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A Process Improvement Project to Increase Referral and Documentation Rates for Diabetic Retinopathy Screening

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The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Debra Ann Bryant Taylor, Student

Dr. Sharon Lock, Advisor

DNP Final Project

A Process Improvement Project to Increase Referral and Documentation Rates for Diabetic
Retinopathy Screening

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College of Nursing

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Dedication

This manuscript is dedicated to my husband, Bill Taylor, and my sister, Cheryl Bryant. Bill, you have given up many, many things to see me succeed in this program. Without your love and support throughout this 3-year period, I could not have succeeded. Cheryl, you have told me to hang in there, day after day, never wavering, pushing me to succeed.   My new-found sister Vicky, even though you have arrived on the scene late, you have repeatedly told me how proud you are of my accomplishments. I am grateful for your encouragement. You three are my anchors from day to day, and my constant rooting section. Thank you for your encouragement. You have both sacrificed time, presence, and my involvement in the day to day living experiences. I hope you both know just how much I love you and need you in my corner. I could not have sustained the last 3 years without either of you. I would also like to thank God and my church family for sustaining me through this program as well. My church family has prayed for my success, they have laughed with me, cried with me, and given me the courage to move forward. I would also like to acknowledge and thank my Edge Body Boot Camp team for providing me with the means to become more fit and strong, while at the same time decreasing my stress level, especially during this last semester.

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Abstract

Background: Approximately 5.3 million Americans, aged 18 and over, carry a diagnosis of diabetic retinopathy (DR). By the year 2050 this number is expected to triple without effective healthcare intervention. Approximately 4.8% of the global blindness is attributable to DR, a silent, progressive, microvascular complication of diabetes. Best practice dictates immediate screening at time of diagnosis of Type II Diabetes Mellitus (T2DM) and biennial screenings thereafter, yet this need is often unmet.

Purpose: This study is a continuation of a process put into place by Dr. Michelle Campbell in October 2017 at the Norton Community Medical Associates Mount Washington practice and was to determine effectiveness of this intervention. This intervention involved formal referral with a specific form documenting the results of the ophthalmological screening being faxed back to the primary care office and scanned into the patient's electronic health record (EHR).

Methods: This study used a retrospective chart review for the period 1 January 2017 to 1 May 2017 and 1 January 2018 to 1 May 2018 to determine the number of formal referrals to ophthalmology pre- and post-implementation as well as the number of formal documentation forms received during both time periods.   Inclusion criteria included T2DM, ICD-10 codes E11.0-E11.9, and ages between 18 years and 70 years. One hundred charts were selected by the Information Technology Department for both pre- and post-implementation review.

Results: SPSS Software was used to analyze the data. A chi square test was used to measure these results. Pre- and post-implementation referrals yielded a p-value of 0.321 which was not statistically significant; however, pre- and post-implementation documentation yielded a p-value of .016 which was significant, unfortunately in the opposite direction than was hoped.

Keywords: Diabetic Retinopathy (DR), Electronic Health Record (EHR), Type II Diabetes Mellitus (T2DM)

Introduction

DR is the most prevalent cause of blindness world-wide. Interestingly, if found early enough, there are treatments available to prevent blindness. However, this needed screening is often not obtained in the T2DM population, whether due to the challenge of going to different facilities for appointments, the lack of knowledge that this is a serious, microvascular complication of diabetes that is often painless and asymptomatic until too late, or because the patient just has too much other information to digest and control. Unfortunately, the reasoning remains unclear as to why screenings are not more consistent in this population. The purpose of this project was to review the rates of referral for retinopathy screening prior to the implementation of a formal referral and a formal documentation process to capture these important screenings in patient's electronic medical records.

Background

In the United States, there are approximately 5.3 million persons, aged 18 and over, with a diagnosis of DR (CDC, 2015). This disease is caused by elevated blood glucose levels which cause damage to the tiny blood vessels in the retina of the eye (Weiss et al., 2015). DR is specifically a microvascular complication of diabetes that is exacerbated by hypertension in the uncontrolled diabetic (Molinaro and Dauscher, 2017). By the year 2050 it is anticipated that this number will triple (Zangalli et al., 2016) without effective healthcare intervention. Global health spending in 2015 to treat and prevent T2DM complications were somewhere between $673 billion and $1.2 billion (Adil, Siddiqui, Waghdhare, Bhargava & Jha, 2017). Comparatively, in 2004 alone, more than $500 million was spent on healthcare costs, both direct and indirect, related to blindness and complications caused by DR (Weiss et al., 2015); an increase of approximately $173 million in eleven years-time. Americans aged 20 to 74 with a new-onset of

blindness (Weiss et al, 2015) due to DR is expected to create a substantial and costly burden to healthcare (Zangalli et al, 2016). Interestingly, DR screening and treatment are reportedly highly cost-effective from a healthcare payer and societal view (Kreft, McGuinness, Doblhammer, & Finger, 2018).

Diabetic patients have increased risk for visual loss related to cataracts and glaucoma, retinopathy and correctable visual impairments (McCulloch, 2018). Fraser & D'Amico (2018) report that DR causes the most impaired vision and is the principal cause of blindness worldwide. Retinopathy affects 63% of all diabetics and increases the risk of blindness 25 times greater than non-diabetics (Jimenez-Baez, Marquez-Gonzalez, Barcenas-Contreras, Morales-Montoya & Espinosa-Garcia, 2015). Regular screenings and early treatment are imperative to preventing progression of DR into blindness in this population. Prevention through good glycemic control is but one avenue of prevention, although this is no guarantee that DR will not develop and certainly does not preclude one from recommended screenings (Fraser & D'Amico, 2018). Prompt treatment is imperative for existing disease to preserve vision (Fraser & D'Amico, 2018).

Unfortunately, the longer a person is diabetic, the higher the incidence of DR (Fraser & D'Amico, 2018). A meta-analysis of 35 studies conducted worldwide from 1980-2008 revealed DR exists in 35.4% of diabetic patients globally, and that proliferative DR exists in 7.5% of the global diabetic population (Solomon, et al., 2017). In developed countries, the leading cause of new onset blindness in adults aged 20-74 is DR (Solomon, et al., 2017).

Up to one-fifth of patients first diagnosed with T2DM already have signs of DR, and should, obtain their first screening at the time of diagnosis (Solomon et al, 2017). Thereafter,

annual exams are encouraged. However, for the sake of cost-effectiveness, bi-annual exams may be encouraged for the well-controlled T2DM who has had a normal retinal examination (Solomon, et al., 2017).

Ninety eight percent of visual loss is preventable with regular follow up, early detection and treatment. Since proliferative DR and macular edema are painless, leaving the patient often-times asymptomatic, it is imperative to provide this population with regular examinations and subsequent treatment. This only re-iterates the importance of Primary Care Providers referring these patients for examination and treatment. Solomon et al. (2017) stress the importance of documenting these examinations in the patient's electronic health record in the Primary Care Provider's office. This necessitates closed loop communication between the Primary Care Provider and the Ophthalmologist performing the DR screenings and or treatments.

In October 2017 a formal referral protocol was implemented at Norton Community Medical Associates (NCMA) in Mount Washington, KY to increase retinopathy screening and documentation rates among patients with T2DM (Campbell, 2017). A referral form was developed to fax to the optometrist or ophthalmologist with a request to fax the completed form back to the primary care provider upon completion of the patient's visit. The completed form included retinal examination findings and recommendations for follow-up. A 4-week follow-up evaluation showed no statistically significant difference in referral and documentation rates from pre- to post-protocol implementation. However, providers in the clinic found the process helpful and have continued to use the referral protocol.

Purpose

The overall objective of this project was to evaluate the referral process implemented at NCMA Mount Washington, KY to increase DR screening and documentation rates among patients diagnosed with T2DM. More specifically, this project focused on the following objectives:

1. Compare the rate of referrals for DR screening from pre-implementation to post-implementation years of the referral protocol.
2. Compare documentation rates of DR screening exams from years pre-implementation to post-implementation of the referral protocol.

Methods

Design. A retrospective chart review was used to evaluate the referral process for DR screening and formal documentation at NCMA Mount Washington, KY.

Sample. Inclusion criteria were ages 18 to 70 years old with a diagnosis of T2DM, (ICD-10 codes E-11 to E-11.9) who were seen at the NCMA Mount Washington, KY Clinic. Exclusion criteria were ages younger than 18 and older than 70 years old and without a diagnosis of diabetes. There were no exclusions for sex/gender or racial/ethnic groups. For the pre-implementation phase a random sample of the electronic health records of 100 patients who met the inclusion criteria and were seen between January 1, 2017 and May 1, 2017 at the NCMA Mount Washington Clinic were reviewed. For the post-implementation phase a random sample of the electronic health records of 100 patients who met the inclusion criteria and were seen between January 1, 2018 and May 1, 2018 at the NCMA Mount Washington Clinic were reviewed.

Informed Consent. Informed consent was waived for this project since it was a retrospective chart review that presented no more than minimal risk to the participants.

Procedure. The Norton Healthcare Information Technology Department was provided with inclusion and exclusion criteria. The department used the inclusion and exclusion criteria to randomly select 100 medical records from the pre-implementation phase and 100 medical records from the post-implementation phase. These charts were reviewed for formal referral documentation for DR screenings along with formal documentation of the result of screenings. Ninety-one charts were included in the pre-implementation review, and 96 charts were included in the post-implementation review. Nine patient records in the pre-implementation period and 4 patient records in the post implementation period were excluded either by death of the patient or age criteria. The medical record numbers of each patient were given a unique study ID number and placed in a crosswalk table. The data contained in the crosswalk table and the spreadsheet were stored in separate files on the principal investigator's identity-authenticated secure H-drive, in a firewall-protected electronic research folder at Norton Healthcare (NHC) that is only accessible to the principal investigator, NHC Information Services representative(s) and NHC UK College of Nursing Academic Partnership network administrators trained to establish file folder access. Demographics collected for this study were age, sex, race, and HgbA1C.

Data Analysis. Data analysis was accomplished using SPSS software and the crosswalk table. The mean age, and HgbA1C levels were calculated. The race and sex of the individuals was tallied. A chi-square test was used to determine the rates of referral and formal documentation for both the pre- and post-implementation reviews.

<center>**Results**</center>

Sample Characteristics The demographics of the randomly selected charts included in the pre-implementation phase are displayed in Table 1. The majority of patients pre- and post-implementation were Caucasian. The difference between male and female pre- and post-implementation were similar, with 92 male and 95 females included. The mean age of patients randomly selected for this study were 54.6 years-old pre-implementation and 55.2 years-old post-implementation. The average HbgA1C level was 7.6 pre-implementation and 7.9 post-implementation.

Documentation of Screening and Referrals. The number of patients receiving formal referral for DR screening were 19 pre- (2017) and 26 post- (2018) implementation (p=.321). While some improvement was shown, it was not statistically significant. The number of patients having formal documentation of screening were 16 pre-implementation (2017), and six post-implementation (2018) (p=.016). This is statistically significant; however, in the wrong direction from what was hoped (see Table 2). This also brings to light the possible lack of closed loop communication between primary care providers and ophthalmologists providing DR screenings.

Further, it should be noted that providers stand to gain anywhere from $37.50 to $75.00 per formally documented retinopathy screening (Blue Cross and Blue Shield, 2017; Centers for Medicare and Medicaid Services (2015). This study alone shows only a small portion of the diabetic community in this one practice. Of the 187 patients who should have received screening, only 32 (33.4%) total in the pre- and post-implementation phases generated revenue back to the provider. More importantly, these 32 patients received benefit of screening and preserving their eyesight a little longer.

<center>7</center>

Discussion

It appears the providers in the study clinic are discussing the need for DR screening in this population as evidenced by Norton Healthcare's Best Practice Screening Reminder for the providers, as most indicated DR was discussed with the patient; however, the use of formal referral and formal documentation of examination results are sporadic. This data was not the focus of this study and was therefore, not collected, although it was a part of the review process. Some formal documentation is present in some patient's EHR, but documentation is far from complete.

It is possible that there are those patients who seek eyecare from outside the Norton Healthcare system or whose insurance does not require referral. It is also possible there are those that do not seek out the screening, despite being told the necessity by providers. Adil, Siddiqui, Waghdhare, Bhargava, & Jha (2017) report that many of the respondents in their study did not receive DR screening and denied knowledge of the importance in relation to their eyesight. Likewise, Pasqual et al., (2015) report the results of their study found that there is a high non-compliance rate of DR screening among the T2DM population.

Limitations. This study was short-in-duration and did not capture a full year of data. Perhaps a longer study period would capture more of this population receiving formal referral and formal documentation for DR screenings. Since these patients are screened every 3 months by the provider when they are considered uncontrolled diabetics, and every 6 months when they are considered controlled diabetics, it is possible that a lot of these individuals did not fall within the study period.

Implications for Clinical Practice. With the American Diabetes Association (ADA) guidelines suggesting regular screening for this population, it is imperative that providers strive to ensure these patients receive the care needed to prevent blindness. Providers coordinate care for these patients on a regular basis and need to ensure the patient understands the importance of regular eye examinations. In addition to formal referral for ophthalmologic retinopathy screening, perhaps the appointment could be confirmed while the patient is still in the office to ensure the patient is aware of the appointment, and is amenable to it, as well as stressing the importance of following through with the appointment. In addition, the patient could return a formal copy of the retinopathy screening for inclusion in their medical records.

Implications for Further Study. Barriers to receiving an ophthalmological screening in the T2DM population should be explored. The barriers foreseen are transportation, time, and the difficulties of attending so many appointments in these patients. While providers cannot make a patient obtain a DR screening, they certainly can assist in addressing any barriers that may exist. Perhaps an automated system to follow up on receipt of formal documentation could be implemented within the EPIC system to ensure reminders to both the provider and the ophthalmologist are generated, increasing the likelihood of receipt of formal documentation.

Conclusion

While providers are aware of the necessity to screen the T2DM population regularly to provide prompt treatment preventing blindness, there still appears to be a deficit among this sample in receiving screenings and having formal documentation added to their medical records. Whatever the issue, it behooves the primary care provider to encourage patients to obtain screenings to prevent blindness and assist in any way possible to alleviate barriers to care.

Table 1. Demographics of Study Population

	Pre-implementation (*n* = 91)	Post-implementation (*n* = 96)	*p*
Age, mean (SD)	54.6 (9.6)	55.2 (8.6)	1.008
HGA1C	7.6	7.9	.874
Gender, no. (%)			
Male	39 (42.9%)	53 (55.2%)	
Female	52 (57.1%)	43 (44.8%)	
Race, n (%)			
Caucasian	86 (94.5%)	94 (97.9%)	
American Indian	1 (1.1%)	0 (0.0%)	
Asian	1 (1.1%)	1 (1.0%)	
African American	2 (2.2%)	0 (0.0%)	
Other	1 (1.1%)	0 (0.0%)	
Hispanic	0 (0.0%)	1 (1.0%)	

Table 2. Diabetic Retinopathy Referrals and Formal Documentation Rates

	Pre-implementation (*n* =91)	Post-implementation (*n* =96)	*p*
Referral to ophthalmology			
Yes	19 (20.9%)	26 (27.1%)	.321
No	72 (79.1%)	70 (49.3%)	
Documentation of screening			
Yes	16 (17.6%)	6 (6.3%)	.016
No	75 (82.4%)	90 (93.8%)	

References

Adil, M., Siddiqui, S., Waghdhare, S., Bhargava, A. & Jha, S. (2017). Awareness of retinal screening in patients with Type 2 Diabetes Mellitus: Are we meeting standards of care? *Asian Journal of Medical Sciences 8*(6), 9-12.

American Diabetes Association. (2013). Living with diabetes: Eye complications. Retrieved from http://www.diabetes.org/living-with-diabetes/complications/eyecomplications/? utm_source=Offline&utm_medium=Print&utm_content=eyehealth&utm _campaign=CON

American Optometric Association. (2014). Evidence-based clinical practice guideline: Eye care of the patient with diabetes mellitus. Retrieved from http://www.aoa.org/optometrists/tools-and-resources/evidence-basedoptometry/ evidence-based-clinical-practice-guidlines/cpg-3--eye-care-of-the-patientwith- diabetes-mellitus?sso=y

Blue Cross and Blue Shield (2017). 2018 PCP Quality Incentive Program. Retrieved from https://www.bcbsri.com/sites/default/files/providers/pdf/BCBSRI-2018-PCP-Quality- Incentive-Program-Booklet_FINAL.pdf

Brunisholz, K. D., Briot, P., Hamilton, S., Joy, E. A., Lomax, M., Barton, N., ... Cannon, W. (2014). Diabetes self-management education improves quality of care and clinical outcomes determined by a diabetes bundle measure. *Journal of Multidisciplinary Healthcare*, *7*, 533-542. http://dx.doi.org/10.2147/JMDH.569000

Campbell, M.R. (2017). A Process Improvement Project to Increase Diabetic Retinopathy Screening Rates as Evidenced by Formal Documentation. *DNP Projects*. 158.

References (continued)

Centers for Medicare and Medicaid Services. (2015). Quality rating system measure technical specifications. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityInitiativesGenInfo/Downloads/2016-QRS-Measure-Technical-Specifications.pdf

Fraser, C.E. & D'Amico, D.J. (2018). Diabetic Retinopathy: Prevention and Treatment. *Wolters Kluwer UpToDate*. Retrieved from http://www.uptodate.com/contents/diabetic-retinopathy-prevention-and-treatment

Jimenez-Baez, M.V., Marquez-Gonzalez, H., Barcenas-Contreras, R., Morales-Montoya, C. & Espinosa-Garcia, L.F. (2015). Early diagnosis of diabetic retinopathy in primary care. *Columbia Medica 46*(1), 14-18.

Kreft, D., McGuinness, M.B., Doblhammer, G., and Finger, R.P. (2018). Diabetic retinopathy screening in incident diabetes mellitus type 2 in Germany between 2004 and 2013 – A Prospective cohort study based on health claims data. *PLOS One.* Retrieved from https://doi.org/10.1731/journal.pone.0195426

Massachusetts Health Promotion Clearinghouse. (2017). Diabetic eye exam referral and communication form. Retrieved from https://massclearinghouse.ehs.state.ma.us/diab/db777.html

McCulloch, D.K. (2018). Overview of medical care in adults with diabetes mellitus. *Wolters Kluwer UpToDate.* Retrieved from http://www.uptodate.com/contents/1750?search=diabetic+retinopathy+screening&sources

References (continued)

Melnyk, B.M. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing and healthcare: A guide to best practice, 2nd ed.* Philadelphia, PA: Lippincott Williams & Wilkins

Molinaro, R., and Dauscher, C. (2017). Complications resulting from uncontrolled diabetes. *Medical Laboratory Observer*. Retrieved from MLO-Online.com

Pasquel, F.J., Hendrick, A.M., Ryan, M., Cason, E., Ali, MK, and Venkat Narayan, K.M. (2016). Cost-effectiveness of Different Diabetic Retinopathy Screening Modalities. *Journal of Diabetes Science and Technology 10*(2) 301–307.

Sheppler, C. R., Lambert, W. E., Gardiner, S. K., Becker, T. M., & Mansberger, S. L. (2014). Predicting adherence to diabetic eye examinations: Development of the Compliance with Annual Diabetic Eye Exams Survey. *Ophthalmology*, *121*, 1212-1219. Retrieved from http://dx.doi.org/10.1016/j.ophtha.2013.12.016

Solomon, S.D., Chew, E., Duh, E.J., Sobrin, L., Sun, J.K., VanderBeek, B.L., Wykoff, C.C., and Gardner, T.W. (2017). Diabetic Retinopathy: A Position Statement by the American Diabetes Association. *Diabetes Care 40*, 412-418.

Walker, E. A., Schechter, C. B., Caban, A., & Basch, C. E. (2008). Telephone intervention to promote diabetic retinopathy screening among the urban poor. *American Journal of Preventative Medicine*, *34(3*), 185-191.

References (continued)

Weiss, D. M., Casten, R. J., Leiby, B. E., Hark, L. A., Murchison, A. P., Johnson, D., ... Haller,

J. A. (2015). Effect of behavioral intervention on dilated fundus examination rates in

older African American individuals with diabetes mellitus: A randomized clinical trial.

JAMA Ophthalmology, *133 (9)*, 1005-1012. Retrieved from

http://dx.doi.org/10.1001/jamaophthalmol.2015.1760

Zangalli, C. S., Murchison, A. P., Hale, N., Hark, L. A., Pizzi, L. T., Dai, Y., ... Haller, J. A.

(2016). An education- and telephone-based intervention to improve follow-up to vision

care in patients with diabetes: A prospective, single-blinded, randomized trial. *American

Journal of Medical Quality*, *31(2)*, 156-161.

http://dx.doi.org/10.1177/1062860614552670