Quality Improvement in Diabetic Retinopathy Screening: Bridging the Gap with Tele-Ophthalmology

Justin Chin DO, MEd[1,2*], Basilia Oseguera, MD[1], Christine Lomiguen MD, MEd[2,3], Yui Nishiike NP[1], and Thomas McBride MD[1]

[1]Lifelong Medical Care-Department of Family Medicine, [2]Lake Erie College of Osteopathic Medicine-Department of Medical Education, [3]Millcreek Community Hospital-Department of Family Medicine

Introduction

Vulnerable populations in the United States often face multiple barriers to accessing health care, especially for chronic conditions such as type 2 diabetes. Despite the high prevalence of diabetic retinopathy, social determinants of health greatly impact the community in Richmond, California [1]. US Department of Health and Human Services Healthy People 2030 campaign has highlighted the importance of screening; however, implementation has been stymied by the COVID-19 pandemic [2].

Co-located health care and specialty services have been shown to reduce the disparities and improve patient outcomes [3-5]. A quality improvement project was undertaken to determine if diabetic retinopathy screening rates could be improved with tele-ophthalmology.

Methods

The quality improvement project utilized a quasi-experimental study in which three Plan-Do-Study-Act cycles were enacted to inform a needs assessment regarding diabetic healthcare maintenance. 159 patients met inclusion criteria. A workflow was established in which patients were identified, scheduled, and screened with appropriate follow-up (Figure 1).

ID
- A1C of greater than or equal to 6.5%
- Fasting blood glucose of greater than or equal to 126 mg/dl
- Two-hour blood glucose of greater than or equal to 200 mg/dl

Referral
- EPIC EMR : " Referral to Diabetic Retinal Screening"
  - History of adverse reaction to ophthalmological dilation
  - Current presence of acute narrow angle glaucoma or cataracts

Outreach
- Medical assistants and support staffs call to schedule
- Bi-monthly clinic with AM/PM availability

Screening
- SPECT Retinal Scan with 1% tropicamide dilation
- Diabetic foot exam, laboratory screening, ADA vaccines
- Traditional HCM: FIT, mammogram, pap smear, DEXA, AAA US

Follow-Up
- Positive screening: Referral to higher level screening
- Negative screening: Reminder call in 1 year for rescreen
- PCP follow-up as indicated

Results

During the study period, 40 patients were screened from eligible participants (25%). Demographics were heavily skewed toward Latinx and uninsured patients in which Spanish was the primary language (Figure 2).

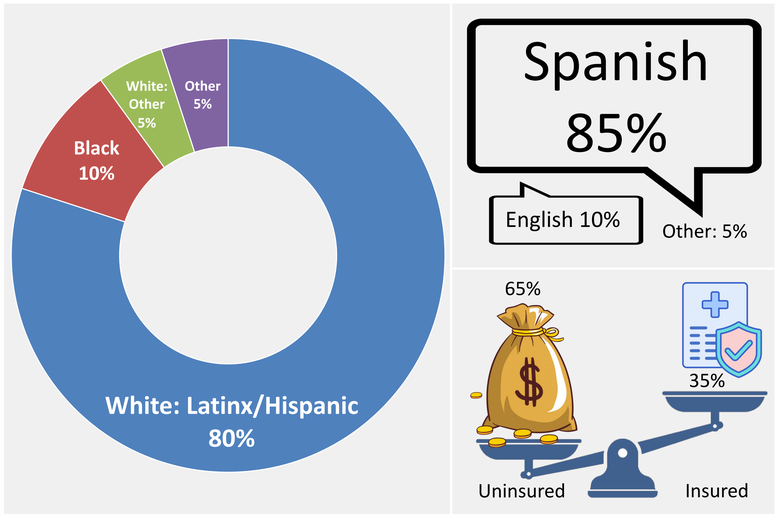

Figure 2. Selected sociodemographic information from patients that attended the clinic.

Prior to the quality improvement project, diabetic retinal screening averaged 10% and afterwards of 40% (Figure 3). Confidence intervals for pre-intervention 9.65-11.35 and post-intervention 35.88-41.78 with a confidence level of 5%. Paired t-test showed statistical significance with the intervention of p = 0.003.

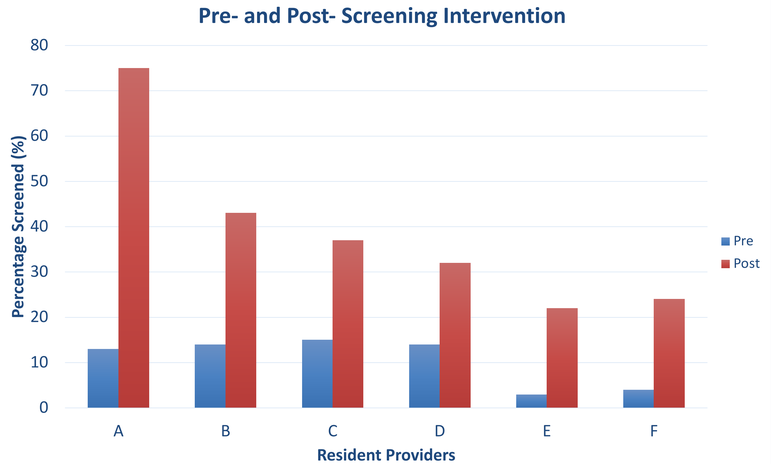

Figure 3. Pre- and post- data for percentage of completed retinopathy screening in patients with type 2 diabetes.

Discussion

The utility of diabetic retinopathy screening lies in its ability to detect the condition at an early stage, before it has progressed to the point where it can cause significant damage to the eyesight. The American Diabetes Association recommends a comprehensive eye exam at the time of diagnosis, and then annually afterwards [5]. By detecting the condition early and starting treatment promptly, people with diabetes can maintain their vision and avoid the potentially devastating effects of diabetic retinopathy [6].

As evinced in the referrals and screened patients, insurance and language concordance likely play a role in the delay of screening, with statistically significant differences in pre- and post-intervention. Having the diabetic retinal screening co-located in the patient's primary care office increased rates of completion compared to the traditional referral model.

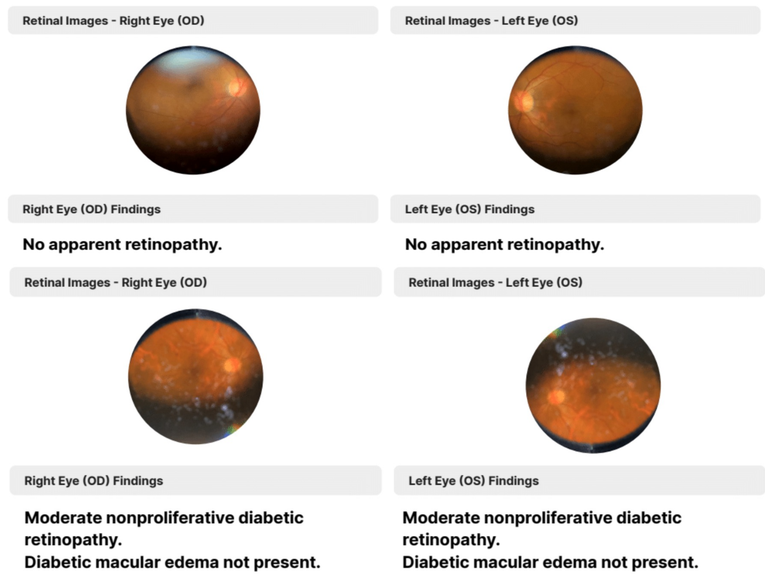

Figure 4. Sample images from SPECT diabetic retinopathy screening. Not pictures: Recommendations/follow-up.

Conclusion

Diabetic retinopathy screening rates improved with co-located services as social determinants of health often complicate external referral processes. The quality improvement process can be useful in identifying whether similar needs are present in other clinic/healthcare settings. Tele-ophthalmology can be used to improve screening rates in the primary care setting. From an osteopathic standpoint, this research supports that structure and function are reciprocally interrelated such that routine retinal screening can decrease retinopathy progression and allow for further discussions in diabetic control.

Contact

Justin Chin DO, MEd
LifeLong Medical Care
justinchindo@gmail.com
Website: http://bit.ly/2yDcbse

Acknowledgements

The authors would like to acknowledge the physicians, nurses, and staff at Lifelong Medical Care in supporting our endeavors.

The authors note that there were no sponsors or grants received for this study. This study is exempt under 45 CFR 46.102(d) as noted by LifeLong Medical Care's Institutional Review Board.

References

1. Contra Costa Health Services: Richmond Health Equity Report Card. Retrieved February 20, 2023, 2012, from https://cchealth.org/health-data/pdf/Richmond-Health-Equity-Report-Card-Full.pdf
2. Gómez CA, Kleinman DV, Pronk N, et al. Addressing Health Equity and Social Determinants of Health Through Healthy People 2030. J Public Health Manag Pract. 2021;27(Suppl 6):S249-S257. doi:10.1097/PHH.0000000000001297
3. Brown AF, Ma GX, Miranda J, et al. Structural Interventions to Reduce and Eliminate Health Disparities. Am J Public Health. 2019;109(S1):S72-S78. doi:10.2105/AJPH.2018.304844
4. Wintergerst MWM, Bejan V, Hartmann V, et al. Telemedical Diabetic Retinopathy Screening in a Primary Care Setting: Quality of Retinal Photographs and Accuracy of Automated Image Analysis. Ophthalmic Epidemiol. 2022;29(3):286-295. doi:10.1080/09286586.2021.1939886
5. American Diabetes Association Professional Practice Committee. 12. Retinopathy, Neuropathy, and Foot Care: Standards of Medical Care in Diabetes-2022. Diabetes Care. 2022;45(Suppl 1):S185-S194. doi:10.2337/dc22-S012
6. Heng LZ, Comyn O, Peto T, et al. Diabetic retinopathy: pathogenesis, clinical grading, management and future developments. Diabet Med. 2013;30(6):640-650. doi:10.1111/dme.12089