discussion

A. Conclusions

1. There may be a benefit to annual A1c screening during the HouseCalls visit.

2. While the annual rate among those with prediabetes to develop diabetes is 4-11%,² only 3.8% of those in the prediabetic and diabetic range groups were diagnosed with diabetes at their 2017 HouseCalls visit.

3. In the diabetic range group, 25% had a sustained HbA1c above 6.5 at their 2017 HouseCalls visit without a recorded diagnosis of diabetes. Thus, the HouseCalls visit is just the initial step for identifying and addressing diabetes and prediabetes. Follow up of abnormal findings by the patient's primary care physician is vital to overall management and outcomes.

B. Limitations

1. Potential that participants with diabetes at baseline were not excluded.

2. Ethnicity and income data not available

3. Sampling timeframe January 1, 2016 through July 24, 2017, but A1c screening was not implemented until April 2016 leaving potential that seasonal factors (such as Northerners migrating south in the winter) impacted the results.

4. Sample not necessarily representative of the Medicare Advantage population as both HouseCalls visit and A1c screening are voluntary.

C. Future Directions

1. Shift focus to comparing diabetes progression rates among other Medicare Advantage plans.

2. Measure A1c from year to year by test setting in order to establish the impact of HouseCalls A1c screening program.

3. Add diet and exercise variables to the HouseCalls assessment in order to enhance data collection and interpretation by better identifying specific behaviors adopted subsequent to HouseCalls A1c screening

4. Pilot a prediabetes program that tracks primary care physician follow up and referral to a lifestyle change program

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Professional Experience: 2013-Current -- Nurse Practitioner, HouseCalls 2005-2012 -- Director of Nursing Practice Standards, Nurse Consultant, Infusion RN, Medical Student Preceptor at Chapters Health System Conduct annual preventive visits to Medicare Advantage recipients (2013 to current) Created a multifaceted system for the development of nursing as a whole through the transformation of nurses into preceptor leaders, resulting in positive nurse preceptor retention and recruitment outcomes, as well as improved overall nurse confidence (2005-2012) Conducted, presented and published research to aid in the enhancement of evidenced-based practices in hospice and palliative care (2002-2012) Established and implemented clinical standards for nursing and allied therapies for hospice, palliative care, Partners-In-Care (pediatrics), Program for the All Inclusive Care of the Elderly (PACE), and nursing home diversion (1999-2012) Established palliative care protocols, including pain/symptom management, wound treatments, infusion access device care (1999-2012) Numerous presentations at national conferences

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