

Appointment Compliance in Patients With Diabetic Macular Edema and Exudative Macular Degeneration

Michael E. Jansen, MD; Chelsey J. Krambeer; Daniel S. Kermany; Jana N. Waters; Wayne Tie, MD; Sepehr Bahadorani, MD; Julia Singer; Jordan M. Comstock; Kendall W. Wannamaker, MD; Michael A. Singer, MD; Compliance Study Group

BACKGROUND AND OBJECTIVE: The purpose of this study is to compare cancellation and no-show rates in patients with diabetic macular edema (DME) and exudative macular degeneration (wet AMD).

PATIENTS AND METHODS: An anonymous survey was sent to 1,726 retina specialists inquiring as to the number of appointments their patients with DME and wet AMD attended, cancelled, or did not show up for in 2014 and 2015.

RESULTS: Data were obtained on 109,599 appointments. Patients with DME in the U.S. had a 1.591-times increased odds of cancelling or no-showing to their appointments than patients with wet AMD ($P < .0001$). Patients with DME in Europe had a 1.918-times increased odds of cancelling or no showing to their appointments than patients with wet AMD ($P < .0001$).

CONCLUSION: Patients with DME in the U.S. and Europe cancelled and no-showed to their appointments significantly more often than patients with wet AMD. These findings can be taken into consideration when establishing treatment plans for patients with DME.

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INTRODUCTION

The number of patients diagnosed with diabetes worldwide is projected to increase from 415 million in 2015 to 642 million in 2040, putting these patients at an increased risk for developing other comorbidities.¹ These associated health care complications can include loss of vision, kidney disease, and cardiovascular disease.² Vision loss is worsened by the progression of diabetic retinopathy to diabetic macular edema (DME). DME is the leading cause of vision loss in diabetic patients, affecting approximately 750,000 people in the United States.³ Approximately 4% of diabetic patients older than 40 years of age are affected by macular edema.⁴ Patients with DME tend to be followed by many specialists, which leads to a high number of health care appointments per year. A study assessing comorbidity and resource use in pa-

From University of Texas Health Science Center at San Antonio, San Antonio, TX (MEJ, JNW, WT, SB, JMC, KWW, MAS); Texas Tech University Health Sciences Center at El Paso, El Paso, TX (CJK); and Medical Center Ophthalmology Associates, San Antonio, TX (DSK, JS).

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Address correspondence to Michael A. Singer, MD, Medical Center Ophthalmology Associates, 9157 Huebner Rd. San Antonio, TX 78240; email: Msinger11@me.com.

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DME vs. wet AMD in U.S.

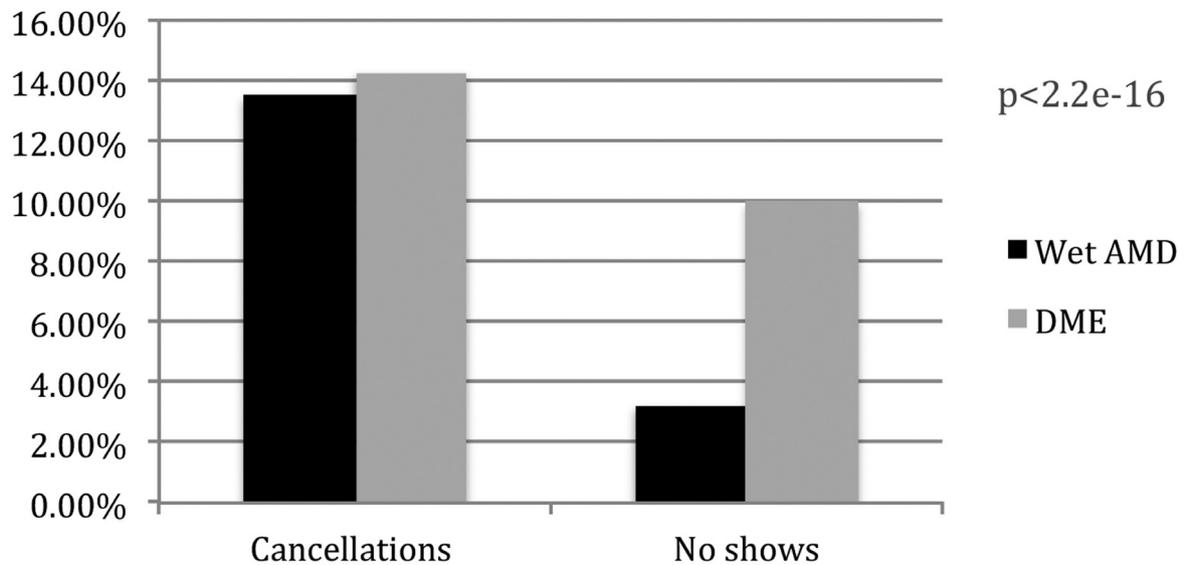


Figure 1. Cancellations and no-shows for patients with diabetic macular edema (DME) and wet age-related macular degeneration (AMD) in the U.S.

tients with DME revealed that these patients have an average of 10 more health care appointments per year than diabetic patients without macular edema.⁵ They had approximately 25.5 appointments per year, and 4.4 of those were for eye-related complications.⁵

A major factor contributing to the high number of ophthalmology-related appointments per year is the treatment regimen required to control DME. Vascular endothelial growth factor (VEGF) is a key facilitator in the disease process, and monthly intravitreal injections of anti-VEGF agents have been proven to reduce the edema and control disease progression.⁶ The effectiveness of these agents in treating DME are based on results in randomized clinical trials where patients are closely regulated and receive timely treatment every month. A study assessing real world use of anti-VEGF agents showed the majority of diabetic patients received substantially fewer anti-VEGF injections than those in clinical trials.⁷ Approximately 63% of patients received fewer than three injections in 12 months, indicating they did not receive optimal treatment for their DME.⁸ The purpose of this study is to see if the potentially increased number of appointments patients with DME attend per year is associated with increased no show and cancellation rates, which may account for the decrease in anti-VEGF injections seen in recent studies.

PATIENTS AND METHODS

A survey was sent to 1,726 retina specialists in the United States and Europe. This survey requests that clinics query their electronic medical records or their practice management systems for appointment data. Institutional review board approval was obtained. The survey questions were as follows:

1. In 2014 and 2015, how many appointments made under ICD-9 362.52 exudative senile macular degeneration did patients:
 - Attend?
 - Cancel?
 - No-show?
2. In 2014 and 2015, how many appointments made under ICD-9 362.07 diabetic macular edema did patients:
 - Attend?
 - Cancel?
 - No-show?
3. Does your clinic charge a fee to patients who no-show and/or cancel their appointments on short notice?
4. What type of practice are you a part of? Multi-specialty or Retina only.
5. Please specify whether you are part of a private practice or associated with a university.
6. How many doctors are in your practice?: One to

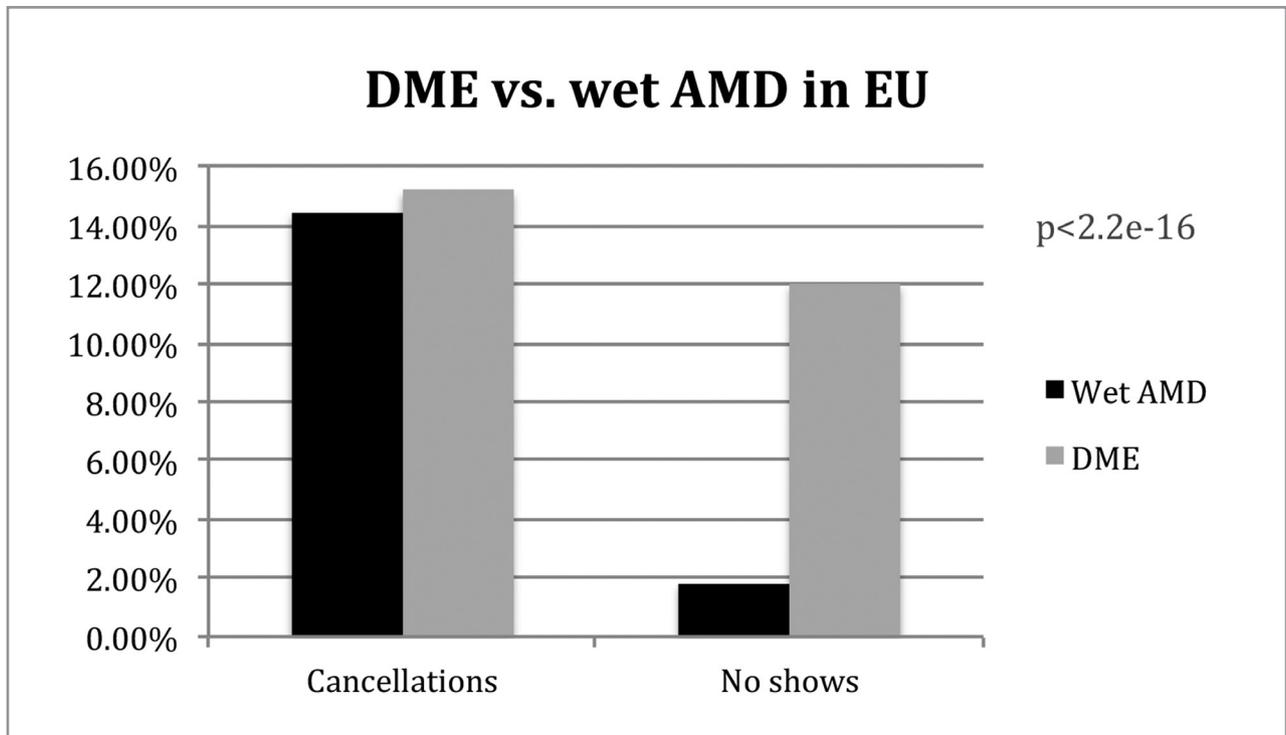


Figure 2. Cancellations and no-shows for patients with wet age-related macular degeneration (AMD) and diabetic macular edema (DME) in Europe (EU).

three, three to six, or more than six.

7. How would you describe your patient population? Indigent, working class, or white collar.
8. Please identify where your practice is located: Northeast, Southeast, Midwest, Northwest, Southwest, or outside of the U.S.
9. Is your practice in an urban, suburban, or rural area?

The results of this survey were submitted anonymously. Exudative macular degeneration (wet AMD) was chosen as the comparison group because this condition is a common diagnosis seen by retina specialists, is not a complication of diabetes, and is also treated using anti-VEGF agents. The survey was sent to retina specialists in Europe to determine if reducing the financial burden of health care appointments revealed different results than those in the United States.

RESULTS

Appointments in the United States

Data were obtained on a total of 87,131 appointments in the United States. Of these appointments, 49,730 were for wet AMD and 37,401 were for DME. In the wet AMD group, 13.55% of appointments were cancellations and 3.27% were no-shows. In the DME group, 14.32% were cancellations and 10.01% were

no-shows (Figure 1). A Chi-squared Goodness of Fit test determined the ratios of appointments in the wet AMD and DME groups were statistically different from one another ($x^2 = 2643.3$, $df = 2$, $P < 2.2e-16$). A Chi-Squared test of Independence determined that there was a significant difference in the proportion of patients in the wet AMD and DME groups who attended their appointments ($x^2 = 752$, $df = 1$, $P < 2.2e-16$). The odds that a DME patient will cancel or no-show to their appointment was found to be 1.591-times higher than the odds for a patient with wet AMD (95% CI, 1.5386-1.6446; $P < .0001$). When broken separately into cancellation and no-show rates, patients with DME had a 1.066-times increased odds of cancelling (95% CI, 1.0257-1.1082; $P < .01$) and a 3.296-times increased odds of no-showing (95% CI, 3.1045-3.4995; $P < .0001$) to their appointments than patients with wet AMD.

The following percentages reflect demographic data out of a total of 84,493 wet AMD and DME appointments. The majority of appointment data (68.63%) came from clinics specializing in retina only, rather than from multispecialty clinics. Most appointments (92.21%) were at private practices as opposed to clinics associated with universities. Appointments at clinics with one to three physicians, three to six physicians, and more than six physi-

cians contributed to 22.07%, 9.27%, and 68.66% of the data, respectively. Most respondents (98.77%) described their patient population as working class, whereas the remaining 1.23% described theirs as indigent. The survey obtained appointment data from the Northeast (5.62%), Southeast (18.63%), Midwest (1.47%), Northwest (2.37%), and Southwest (71.91%). Appointments from clinics in urban areas comprised 66.48% of the data, whereas appointments in suburban areas comprised the remaining 33.52%. No survey responses reflected data in rural areas. The large majority (90.9%) of clinics revealed they do not charge a fee to patients who no-show and/or cancel their appointments on short notice.

Appointments in Europe

Data on a total of 22,468 appointments were obtained from Europe. Of these appointments, 20,820 were for wet AMD and 1,648 were for DME. In the wet AMD group, 14.47% of appointments were cancellations and 1.83% were no-shows. In the DME group, 15.19% of appointments were cancellations and 12.01% were no shows (Figure 2). A Chi-squared test of Independence determined that there was a significant difference in the proportion of patients in the wet AMD and DME groups who attended their appointments ($\chi^2 = 172.48$, $df = 1$, $P < 2.2e-16$). The odds that a patient with DME will cancel or no-show to their appointment in Europe was found to be 1.918-times higher than the odds for a patient with wet AMD (95% CI, 1.7392-2.1178; $P < .0001$). When broken separately into cancellation and no-show rates, patients with DME had a 7.329-times increased odds of no-showing (95% CI, 6.2636-8.5744; $P < .0001$), but did not have a significant increased odds of cancelling (odds ratio [OR]: 1.059; 95% CI, 0.9390-1.1939; $P < .3508$) to their appointments than patients with wet AMD. The no-show rate for patients with DME was 6.56-times higher than the no-show rate for patients with wet AMD.

Appointments in U.S. Versus Europe

A Chi-squared Goodness of Fit test comparing U.S. wet AMD appointments with Europe wet AMD appointments determined these two groups were significantly different from one another ($\chi^2 = 626.17$, $df = 2$, $P < 2.2e-16$). Patients with wet AMD in the U.S. were more likely to no show, instead of cancelling, compared to the wet AMD patients in Europe. A Chi-squared Goodness of Fit test comparing U.S. DME appointments with Europe DME appointments determined these two groups were significantly different from one another ($\chi^2 = 171.31$, $df = 2$, $P < 2.2e-16$). Patients with DME in the U.S. were more likely to

attend their appointments than patients with DME in Europe (Figure 3).

DISCUSSION

In this study comparing appointment trends in patients with DME and exudative macular degeneration, patients with DME were found to cancel and no-show to their appointments more often than patients with wet AMD. In particular, the no-show rates of patients with DME were significantly higher than those of patients with wet AMD. The higher no-show rates may be attributed to the increased number of health care appointments these patients have to attend per year due to the numerous comorbidities associated with diabetes.⁵ Additionally, socioeconomic factors may play a role in increased cancellation and no-show rates. In a study examining factors associated with noncompliance, researchers concluded that low education levels, no health insurance, no eye exam in the last year, and poorly controlled diabetes mellitus played a role in this issue.⁹ The results of our survey found that the large majority of physicians classified their patient population as working class. Maintaining a job while attending the average 25.5 health care appointments per year for patients with DME may play a role in decreased compliance. The survey also revealed that more than 90% of clinics that responded do not charge no-show or cancellation fees, so patients at these clinics would not have felt extra financial pressure to attend their ophthalmology appointments.

The appointment data received from Europe showed patients with DME there are also significantly more likely to cancel and no-show than patients with wet AMD. This weakens the argument that health care costs in the U.S. are a major contributor to decreased appointment attendance. When comparing data between the United States and Europe, it was found that patients with DME in Europe had higher cancellation and no-show rates than patients with DME in the United States. Further studies assessing socioeconomic differences between these two regions would be needed to determine an explanation for this finding.

When appropriate, other treatment options should be considered when caring for this group of patients. Using combination therapy to treat DME may improve compliance due to the increased time interval between treatments compared to anti-VEGF monotherapy.¹⁰ The anti-inflammatory effects of corticosteroids used in conjunction with anti-VEGF treatment causes significant reduction in macular edema and allows for an increased time interval.^{11,12,13,14} Side effects of using corticosteroids may include steroid-

induced glaucoma and cataracts, which should be taken into consideration before beginning combination therapy.^{12,13}

A limitation of this study is that it was conducted using a survey, which has potential to introduce bias and inaccurate data. Another limitation is the small number of DME appointments we received from Europe. Only 1,648 appointments out of 20,820 were from patients with DME. According to the World Health Organization, the prevalence of diabetes in Europe is 10.3% in men and 9.6% in women.¹³ When we consider the prevalence of diabetes in the United States is 9.3%, the ratio of DME appointments received in the survey from the U.S. and Europe should not have been very different from one another.¹⁴ Had we received data proportional to the disease prevalence in Europe, we may have seen different ratios of cancellations and no-shows. It is important to note that this survey does not determine if all patients represented in the data were treated exclusively with anti-VEGF agents. In addition, the design of this study does not allow us to determine a cause-and-effect relationship between diagnosis and appointment attendance.

Despite these limitations, this study demonstrated that decreased appointment compliance in patients with DME is an issue that needs to be addressed when caring for these patients. Further research should be carried out to determine what factors play a role in decreased compliance, and to assess whether these patients have high cancellation and no-show rates at appointments with their other specialists.

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