

OPTOMETRY AND DIABETES: STANDARDS OF PRACTICE IN SOUTHEASTERN
MICHIGAN

By

Jennifer C. Sinclair & Emily M. Schafer

This paper is submitted in partial fulfillment of the
requirements for the degree of:

Doctor of Optometry

Ferris State University
Michigan College of Optometry

May, 2010

OPTOMETRY AND DIABETES: STANDARDS OF PRACTICE IN SOUTHEASTERN
MICHIGAN

By

Jennifer C. Sinclair & Emily M. Schafer

Has been approved

May, 2010

APPROVED:

Faculty Advisor

ACCEPTED:

Faculty Course Supervisor

Ferris State University
Doctor of Optometry Senior Paper
Library Approval and Release

OPTOMETRY AND DIABETES: STANDARDS OF PRACTICE IN
SOUTHEASTERN MICHIGAN

I, Jennifer C. Sinclair, and Emily M. Schafer, hereby release this Paper as described above to Ferris State University with the understanding that it will be accessible to the general public. This release is required under the provisions of the Federal Privacy Act.

4/30/10

Date

ABSTRACT

Background: The American Optometric Association (AOA) assembled the Optometric Clinical Practice Guidelines, stating recommendations for eyecare professionals and the diabetic eye examination. The purpose of this research was to evaluate how well practicing optometrists were following these AOA guidelines. *Methods:* An eighteen item electronic survey was created and distributed through five counties [Oakland, Wayne, Macomb, Washtenaw, Monroe] in southeastern Michigan. *Results:* Out of the 187 electronic surveys distributed, 58 optometrists responded. Information was obtained regarding patient history, exam elements performed, dilation schedules, and referral guidelines for their diabetic patients. *Conclusions:* After evaluating the results, it was concluded that the majority of optometrists in southeastern Michigan do follow the AOA guidelines, and in some ways practice at a level above the AOA recommendations.

ACKNOWLEDGEMENTS

The authors would like to acknowledge Dr. Rene Mika, O.D, FAAO for her guidance in this project. Without her expertise and patience, this project would not have been possible.

TABLE OF CONTENTS

	Page
ABSTRACT.....	ii
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
INTRODUCTION.....	1
METHODS.....	2
RESULTS.....	3
DISCUSSION.....	12
APPENDIX	
A. DIABETIC SURVEY.....	22

LIST OF TABLES

Table	Page
1. Duration of Diabetes Mellitus and Presence of Eye Disease.....	1

LIST OF FIGURES

Figure	Page
1. Age of Optometrists Surveyed.....	4
2. Number of Years in Practice.....	4
3. Location of Practice (County).....	4
4. Mode of Practice of Surveyed Optometrists.....	5
5. Percentage of Optometrists Performing Exam Elements on Diabetic Patients	6
6. Mydriatics Used.....	7
7. Dilation Timeframe for Controlled & Uncontrolled Diabetics without Retinopathy	8
8. Referral of Diabetic Patients with Retinopathy.....	9
9. Dilation Schedules for Controlled Diabetics.....	9
10. Dilation Schedules for Uncontrolled Diabetics.....	10
11. Referral of Diabetic Patients to Ophthalmology.....	10
12. Types of Literature Utilized.....	11

INTRODUCTION

Diabetes mellitus (DM) is a disease that affects an estimated 24 million people in the United States.¹ Type 2 DM has an annual incidence of 2.4 per 1,000 persons over the age of 20.² By the year 2050, it has been projected that 48.3 million individuals in the United States will be diagnosed with diabetes.³ DM is a chronic disease with long-term vascular complications that may include retinopathy. For those between the ages of 20-74, it is the leading cause of blindness in the United States.⁴

Diabetic retinopathy can occur early in the disease process; however patients may not experience any symptoms until later on when treatment would be ineffective. For patients with DM, the risk of ocular complications is related to the duration of the disease.⁵ The projected ocular manifestations relating to a specific duration of the disease have been summarized in the following table (reproduced from the Optometric Clinical Practice Guideline).

Duration of Diabetes Mellitus and Presence of Eye Disease⁵

Diabetes	Duration of Disease	Ocular Manifestations
Type 1	➤ 10 years	60% have some retinopathy
	➤ 15 years	Virtually all patients have some degree of retinopathy; 25% progress to proliferative diabetic retinopathy
	➤ 20 years	50% progress to proliferative retinopathy
Type 2	At diagnosis	20% have retinopathy
	➤ 4 years	4% progress to proliferative retinopathy
	➤ 15 years	60-80% have some retinopathy; up to 20% progress to proliferative retinopathy

Due to the ocular complications that may manifest over time in those with DM, these patients require a routine health examination of their eyes throughout their life. This is especially important due to likelihood of the patient being asymptomatic of any diabetic changes to the eyes. The American Optometric Association (AOA) assembled a set of practice guidelines stating

recommendations for eye care professionals and the diabetic eye examination. The guidelines outline the patient history, exam elements to be performed, dilation schedules, and referral guidelines. The AOA believes that by following these guidelines, optometrists can preserve vision and prevent vision loss in patients with DM. This is done through proper diagnosis, and appropriate referral and intervention.⁵ Simply assuming optometrists follow these practice guidelines is not enough to ensure proper diabetic eye care. A pilot study was conducted in southeastern Michigan to evaluate how well the practicing optometrists of that area were following the AOA guidelines. This descriptive study was meant to evaluate if optometrists practice at a level above, below, or at the standard defined by the AOA.

METHODS

A fifteen item electronic survey was created and distributed through five counties [Oakland, Wayne, Macomb, Washtenaw, and Monroe] in southeastern Michigan. Participants were chosen from a list of optometrists on the Michigan Optometric Association (MOA) website. Optometrists met criteria for selection if they were MOA members, practiced in one of the five counties surveyed, and had a valid email address.

After obtaining approval from the Ferris State University's Human Subjects Review Committee, the survey was sent electronically to 187 optometrists practicing in southeastern Michigan. The recipients were informed that the survey was voluntary and all identifying information would be kept confidential. The survey was sent by the Institutional Research and Testing of Ferris State University using SNAP[®] electronic survey software. The survey consisted of 18 questions. Four questions on demographic information were asked, including the participants' age, county of practice location,

number of years in practice, and type of practice. Fourteen questions focused on case history, exam elements, dilation protocol, referrals patterns, and patient education supplementation.

Although the survey was confidential, it was not anonymous. Participants surveyed were self-selected, and presumably honest in answering the questions. The data from the responses was analyzed and summarized in the following sections.

RESULTS

A total of 58 optometrists responded to the electronic survey. The ages of those surveyed were evenly dispersed, aside from the age range of 46-55 having the most surveyors at 28%, and the ages over 65 having 7% of the respondents. When it came to the number of years in practice, 41% of those surveyed have been practicing for over 25 years. Optometrists working in a private practice setting were the majority of responders at 67%, with the minority working for a VA hospital or a HMO. Lastly, the greater parts of the responses were from optometrists working in Oakland County at 40% of our total number of respondents. The figures below summarize the demographic data collected.

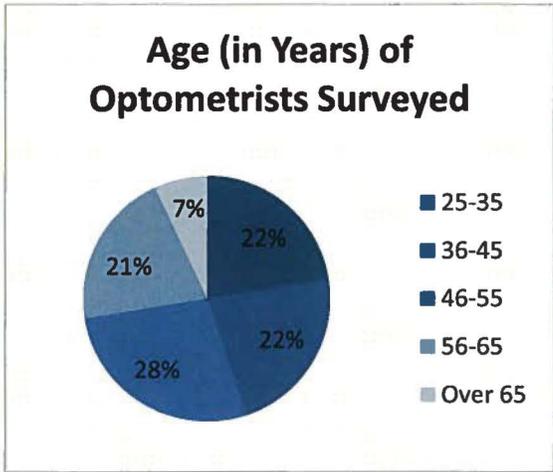


Figure 1: Age (years) of Optometrists Surveyed

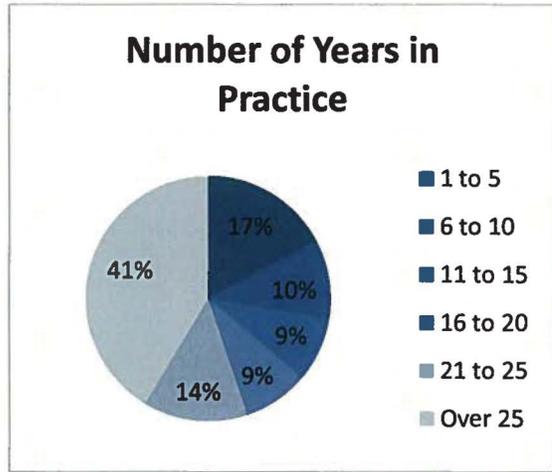


Figure 2: Number of Years in Practice

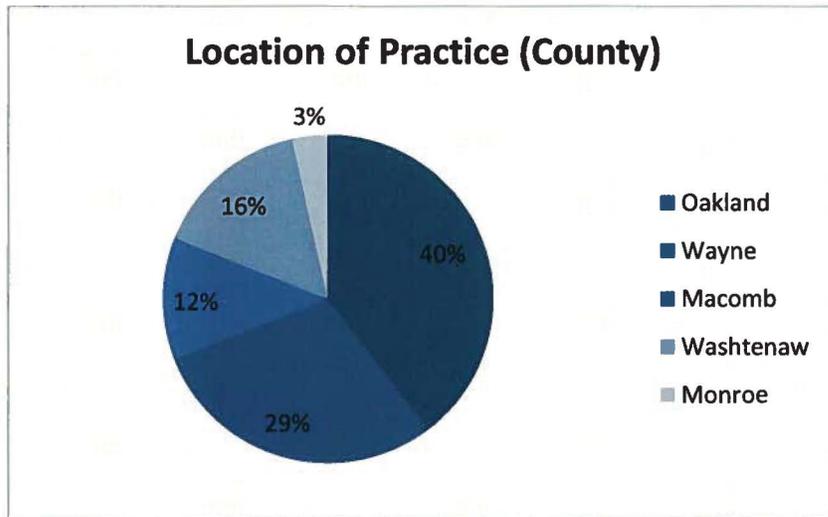


Figure 3: Location of Practices by County

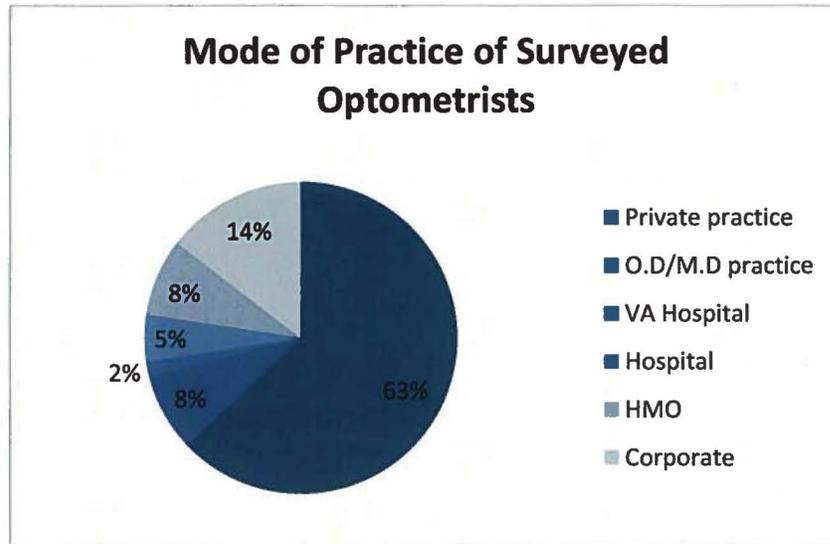


Figure 4: Mode of Practice of Surveyed ODs

Part of our survey was dedicated to what elements are asked during case history of an annual diabetic examination. Questions encompassed all aspects of case history including fasting blood glucose, which 84% of optometrists ask during an examination, along with hemoglobin A1c, asked at a rate of 72%. Duration of disease and current medications were the most frequently asked questions at 97% and 100% respectively. Patient compliance was asked 88% of the time and review of systems workup was asked by 76% of surveyed optometrists.

In addition to case history, participants were surveyed on the different exam elements which were completed during all annual diabetic examinations. The exam elements completed have been summarized in Figure 5 below. Visual acuity, pupils, extraocular muscle ranges, and intraocular pressures were the most frequent exam elements completed by 100%. Slit lamp examinations followed by refraction were the next most common at 98% and 97% respectively; stereo-fundus examination occurred at 74% and fundus photography at 50%.

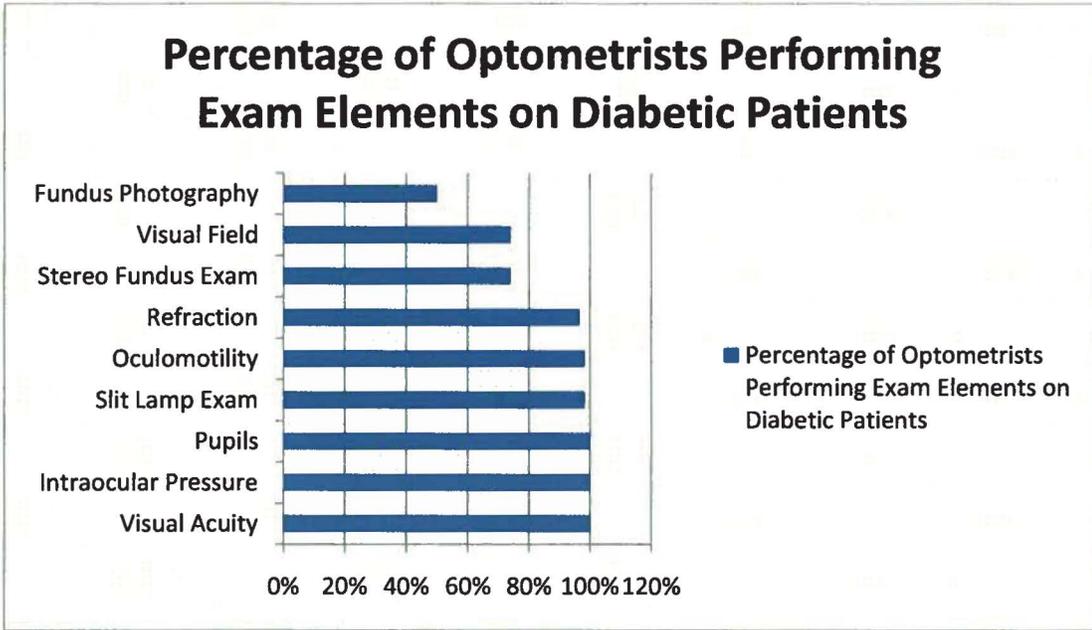


Figure 5: Percentage of Optometrists Performing Exam Elements on Diabetic Patients

Participants had the option of listing additional testing they routinely used on all diabetic patients, they are listed as follows:

- Amsler Grid
- Macular OCT
- Blood Pressure
- Dry Eye Evaluation
- Fluorescein Angiography
- Nutritional Assessment
- Substance Abuse Screening

The majority of participants (97%) routinely use mydriatics during diabetic exams. Figure 6 below summarizes the types of mydriatics used during diabetic examinations.

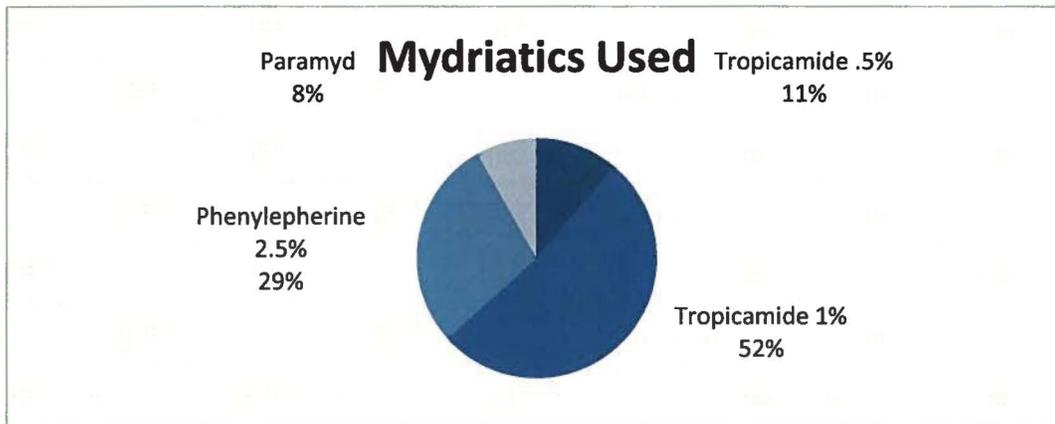


Figure 6: Mydriatics Used

A large part of our survey concentrated on follow up for dilation and referral practices for diabetic patients based on the severity of retinopathy upon presentation at their annual eye examination. Figures 7 below summarize dilation schedules for controlled and uncontrolled diabetics without retinopathy. Figure 8 summarizes the percentage of optometrists referring their diabetic patients with retinopathy to ophthalmology. In regards to patients who are under control with mild retinopathy, 57% dilate yearly, 45% within 6 months, 1.9% within 3 months, and 9% consult with a retina specialist; patients who are controlled with moderate retinopathy were referred by 12% of surveyed optometrist, dilated yearly by 17%, every 6 months by 52%, and every 3 months by 17%. Finally, controlled diabetes with severe retinopathy were referred for consult 48% of the time, followed every 3 months by 40%, every 6 months by 10%, and yearly by 2%. As for uncontrolled diabetic patients with mild retinopathy, 9% were referred for a retinal consult, dilated every 3 months by 19%, every 6 months by 45%, and yearly by 26%; patients with moderate retinopathy and uncontrolled were referred 19% of the time, dilated every 3 months by 41%, every 6 months by 33%, and yearly by 7%. Patients with

severe diabetic retinopathy and uncontrolled blood sugar were referred by 53%, dilated every 3 months by 40%, every 6 months by 5%, and yearly by 2%. Additionally, when asked about proliferative diabetic retinopathy, 67% of optometrist's referred, 29% dilated every 3 months, and 2% followed every 6 months or 1 year. Patients with macular edema were referred 62% of the time to ophthalmology by surveyed optometrists, or followed on a 3 month (29%), 6 month (5%), or yearly (3%) dilation schedule. More specifically, some optometrists commented on seeing the patient for yearly examinations/refractions, while the patient continues to see the retinal specialist for all diabetic care. When surveyed regarding visual field defects 26% of optometrists follow their patients every 3 months, 19% every 6 months, and 9% yearly. 41% fell into the "other" category, which included the following:

- Patient followed depending on etiology of visual field defect
- Refer all new visual field defects

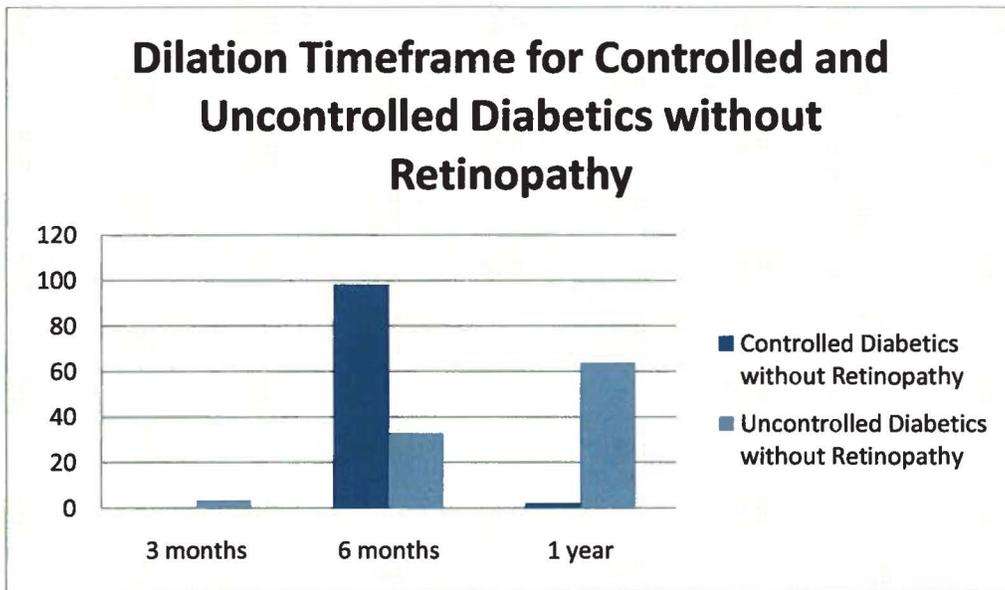


Figure 7: Dilation timeframe for controlled and uncontrolled diabetes without retinopathy

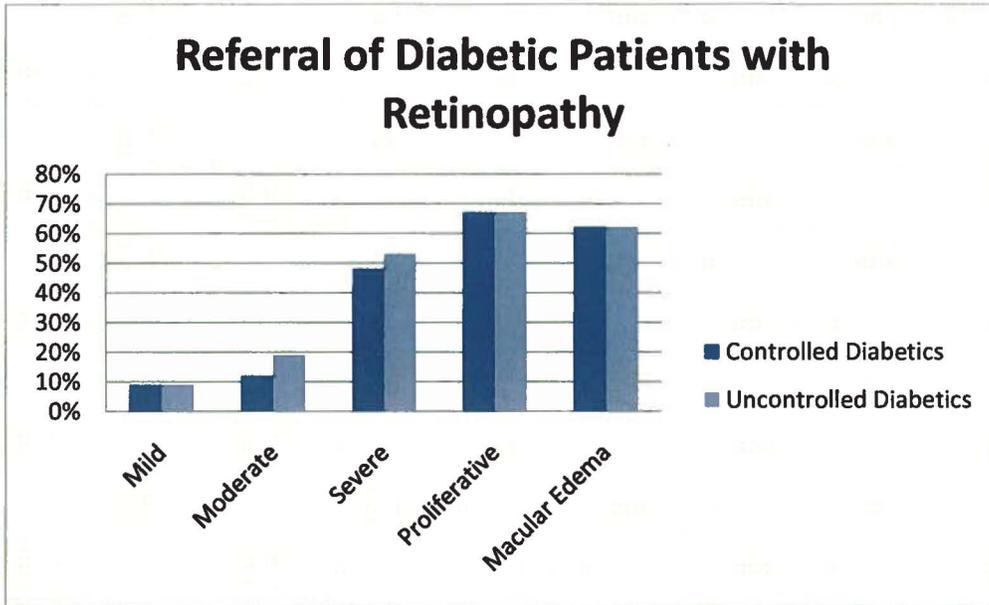


Figure 8: Percent of diabetic patients with retinopathy referred to ophthalmology

The following figures summarize and compare the dilation schedules and referral percentages for controlled and uncontrolled diabetics, separated by severity of retinopathy and time.

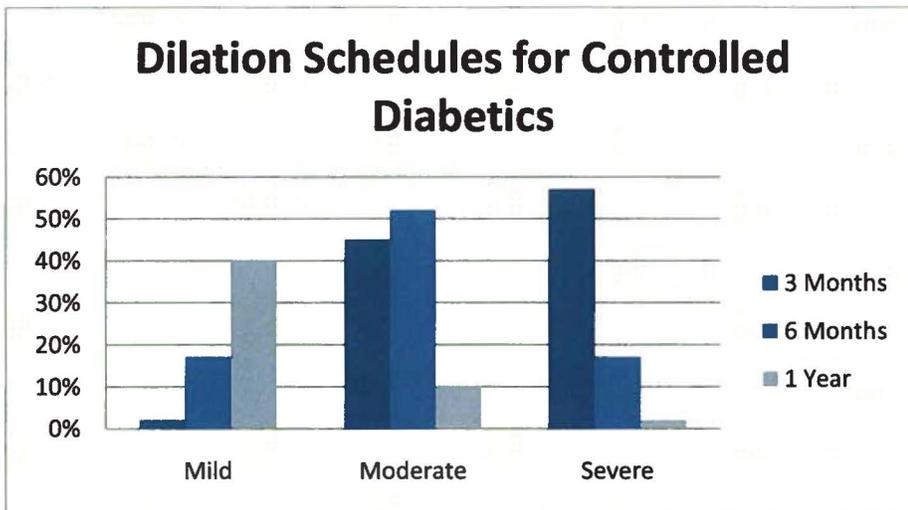


Figure 9: Controlled Diabetics Dilation Schedule

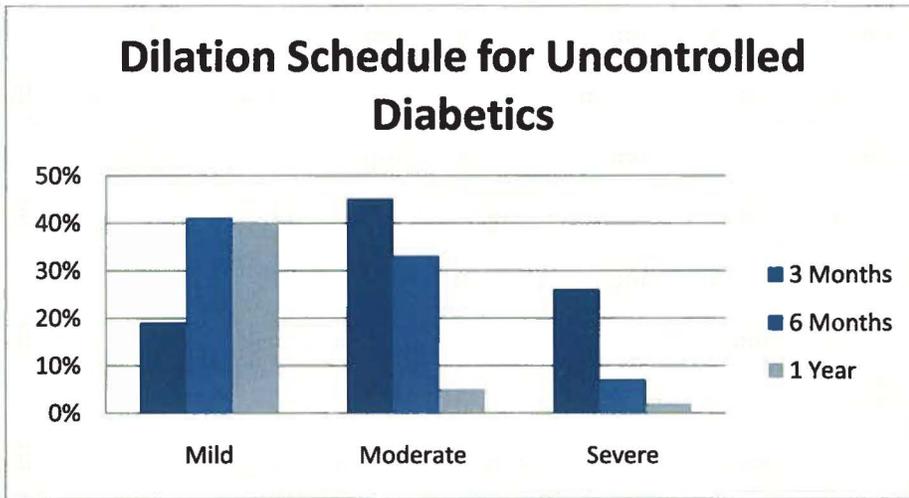


Figure 10: Uncontrolled Diabetics Dilation Schedule

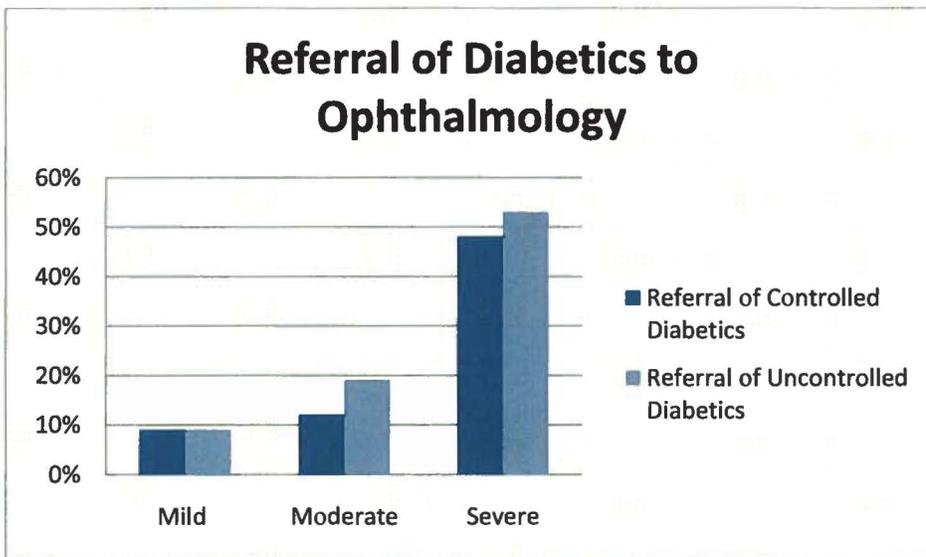


Figure 11: Referral of Controlled and Uncontrolled Diabetics

Participants were question regarding the types of referrals made to other professionals with the following results: 65.5% refer the patient back to the primary care physician, 2% make referrals to dental, 7% make referrals to podiatry, 7% to neurology,

and 22% to endocrinology. 10% of optometrists made “other referrals”, which consisted of urology and reports to the primary care physician.

When questioned regarding the use of literature to educate patients, optometrists were asked whether they always, occasionally, or never used literature and brochures with patients. 14% of all participants always use literature, 64% occasionally use literature, and 22% never use literature or brochures. Figure 13 below shows the distribution of the types of literature used. The other category consisted of literature from the American Academy of Optometry, pamphlets from a Detroit-Metro hospital, the Atlas of Clinical Ophthalmology, ophthalmology provided pamphlets, and websites from the American Dental Association and American Diabetes Association.

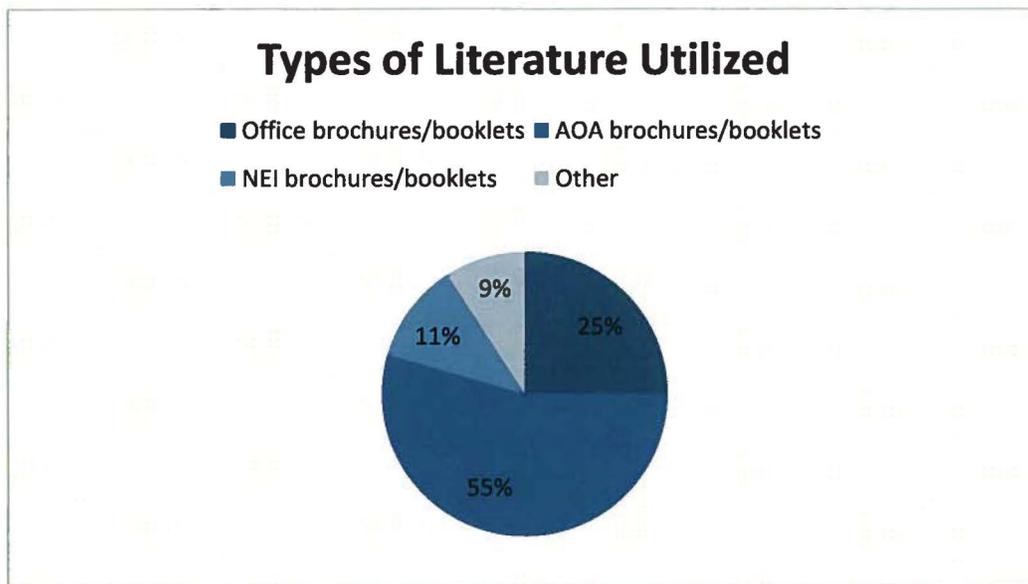


Figure 13: Distribution of types of literature used

When surveyed regarding the use of online resources to supplement patient education, 78% of optometrists claim to never use online websites, 5% always use them, and 17%

occasionally use resources on a case-by-case basis. The following is a list of online resources that were used by optometrists' polled:

- Eye Motion® animations
- Google®
- Medscape
- American Optometric Association
- American Diabetes Association
- Cochrane's Reviews
- WebMD
- Detroit-Metro hospital website

DISCUSSION

The purpose of this study was to evaluate how well optometrists in southeastern Michigan follow the AOA guidelines with their diabetic patients. The hypothesis being that the majority (about 80%) of optometrists do follow the guidelines. After evaluating the results, it was concluded that the majority of optometrists in southeastern Michigan do follow the guidelines. Any of the responses not consistent with this will be discussed further. Since this was only a pilot study of a small sample population, the results discussed cannot be generalized to represent larger populations.

According to the practice guidelines, a case history for a diabetic eye exam should include questions such as duration of disease, current medications, fasting blood glucose, and hemoglobin A1c levels. In response to the survey, practitioners in southeastern Michigan include all of these elements in their case history with duration of disease and current medications being the most frequently asked questions. As previously mentioned, the risks for ocular complications associated with diabetes directly correlates to the duration of the disease. It is important to know that these optometrists are asking

that information during their examination to determine the level of risk a patient has for diabetic ocular complications.

According to the results, the majority of AOA recommended exam elements were performed by 100% of surveyed optometrists. However, a stereo-fundus examination was performed by only 74%, or 43 of the 58 surveyed optometrists. The remaining percentage may be achieving their visualization of the retinal health through ophthalmoscopy or fundus photography. Amsler grid and macular optical coherence tomography (OCT) were additional tests performed that were not recommended on every diabetic patient by the AOA. By performing these additional tests, optometrists perform at a level above the standard. In order to achieve an adequate visualization of the retina for examination, a pupillary dilation with 0.5% or 1.0% tropicamide and 2.5% phenylephrine hydrochloride was recommended in the guidelines. This was followed by 97% of surveyed optometrists, allowing them to evaluate retinal health with fundus examination or fundus photography.

To ensure proper care, the AOA made an outline of when to dilate diabetic patients depending on the presence of retinopathy. The research concluded that many optometrists in southeastern Michigan follow the recommendations for dilation of these patients. There is no set dilation schedule for those who are diabetic without retinopathy, however “regular eye examinations” should occur. Almost 100% of the optometrists examined these controlled diabetic patients every 6 months. This may be optometrists being cautious as to not miss any retinopathy that may present. The optometrists tended to dilate those with uncontrolled diabetes without retinopathy yearly (over 60%) as opposed to every 6 months. It was assumed that the uncontrolled diabetics would be

monitored more closely than those with controlled diabetes as it was for the rest of the results.

For those with controlled mild non-proliferative retinopathy, more than half of the optometrists were found to follow the recommendations and dilate those patients every year. The remaining optometrists were examining their patients more often than once a year. This may be the optometrist being cautious, or they may have doubts regarding the patient reporting good blood sugar control. As expected, the research showed that uncontrolled diabetics with mild retinopathy were dilated more frequently than those who were controlled diabetics.

The recommendations were followed for moderate non-proliferative retinopathy, with a total of 69% dilating their controlled retinopathy patients every 6-12 months. However, only 40% dilated their uncontrolled moderate retinopathy patients 6-12 months. This is again due to optometrists being cautious and dilating the uncontrolled retinopathy patients more frequently than 6-12 months. Severe retinopathy requires the patient to be examined every 2-3 months in consultation with a retinal specialist. Whether the patient's blood sugar was controlled or uncontrolled, about half of the optometrists referred the patient to a retina specialist, and 40% examined the patient every 2-3 months. Despite the recommendations, 2% (1 out of 58) of the surveyed optometrists was examining the severe retinopathy patient only once a year. This could possibly allow proliferative retinopathy to develop and progress without the optometrist or patient even knowing. Also, depending on the judgment of the retinal specialist, severe non-proliferative retinopathy may require early scatter laser to ensure it will not progress to proliferative diabetic retinopathy.⁶

A prompt referral to a retinal specialist should take place when an optometrist discovers proliferative diabetic retinopathy (PDR). Those with PDR have a 75% chance of it progressing into high-risk PDR within 5 years. Also, the guidelines state that even if the patient does not have high-risk PDR or clinically significant macular edema (CSME), scatter laser photocoagulation may still be a benefit in preserving vision.^{7,8} The surveyed optometrists did not follow these guidelines with 29% continuing to examine their patients every 3 months without referral, and 2% (1) followed their patients every 6-12 months. The survey question did not detail whether or not the patient was being followed by optometry and ophthalmology concurrently. Therefore, the optometrists who are dilating patients with PDR every 6-12 months may be seeing the patient for “routine care”, while the patients are also under the care of a retinal specialist. Though macular edema that is not clinically significant can be followed every 2-3 months, it should be in consultation with a retinal specialist in case there are any treatable areas of edema. Those following a 3 month examination schedule did not mention consulting with a retinal specialist.

The AOA practice guidelines state no specific type of literature or source to be used for patient education; however it was recommended that practitioners give their patients take-home literature to read. Only 14% (8) of the surveyed participants always use literature. Unfortunately, this estimate is low compared to the hypothesis. Many patients forget information told to them, therefore supplemental literature is necessary. When they do use literature, most practitioners, 55% (24), are using AOA brochures for patient education on diabetes and the eye while 25% (11) are using office brochures

created for their own office. AOA brochures are important to give to patients for more than just patient education. They help to promote optometry and the importance of eye care without advertising one practice or company.

In order to determine whether or not southeastern Michigan O.Ds are complying with the AOA guidelines of diabetic care, the authors set forth an expectation that 80% of all optometrists must be following the guidelines to be considered compliant. While analyzing the data, a few surprises caught the attention of the authors. When surveyed on case history questions, 72% of all O.Ds inquired about hemoglobin A1c levels. The A1c level of a diabetic determines how well controlled a patient has been over the past 2-3 months. Research suggests that A1c levels of 7% or under is appropriate for most diabetics⁹, however it is the discretion of the physician to decide whether or not this is an suitable goal for each individual. With the amount of evidence compiled from the American Diabetes Association, American Heart Association, National Institute of Health, and many other organizations on the importance of A1c, why are some optometrists ignoring this important question? Presumably, ODs are not asking patients about their hemoglobin A1c because most patients do not know their percentage. However, the authors feel that this is a pertinent negative to document in each diabetic patient's chart.

When questioned regarding routinely used example elements, numerous ODs replied with fluorescein angiography (FA). The authors have assumed that this question was misinterpreted from "routinely" to "any other additional test." FA gives important information regarding the circulation of the retina; however this is a fairly invasive

procedure which ODs in Michigan cannot perform. Therefore the assumption was made that this specific test was ordered when clinically significant macular edema or proliferative diabetic retinopathy was suspected.

Many questions were asked regarding the dilation schedule and referral patterns of diabetic patients which present with retinopathy. The authors made the assumption that as the severity of retinopathy increases, dilation and referrals should increase. Likewise, the more uncontrolled a patient is, the more times they should be dilated. The data shows that controlled diabetics without retinopathy were dilated more frequently (every six months) than diabetics who were uncontrolled. Similarly, moderate, non-proliferative retinopathy patients who were controlled were dilated at a higher percentage (69%) at six months than uncontrolled diabetics with the same retinopathy (40%). Also interesting to note, diabetics with mild retinopathy were referred to ophthalmology equally (9%) no matter if they are controlled or uncontrolled. So why is it that there was an increase in dilation of controlled diabetics? The authors believe that more optometrists are referring patients who are uncontrolled sooner and continuing the management of controlled diabetics for a longer period of time.

As with any pilot study, certain limitations of the survey restrict the amount of assumptions that can be made. A large portion of the data compared the differences in care between controlled and uncontrolled diabetics. The survey itself never defined the parameters of each and therefore the questions are under the interpretation of the survey participants. The authors have assumed that controlled diabetes as defined by the American Diabetic Association as a hemoglobin A1c of 7% or lower and a fasting blood

glucose of 70 to 130mg/dl.¹⁰ In the future, it may be helpful to define these parameters in the survey in order to reduce any interpretation differences between participants.

Another addition that should be made to the survey would be a question regarding what impact the duration of the diabetes had on the care given to the patient. The survey concluded that optometrists were asking this question in the history, but never determined if it had any effect on their exam patterns.

The AOA guidelines state that patient compliance is a very important part of the case history during a diabetic eye exam. Results show that optometrists in southeastern Michigan also believe that compliance is important, and were asking about compliance 88% of the time during history taking. The AOA guidelines do not define what additional questions are necessary to determine what qualifies a patient on being compliant. The authors assume that compliance is a measure that is subjective, and is influenced by the optometrist based on information obtained from that patient during examination. Compliance may include items such as A1c, fasting glucose levels, whether or not a patient consistently takes prescribed medications, and whether they have developed and are meeting additional diet and exercise goals as recommended by their physician. Future surveys should further investigate the compliance issue and develop what facilitates the decision [of ODs] on whether patients are compliant or not.

A large limitation to this study would be the limited number of respondents to the survey. A 31 percent response rate (n=58) was not ideal for achieving accurate information from a sample population. Likewise, the survey was distributed to a small, concentrated area in southeastern Michigan that has a large population of optometrists

and ophthalmologists. Optometrists in more rural areas in the state of Michigan may be referring patients to ophthalmology in later stages of retinopathy due to the lack of access to health care. Furthermore, we would recommend a larger sample size in a future survey and to include more rural area optometrists.

A full understanding of the survey questions along with honest answers is critical in a study. This survey consisted of a potential lack of knowledge or misunderstanding of the Early Treatment Diabetic Retinopathy Study (ETDRS), leading the surveyors to randomly choose an answer for that question or to not answer the question at all (n=52). The ETDRS provides very valuable information in the risk of progression of diabetic retinopathy and treatment options for patients. Another question with further explanation of the ETDRS would be required in a future survey. The authors assumed that the participants were honest in their answers. However, because the participants self selected to take this survey, perhaps only the optometrists who follow the guidelines responded. The responders may have also given what they thought to be the correct answer as opposed to how they actually practice. Either of these situations may have caused the results to have overestimated percentages of optometrists who are actually following the AOA guidelines.

Aside from the previously mentioned, another area to improve on during a future study would be the age of the practicing optometrists. Due to software limitations, the ages of the surveyed optometrists were unable to be correlated to the results found. This would have been useful information while interpreting any outliers in the results. For instance, older optometrists did not learn how to do a stereo fundus examination in school

and therefore may not be performing this exam element. The older generation may also be referring more of the diabetic patients to ophthalmologists instead of managing their care themselves.

The AOA guidelines have been set forth in order for optometrists to provide the absolute highest quality primary care examination for their diabetic patients. Overall, the authors conclude that most optometrists in southeastern Michigan are following the AOA guidelines for diabetic care and some optometrists are going above and beyond the guidelines. This research paves the way for further research in this area, including larger studies so that further inferences can be made and additional questions may be answered.

REFERENCES

1. National Institute of Diabetes and Digestive and Kidney Diseases. National Diabetes Statistics, 2007 fact sheet [Internet]. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health; 2008 [cited 2010 Mar 8]. Available from: <http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm>.
2. Kenny S, Aubert R, Geiss L. Prevalence and incidence of non-insulin-dependent diabetes. In: Diabetes in America. 2nd ed. NIH publication No. 95-1468. Washington, DC: U.S. Government Printing Office; 1995. p. 47-68.
3. Narayan KM, Boyle JP, Geiss LS, Saaddine JB, Thompson TJ. Impact of recent increase in incidence on future diabetes burden: US. Diabetes Care. 2006;29(9):2114-2116.
4. Harris MI, Hadden WC, Knowler WC, Bennett PH. Prevalence of diabetes and impaired glucose tolerance and plasma glucose levels in U.S. population aged 20-74 yr. Diabetes. 1987; 36:523-34.
5. Cavallerano, J, editor. Optometric clinical practice guideline care of the patient with diabetes mellitus [Internet]. 3rd ed. St. Louis: American Optometric Association; 2009 [cited 2010 Mar 8]. Available from: <http://www.aoa.org/documents/CPG-3.pdf>.
6. Ferris FL. Early photocoagulation in patients with either type I or type II diabetes. Trans Am Ophthalmol Soc. 1996;94:505-37.
7. Early Treatment Diabetic Retinopathy Study Research Group. Grading diabetic retinopathy from stereoscopic color fundus photographs: an extension of the modified Airlie House classification. ETDRS Report No. 10. Ophthalmology. 1991;98:786-806.
8. Early Treatment Diabetic Retinopathy Study Research Group. Fundus photographic risk factors for progression of diabetic retinopathy. ETDRS Report No. 12. Ophthalmology 1991;98:823-33.
9. Qaseem A, Vijan S, Snow V, Cross T, Weiss K, Owens D. Glycemic control and type 2 diabetes mellitus: the optimal hemoglobin A1c targets. A guidance statement from the American College of Physicians. Annals of Internal Medicine. 2007 Sept 18;147(6):417-422.
10. A1C - American Diabetes Association [Internet]. Alexandria (VA): American Diabetes Association; c1995-2010 [cited 2010 Mar 29]. Available from: <http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-glucose-control/a1c/>.

APPENDIX A

DIABETIC SURVEY

SURVEY

Please fill out the survey in its entirety by checking the response(s) that best describe how you care for your diabetic patients. Thank you for your participation.

1. Please choose your age:
 - 25-35
 - 36-45
 - 46-55
 - 56-65
 - 65+
2. Number of years in practice:
 - 1-5
 - 6-10
 - 11-15
 - 16-20
 - 21-25
 - 25+
3. Please choose your mode of practice:
 - Private practice (1 or more O.Ds)
 - O.D/M.D practice
 - VA Hospital
 - Hospital
 - HMO
 - Corporate
4. Please choose the county that you work in:
 - Oakland
 - Wayne
 - Macomb
 - Washtenaw
 - Monroe

5. What questions encompass your case history during a diabetic eye examination (check all that apply)?
- A1c Level
 - Fasting blood glucose
 - Duration of disease
 - Medications
 - Compliance
 - Medical history – Review of systems, such as renal function, neuropathy, weight loss/gain, podiatry, and oral hygiene
6. What elements are typically included in your diabetic eye examination (check all that apply)?
- Visual Acuity
 - Intraocular pressures
 - Pupil function
 - Oculomotility
 - Visual field screening
 - Refraction
 - Slit lamp examination
 - Stereo fundus examination
 - Fundus Photography
7. How often do you dilate the following diabetic patients (controlled meaning that the patient has met their fasting glucose and HbA1c goals per the primary care physician/endocrinologist) NPDR=nonproliferative diabetic retinopathy?
- | | | | | |
|---------------------------------|---------|---------|-------|-----------|
| a. Controlled w/o retinopathy | 3months | 6months | 1Year | other____ |
| b. Uncontrolled w/o retinopathy | 3months | 6months | 1Year | other____ |
| c. Controlled w/ mild NPDR | 3months | 6months | 1Year | other____ |
| d. Uncontrolled w/ mild NPDR | 3months | 6months | 1Year | other____ |
| e. Controlled w/ moderate NPDR | 3months | 6months | 1Year | other____ |

- f. Uncontrolled w/ moderate NPDR
 3months 6months 1Year other____
- g. Controlled w/ severe NPDR
 3months 6months 1Year other____
- h. Uncontrolled w/ severe NPDR
 3months 6months 1Year other____
- i. Proliferative Diabetic Retinopathy
 3months 6months 1Year other____
- j. Visual field defect
 3months 6months 1Year other____
- k. Diabetic macular edema
 3months 6months 1Year other____

8. Which statement below MOST accurately reflects how you value the retinopathy severity scale (based upon the clinical approximations of the ETDRS modified retinopathy severity scale via the Airlie House classification of DR)?
- The retinopathy severity scale is not of much value as it is long outdated
 - The retinopathy severity scale is most valuable for coding purposes ONLY
 - The retinopathy severity scale is most valuable for coding purposes AND as a practical guideline for clinical diagnoses and management
 - The retinopathy severity scale is most valuable for coding purposes, as a strict guideline for diagnosis/management AND as a description of baseline retinopathy levels and for identifying the risk for progression of DR

9. Do you routinely use mydriatics? Yes No
- If yes, what mydriatics do you typically use on your diabetic patients (check all that apply)?

- .5% Tropicamide
- 1% Tropicamide
- 2.5% Phenylephrine
- Other? Please list _____

10. Are there any additional tests not mentioned above that you routinely perform on your diabetic patients?

11. Which statement below MOST accurately reflects your referral patterns for patients with diabetic retinopathy?

- I routinely refer ALL (or most) patients presenting with ANY retinopathy or ME regardless of severity
- I routinely refer only the MOST SEVERE cases of NPDR and ALL cases of PDR or ME
- I routinely refer cases according to the retinopathy severity scales and risk factors for progression

12. Are there any other referrals that you make for your diabetic patients (check all that apply)?

- PCP
- Dentist
- Podiatry
- Neurology
- Endocrinology
- Other _____

13. How often do you utilize written literature to supplement your patient education?

- Never
- Occasionally/Depends
- Always

If you answered 'never', please skip this question. If 'occasionally' or 'always', please answer this question before moving on...

Whose written educational materials do you utilize most often?

- Your own brochures/booklets
- AOA brochures/booklets
- NEI brochures/booklets
- CDC brochures/booklets

- Other:

14. How often do you utilize online literature to supplement your patient education?

- Never
- Occasionally/Depends
- Always

If you answered 'never', please skip this question. If 'occasionally' or 'always', please answer this question before moving on...

Whose online educational materials do you utilize most often (please write in the box below)?