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Improving Documentation of and Access to Diabetic Retinopathy Screening at a Student-Run Free Clinic

Aleksandra Zarska[1]*; Sharmi Amin[1]*; Joshua R Ehrlich, MD, MPH[2]; Hari Conjeevaram, MD[3]

[1]University of Michigan Medical School, Ann Arbor, Michigan, USA
[2]Department of Ophthalmology and Visual Sciences, University of Michigan, Ann Arbor, Michigan, USA
[3]Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, Michigan, USA
*These authors contributed equally to this work.

Corresponding Author: Aleksandra Zarska; email: azarska@med.umich.edu

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Abstract

Background: Diabetic retinopathy (DR) affects approximately 9.6 million people in the United States (US) and is the leading cause of vision loss in working-age adults. However, less than 50% of people with diabetes in the US undergo the recommended screening. We aimed to assess need for DR screening (DRS) at the University of Michigan Student-Run Free Clinic (UMSRFC) and examine current DRS documentation practices to inform quality improvement initiatives at the clinic.
Methods: We conducted a needs-assessment survey of 67 patients to examine access to eye and vision care among patients seen at the UMSRFC between January and April 2023. Descriptive analysis of survey data was performed. A retrospective chart review of all patients seen at the clinic between March 2021 and March 2023 was conducted to evaluate documentation of DRS in the medical record. These results informed the development of a DRS initiative at the clinic.
Results: Of the 67 patients surveyed, 17 had a diagnosis of diabetes. Twenty-six patients reported an eye problem, of which 16 (62.0%) reported blurry vision, 9 (35.0%) reported floaters, and 1 (4.0%) reported dark/empty areas in their vision. Chart review yielded 404 patients, of which 70 had a diagnosis of type 2 diabetes. Twenty-eight (40.0%) had any mention of a diabetic eye exam in their chart, and 12 of these were up to date with the American Diabetes Association (ADA) screening guidelines. Twenty-three (33.0%) patients had any mention of a referral to an optometrist or ophthalmologist in their chart. On the DRS day, three patients were screened for DR. No cases of DR were identified.
Conclusion: Survey and chart review data indicated a need for increased DRS and improved documentation practices of DRS at the UMSRFC. A DRS initiative was successfully implemented at the UMSRFC under the oversight of an ophthalmologist.

Introduction

Approximately 37.3 million people in the United States (US) have a diagnosis of diabetes, and an additional eight million are estimated to have undiagnosed diabetes.[1] The prevalence of diabetes is rising at an unprecedented rate, with the CDC predicting a staggering 700% increase in the number of young people with diabetes by 2060.[2] Diabetic retinopathy (DR) is the most common complication of diabetes and the leading cause of vision loss in working-age adults.[3,4] DR is a microangiopathy of the retina that is worsened by poor glycemic and metabolic control.[5,6] In the US, approximately 9.6 million people have DR, a number that is expected to double by 2050.[7,8] Given this concerning trend, early diagnosis and treatment of the disease is critical to prevent vision loss among patients.

The American Diabetes Association recommends a dilated eye exam every one to two years in individuals with diabetes to screen for DR.[9] However, less than 50% of people with diabetes in the US undergo the recommended screening.[10] This is particularly concerning because DR is asymptomatic in its early stages and treatment

cannot restore vision that has already been lost.[11] Low screening rates are attributed, in part, to systemic and socioeconomic barriers including poor access to care, insufficient care coordination, and high out-of-pocket expenses.[12] These barriers restrict access to preventive screening, particularly in low-income communities, thereby increasing the risk of delayed diagnosis and vision-threatening DR.[13]

Student-run free clinics (SRFCs) provide longitudinal, comprehensive primary care services to uninsured patients and can serve as an important source of vision and eye health screening in low-income communities. However, only 21.7% of student-run free clinics across the US offer routine eye care.[14] As a result, patients with or at risk for DR at student-run free clinics are referred to external optometry or ophthalmology services where follow-up can take several weeks or may not occur at all. Furthermore, failure to document DR screening (DRS) in the electronic medical record (EMR) may contribute to providers overlooking DR and not making timely referrals when screening is due.

The University of Michigan Student Run Free Clinic (UMSRFC), first established in 2012, provides high quality health care to uninsured and under-insured adults.[15] The clinic is the sole provider of free primary health care in Livingston County and provides care to approximately 400 patients each year. This study aimed to assess the need for DRS at the UMSRFC and examine current practices for documenting DRS in the EMR. This assessment informed the development of a diabetic retinopathy screening day at the UMSRFC to improve access to eye health services.

Methods

This study was deemed exempt by the University of Michigan Institutional Review Board (HUM00237348).

Pilot Needs Assessment Survey

This report is part of a mixed-methods study to inform quality improvement initiatives at the UMSRFC. The first phase was a needs-assessment survey, which was administered to patients seen at the clinic over a 3-month period. This eight-question survey consisted of multiple-choice and free-text response questions regarding diabetes diagnosis, previous/current eye diagnoses, previous/current eye concerns (e.g., blurry vision, dark or empty areas in visual fields), where patients receive their eyeglasses prescription, and patients' most recent visit to an ophthalmologist (online appendix). All responses were anonymized, and results were descriptively analyzed using Microsoft Excel (Version 2304, Microsoft, Redmond, WA). Survey results are reported as frequency-percent for multi-level and dichotomous variables.

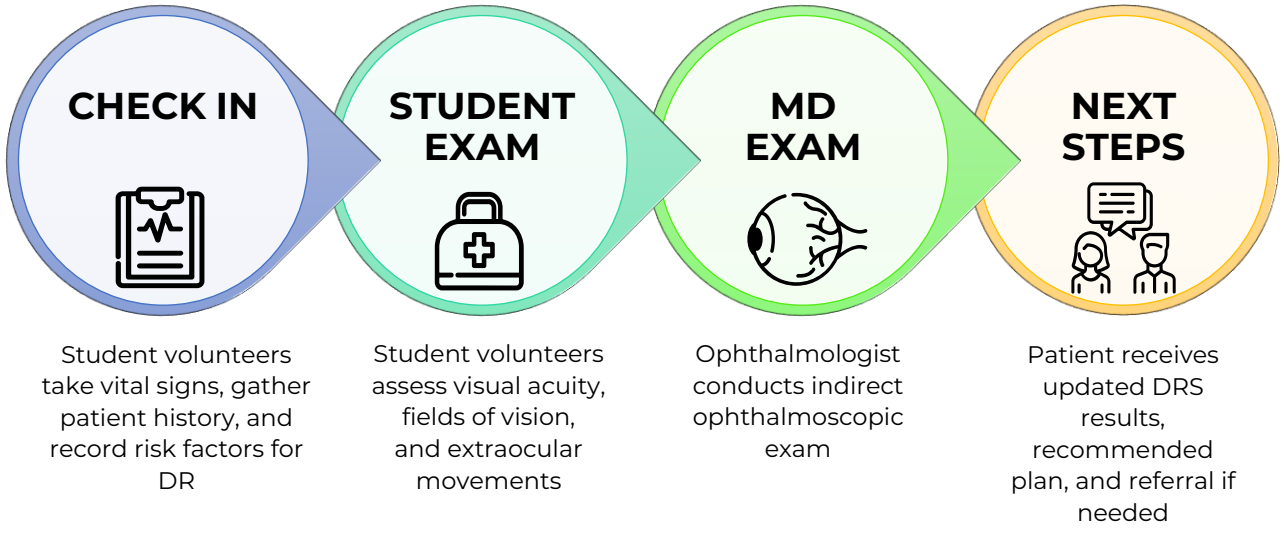
Chart Review

We completed a retrospective chart review of all patients seen at the clinic between March 2021 and March 2023 (n=404), extracted from Practice Fusion (EMR; Allscripts, San Francisco, CA). Variables of interest included diabetic diagnosis, documented eye concerns, most recent Hemoglobin A1c (HbA1c) value (%), documentation of any DRS in the EMR, and date of referral to optometry or ophthalmology, if available. Diabetic diagnoses included type 2 diabetes mellitus with complications, without complications, with unspecified complications, with diabetic polyneuropathy, or with unspecified diabetic retinopathy. Demographic data included gender, age, race/ethnicity, and preferred language. All protected health information (PHI) from the chart review was de-identified and stored in a Health Insurance Portability and Accountability Act (HIPAA)-compliant folder, accessible only to those with direct involvement in this study.

Diabetic Retinopathy Screening Day Implementation

A UMSRFC leadership team member developed and presented a proposal to the UMSRFC advisory board regarding the implementation of a diabetic retinopathy screening day at the clinic, and advisory board approval was granted. Patients with a diagnosis of type 2 diabetes were selected at random and contacted by phone by leadership team members to schedule an appointment. Patients were asked the date of their last eye exam, and those who had a dilated eye exam for DR in the past year were excluded from participating. Providers from the University of

Figure 1. Representation of Diabetic Retinopathy Screening Day workflow at the University of Michigan Student-Run Free Clinic



DR: diabetic retinopathy; MD: Doctor of Medicine; DRS: diabetic retinopathy screening.

Michigan Department of Ophthalmology and Visual Sciences were recruited by email and word of mouth to participate in the screening day and conduct dilated eye exams. A medication protocol for the use of dilating eye drops was drafted by clinic leadership team members and approved by the UMSRFC advisory board and an ophthalmology faculty member. Dilating eye drops and post-mydriatic sunglasses were purchased by the clinic prior to the screening day. An indirect ophthalmoscope was loaned by the University of Michigan Department of Ophthalmology and Visual Sciences and brought to the clinic by a resident ophthalmologist.

On the day of the screening event (Figure 1), patients were greeted at by intake volunteers and completed an informed consent form. Once patients were roomed, medical student volunteers assessed visual acuity and conducted a penlight exam under the supervision of an ophthalmology provider. Dilating eye drops (2.5% phenylephrine and 1% tropicamide) were administered to patients by students overseen by the provider. 20-30 minutes after the drops were administered, patients were assessed for dilation and indirect ophthalmoscopy was conducted by the ophthalmology provider to assess for diabetic retinopathy. Point-of-care HbA1c levels were obtained using fingerstick blood samples from patients who had not had a HbA1c test in the past three months. At the end of the visit, patients received their diagnosis, if applicable, and discussed next steps for follow-up.

Results

Needs Assessment Survey Results

Of the 67 patients surveyed, 17 (25.0%) had a diagnosis of diabetes (type 1 or 2). Thirty (46.0%) of the 67 patients reported having access to eye/vision care and 36 (54.0%) did not. Twenty-six patients reported an ongoing eye problem, of which, 16 (62.0%) patients reported blurry vision, 9 (35.0%) patients reported floaters, and 1 (4.0%) reported dark or empty areas in their vision. Nineteen of 67 (28.0%) patients saw an eye doctor in the last year, 20 (30.0%) patients saw an eye doctor in the last 1-2 years, and 9 (13%) patients saw an eye doctor 3-5 years ago.

Chart Review Results

Chart review yielded 404 patients seen at the

Table 1. Demographic data for patients included in chart review

Characteristic	Number of patients, n (%)	Patients with pre-diabetes diagnosis, n (%)	Patients with diabetes diagnosis, n (%)
Patients seen between March 2021 and March 2023	404 (100)	39 (10.0)	70 (17.0)
Age (years)			
18-40	131 (32.0)	2 (5.0)	4 (6.0)
41-65	225 (56.0)	28 (72.0)	51 (73.0)
>65	48 (12.0)	9 (23.0)	15 (21.0)
Ethnicity			
Hispanic	25 (6.0)	6 (15.0)	8 (11.0)
Non-Hispanic	72 (18.0)	4 (10.0)	7 (10.0)
Not specified	307 (76.0)	29 (75.0)	55 (79.0)
Preferred language			
English	340(84.0)	28 (72.0)	57 (82.0)
Spanish	49 (12.0)	9 (23.0)	11 (16.0)
Hindi	3 (1.0)	0 (0.0)	1 (1.0)
Russian	3 (1.0)	2 (5.0)	0 (0.0)
Chinese	1 (0.2)	0 (0.0)	0 (0.0)
Other	8 (2.0)	0 (0.0)	1 (1.0)

clinic between March 2021 and March 2023. Demographic data for this cohort are provided in Table 1. Seventy patients (17.0%) had a diagnosis of type 2 diabetes. The average HbA1C for the patients with diabetes was 7.8%, with a range of 5.2%-17.8%. Twenty-eight (40.0%) of the 70 had any mention of a diabetic eye exam in their chart from any point in time. Explicit documentation of a previous diabetic eye exam was found in 17 of 70 patients' (24.0%) charts, and 12 (71.0%) of these 17 patients were up to date with the ADA screening guidelines (DRS performed in the last 1-2 years) as of their last visit at the UMSRFC. Twenty-three of 70 (33.0%) patients had mention of a referral to an optometrist or ophthalmologist for an eye exam in their chart.

Diabetic Retinopathy Screening Day Results

We contacted 36 patients by phone to attend the diabetic retinopathy screening day. Patients were randomly selected and contacted from the cohort of patients who were due for DRS based on chart review. For those unable to be contacted, a voicemail was recorded describing the DR screening day. In total, four patients scheduled an appointment for DR screening. Prior to the screening day, there were two cancellations and zero no-shows on the screening day. DRS exams were also offered to any patients who were being seen for a general wellness visit and had a diabetes diagnosis. In total, three patients with a diagnosis of type 2 diabetes were seen by an ophthalmology provider and screened for DR. One patient had never had a dilated eye exam, one patient had their last eye exam over 10 years ago, and one patient had their last exam one to two years ago. Of the three eye exams conducted, one patient had a normal eye exam, one patient had a finding of exudative maculopathy in the temporal macula, and one patient had peripheral cobblestone changes. No cases of diabetic retinopathy were visualized.

Discussion

Diabetic retinopathy is a harmful, yet preventable complication of diabetes. Previous studies have found that low socioeconomic status is a risk factor for developing DR due, in part, to decreased access to screening and lack of health insurance.[16] Our comprehensive mixed-methods study uncovered two main findings. First, despite citing many eye concerns, most patients seen at the UMSRFC did not have access to eye/vision

care. Second, there were inconsistencies in the documentation of DRS in the EMR, which may be contributing to lower screening rates within our patient population. Addressing these issues is vital to ensure equitable healthcare access and effective management of DR in vulnerable patient populations.

While our study did not directly measure diabetic retinopathy screening rates due to a lack of data and documentation of DRS in the EMR, studies have found that DRS rates are particularly low in socioeconomically disadvantaged populations and those without health insurance.[17] These patients are at an increased risk for severe complications from diabetes, including vision loss and blindness. Of the three patients who were screened for DR during our screening event, one patient had never had an eye exam for DRS, and one had an eye exam over 10 years ago, highlighting the need for increased access to vision care in our patient population. For patients with abnormal findings during the screenings, we improved our referral practices to local optometry clinics. Additionally, we connected patients with our insurance and referral coordinators to assist in obtaining Medicaid or institutional financial assistance if patients were eligible and in need of further ophthalmic care.

This study also revealed significant gaps regarding documentation of DRS within the UMSRFC's EMR. This may be partially explained by clinic workflow given that the UMSRFC has rotating volunteer providers and students on a weekly basis. The UMSRFC also lacks a standardized protocol for charting, and as a result, we found that documentation of screenings can be irregular and infrequent. The absence of proper DRS documentation may also be attributed to providers not routinely inquiring about DRS during patient visits. Many patients seen at the UMSRFC have multiple chronic conditions and limited time during visits poses a challenge to addressing each concern. Unfortunately, lack of adequate charting can put patients at risk of missing critical screening checkpoints, as evidenced by some patients having partial documentation but still not meeting ADA standards for compliance. Notably, the clinic's current workflow does not have reminders for providers to inquire about the timing and results of DRS for patients with diabetes. To address this issue, the study team proposed and received approval from the UMSRFC Advisory Board to include two questions about eye screening in the patient intake packet. of care and promote better management of diabetic retinopathy in the clinic's patient population.

Limitations

Our study has several limitations. First, we conducted surveys with only a subset of clinic patients over a three-month period, and we did not assess barriers in patients who did not complete the needs assessment survey, which may limit the generalizability of our findings. Nevertheless, we were able to successfully reach 67 patient respondents, who provided valuable and diverse insights. Second, all patients who attended the screening day were English-speaking. To promote inclusivity, we plan to make use of interpreters to attract more non-English speaking patients to screening events as these patients comprise a significant subset of patients with diabetes at our clinic (28%). Additionally, we did not gather data on race and ethnicity in our chart review given that it was unspecified in most patient charts. However, we accounted for diversity in ethnicity, age, and preferred language in our descriptive analysis. Lastly, our survey results indicated that many patients were interested in receiving prescription services at the clinic. Due to a lack of ophthalmic equipment and limited clinic resources, however, we were unable to provide patients with glasses prescriptions. To address this limitation, we provided printed flyers with information on low-cost, local optometry services.

Future Directions

In our efforts to increase the number of DRS events and reach more patients, we have identified several future interventions that can be implemented at the free clinic. First, investing in a remote retinal screening device could eliminate the necessity for an in-person ophthalmologist at screening events. This device would enable us to conduct eye exams for individuals with diabetes during their routine general medical visits, enhancing convenience for both patients and providers. Second, to better reach the clinic's

Spanish-speaking patient population, we plan to partner with Community-Led Interpretation for Medical Equity, a student-based interpreter service, to help assess needs and schedule appointments. Furthermore, we plan to implement reminder notification systems within patient charts to maximize patient engagement and participation in DRS events and reduce the risk of missed opportunities for health maintenance. Finally, in response to concerns raised by patients regarding the cost of prescription eye care, we are exploring future possibilities to establish a program that provides free, recycled glasses to patients.

Conclusion

Survey and chart review data indicated a need for increased DRS at the UMSRFC. To address this issue, we plan to implement a formal, quarterly DRS program under the guidance and oversight of an ophthalmologist. Moreover, chart review analysis revealed a significant lack of documentation concerning DRS in current practices. Interventions to improve the standardization of screening documentation in the EMR include the addition of two questions about most recent eye screening to the UMSRFC patient intake form and the creation of a template in the EMR to ensure consistent documentation of DRS by providers and volunteers.

By implementing these interventions, we aim to strengthen our DRS program, enhance patient care, and foster collaboration between the UMSRFC team and ophthalmology providers. This systematic approach to documentation will also enable us to regularly monitor and address patients' eye health leading to better overall health outcomes for our clinic population.

Disclosures

The authors have no conflicts of interest to disclose.

References

1. Diabetes Research Institute Foundation (DRIF). Diabetes Statistics. Hollywood (FL): DRIF; [accessed 2023 Jul 26]. Available from: https://diabetesresearch.org/diabetes-statistics/ LINK
2. Centers for Disease Control and Prevention (CDC). Future Surge in Diabetes Could Dramatically Impact People Under 20 in U.S. Atlanta (GA): CDC; 2022 Dec 19 [accessed 2023 Aug 6]. Available from: https://www.cdc.gov/media/releases/2022/p1229-future-diabetes-surge.html LINK
3. Deshpande AD, Harris-Hayes M, Schootman M. Epidemiology of diabetes and diabetes-related complications. Phys Ther. 2008;88(11):1254-64. https://doi.org/10.2522/ptj.20080020 LINK
4. Hartnett ME, Baehr W, Le YZ. Diabetic retinopathy, an overview. Vision Res. 2017;139:1-6. https://doi.org/10.1016/j.visres.2017.07.006 LINK
5. Kollias AN, Ulbig MW. Diabetic retinopathy: early diagnosis and effective treatment. Dtsch Arztebl Int. 2010;107(5):75-83; quiz 84. https://doi.org/10.3238/arztebl.2010.0075 LINK
6. Moreno A, Lozano M, Salinas P. Diabetic retinopathy. Nutr Hosp. 2013;28 Suppl 2:53-6. https://doi.org/10.3305/nh.2013.28.sup2.6714 LINK
7. American Society of Retina Specialists (ASRS). Americans in the Dark on Diabetic Retinopathy Symptoms, Risks, Survey Finds. Chicago (IL): ASRS; 2020 Oct 29 [accessed 2023 Jul 26]. Available from: https://www.asrs.org/sections/member-news/5097/Americans-in-the-Dark-on-Diabetic-Retinopathy-Symptoms-Risks-Survey-Finds LINK
8. Lundeen EA, Burke-Conte Z, Rein DB, et al. Prevalence of diabetic retinopathy in the US in 2021. JAMA Ophthalmol. 2023;141(8):747-54. https://doi.org/10.1001/jamaophthalmol.2023.2289 LINK
9. Solomon SD, Chew E, Duh EJ, et al. Diabetic retinopathy: a position statement by the American Diabetes Association. Diabetes Care. 2017;40(3):412-8. https://doi.org/10.2337/dc16-2641 LINK
10. Chedid EH, Golden QR, Jager RD. Operational challenges in delivery of a charity care program for diabetic retinopathy screening in an urban setting. Perm J. 2013;17(1):21-5. https://doi.org/10.7812/TPP/12-041 LINK
11. Hall A. Recognising and managing diabetic retinopathy. Community Eye Health. 2011;24(75):5-9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3218392/ LINK
12. Lu Y, Serpas L, Genter P, et al. Divergent perceptions of barriers to diabetic retinopathy screening among patients and care providers, Los Angeles, California, 2014–2015. Prev Chronic Dis. 2016;13:E140. https://doi.org/10.5888/pcd13.160193 LINK
13. Hazin R, Colyer M, Lum F, Barazi MK. Revisiting diabetes 2000: challenges in establishing nationwide diabetic retinopathy prevention programs. Am J Ophthalmol. 2011;152(5):723-9. https://doi.org/10.1016/j.ajo.2011.06.022 LINK
14. Okaka Y, Meah YS, Fallar R, Chadha N. Ophthalmology services at student-run free clinics: a national survey. J Natl Med Assoc. 2021;113(4):431-5. https://doi.org/10.1016/j.jnma.2021.02.004 LINK
15. Desmond BS, Laux MA, Levin CC, Huang J, Williams BC. Reasons why individuals remain uninsured under the affordable care act: experiences of patients at a student-run free clinic in Michigan, a Medicaid expansion state. J Community Health. 2016;41(2):417-23. https://doi.org/10.1007/s10900-015-0112-3 LINK
16. Nguyen CTN, Yosef M, Khalatbari S, Shah AR. Sociodemographic variables associated with risk for diabetic retinopathy. Clin Diabetes Endocrinol. 2022;8(1):7. https://doi.org/10.1186/s40842-022-00144-z LINK

17. Fairless E, Nwanyanwu K. Barriers to and facilitators of diabetic retinopathy screening utilization in a high-risk population. J Racial Ethn Health Disparities. 2019;6(6):1244-9. https://doi.org/10.1007/s40615-019-00627-3 LINK