Patient burden, treatment patterns, and visual acuity associated with neovascular age-related macular degeneration in Japan

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Purpose: To evaluate patient burden measured by patient-reported outcomes, such as quality of life (QoL), depression level, treatment satisfaction, treatment pattern, and visual acuity associated with neovascular age-related macular degeneration (wAMD) in Japan.

Methods: This is a multicenter evaluation consisting of a retrospective medical chart review and patient interviews conducted at three hospitals. Medical chart information of wAMD patients who visited these hospitals for treatment between June 2012 and February 2013 was collected. Each patient was also interviewed regarding QoL, depression, and satisfaction. The National Eye Institute Visual Functioning Questionnaire-25 (NEI VFQ-25) Japanese version, and the Geriatric Depression Scale-Short Version-Japanese (GDS-S-J) were administered during the interview.

Results: A total of 225 wAMD patients were enrolled. The mean NEI VFQ-25 composite score for all patients was 68.4 (standard deviation [SD] =18.4). For GDS-S-J, 28 patients (12.4\%) had a score indicative of depression. Visual acuity in treated eye showed significant correlations ($P<0.01$) to GDS-S-J total score ($r=-0.228$) and to all NEI VFQ-25 subscales ($0.221–0.478$), except for the general health scale. Subjects with bilateral wAMD had significantly lower NEI VFQ-25 subscale scores compared to unilateral subjects. Overall, subjects visited the eye clinic an average of 11.4 times (SD =4.0) during the study period. The majority of the subjects received antivascular endothelial growth factor treatment ($n=192$, 85.3\%), with ranibizumab monotherapy being the most common ($n=176$). The average number of ranibizumab monotherapy injections was 3.0 (SD =1.7). Approximately 40\% of the patients were not satisfied with the current treatment, and 33.8\% were willing to try another treatment.

Conclusion: The present study found that better visual acuity and unilateral disease status were associated with better quality of life and less depression. Subjects with better visual acuity also received more frequent ranibizumab injections. Despite improvements in vision and associated QoL, patients were still not fully satisfied with their current therapy, and thus additional research is warranted.

Keywords: quality of life, treatment satisfaction, depression, anti-VEGF, age-related macular degeneration, Japan

Introduction

Age-related macular degeneration (AMD) is the fourth leading cause of visual impairment in Japan, with an estimated 10.9\% (178,000) of all cases of visual impairment attributed to AMD in 2007.\textsuperscript{1} In addition to the loss of central vision that characterizes AMD, affected patients also suffer from a higher percentage of other vision-related comorbidities, such as glaucoma and cataracts, than healthy subjects.\textsuperscript{2,3} The resulting visual impairment and blindness can have a significant impact on patients'...
health-related quality of life (QoL), and thus, the disease constitutes a considerable humanistic burden.\textsuperscript{3–5}

AMD occurs in both “wet” (wAMD) and “dry” forms, known as “neovascular” and “non-neovascular” AMD, respectively. Although the prevalence of wAMD is reported to be low, at \(-1%.\textsuperscript{6,7}\) it causes 79\%–90\% of AMD-related vision loss.\textsuperscript{8} Not surprisingly, it has been reported that QoL in wAMD patients declines significantly as visual impairment worsens,\textsuperscript{2,4,9} and that wAMD patients are more likely to suffer from anxiety and depression compared to healthy subjects in the similar age group.\textsuperscript{2,3}

Other impacts include trouble with activities of daily living. wAMD patients are more likely to receive assistance for activities of daily living\textsuperscript{2,4} compared to healthy subjects of a similar age, and approximately a quarter of wAMD patients have reported having an accident in the previous 12 months.\textsuperscript{2} The risk of falls among wAMD patients is double that of healthy subjects, and more than half of such falls require medical treatment.\textsuperscript{2,4} Some wAMD patients also require rehabilitation to adjust to their impaired vision and receive social benefits as a consequence of their condition.

As Japan’s population continues to age, wAMD, as well as other age-related maladies, is poised to become an increasing health care concern; however, research on the burden of wAMD remains limited, and the data on the humanistic and financial burden associated with wAMD patients, in Japan specifically, are scarce. Moreover, little is known regarding current treatment patterns of wAMD as well as associated outcomes in this population, both clinically and from the patient’s perspective.

To understand the clinical outcome and health care burden of wAMD, this study aimed to evaluate patients’ visual acuity, QoL, depression level, treatment satisfaction, and treatment pattern via a retrospective medical chart review and patient interviews conducted in three Japanese outpatient hospitals.

**Methods**

**Data source**

The present study was a multicenter evaluation consisting of a retrospective medical chart review and face-to-face interviews conducted at three hospitals (Surugadai Nihon University Hospital and Nihonmatsu Eye Hospital in Tokyo, and Kansai Medical University Hospital in Osaka), with wAMD patients who visited these hospitals for treatment between June 2012 and February 2013. An interview was conducted with each patient at his or her clinic visit to assess QoL and depression level, as well as his or her satisfaction with the treatment. As part of the interview, each patient was administered the National Eye Institute Visual Functioning Questionnaire-25 (NEI VFQ-25) Japanese version\textsuperscript{10} and the Geriatric Depression Scale-Short Version-Japanese (GDS-S-J),\textsuperscript{11} and was queried regarding satisfaction with the current treatment. Questions on patient treatment and visits, financial burden, and caregiver assistance were also asked during the interview. Case report forms were used to collect patients’ demographic data, and chart abstraction was accomplished by reviewing medical charts for 1 year prior to the visit. Information collected by chart abstraction included dates of first clinical presentation, diagnosis and treatment, date of each clinical visit and medical treatment, and examination and observation applied and their results. Visual acuity was measured and recorded as a decimal notation according to standard practice in Japan. Visual acuity, which was measured most recent to the clinic visit when the patient interview was conducted, was recorded for treated eyes.

The observational study was conducted in compliance with the Ethical Guidelines for Epidemiologic Studies\textsuperscript{12} and the Declaration of Helsinki. The study also complied with all local laws, and ethical committee approval was obtained from each study site: Surugadai Nihon University Hospital and Nihonmatsu Eye Hospital in Tokyo, and Kansai Medical University Hospital in Osaka. Written informed consent was collected from each patient prior to inclusion in the study.

**Eligibility criteria**

Patients 50 years of age or older who visited the participating clinics, and who were diagnosed with wAMD and were currently receiving, or had received treatment, for wAMD within the prior 12 months, were recruited to the study.

**Questionnaires**

The NEI VFQ-25 consists of a base set of 25 questions representing eleven vision-related constructs.\textsuperscript{13} The NEI VFQ-25 contains the following subscales: global vision rating, difficulty with near-vision activities (near activities), difficulty with distance vision activities (distance activities), limitations in social functioning due to vision, role limitations due to vision, dependency on others due to vision (vision specific: dependency), mental health symptoms due to vision (four items), driving difficulties, limitations with peripheral and color vision, ocular pain, and a question on general health.\textsuperscript{10} A composite score is also calculated as the average of the vision-targeted subscales. The NEI VFQ-25 is scored on a 0–100 scale, with 0 representing poor vision-related QoL and 100 representing very good vision-related QoL.
The GDS-S-J is a screening measure for depression in older adults.\textsuperscript{11,14} Scores range between 0 and 15, with scores of $\geq 6$ being indicative of depression and scores of $\geq 11$ being highly indicative of depression.

In addition to these instruments, treatment satisfaction, caregiver situation, and assistance requirement were evaluated by additional questions (Supplementary material).

Analysis
Descriptive analyses were performed on the demographic and health information of the study population. The following disease-related variables were reported to further articulate the characteristics of patients enrolled in the study: type of wAMD (typical AMD, polypoidal choroidal vasculopathy or retinal angiomatous proliferation, unilateral or bilateral), visual acuity, and comorbid disease (cataract, glaucoma, and diabetic retinopathy). The decimal visual acuity was converted to logarithmic minimum angle of resolution units for statistical analyses.

NEI VFQ-25 subscale scores were described by presenting the mean and standard deviation (SD). Levels of depression were presented as the number and percentage of patients in each category — less suggestive of depression (GDS-S-J scores 0–5), indicative of depression (GDS-S-J scores 6–10), and almost always indicative of depression (GDS-S-J scores 11–15). Treatment dissatisfaction/satisfaction was evaluated as the percentage of patients in each response category, and the percentage of patients who reported their desire to either continue on the current treatment or try another treatment.

It was hypothesized that lower visual acuity would be associated with lower QoL, higher depression, and higher dissatisfaction, and thus, NEI VFQ-25 score, GDS-S-J score, and dissatisfaction rate were assessed in the context of visual acuity.\textsuperscript{1,4} Particularly, four vision-related QoL subscales — near activities, distance activities, vision specific, dependency, and composite score — were assessed to enable comparative discussion with previous studies.\textsuperscript{15,16} These data were also compared between unilateral and bilateral AMD. Correlational magnitudes were interpreted according to Cohen’s recommendations: 0.10 = small, 0.30 = medium, and 0.50 = large.\textsuperscript{17} NEI VFQ-25 and GDS-S-J scores were assessed using analysis of variance controlling for age, sex, comorbidity, and visual acuity. Z-test was performed for treatment satisfaction questions. A $P$-value of $<0.05$ was interpreted as statistically significant.

The number of total clinic visits, injections, and medical exams within the study period of 12 months was presented with mean, SD, and figures. The number of treatments and medical exams was compared to the treatment guideline,\textsuperscript{18} and further analyzed in relation to visual acuity, NEI VFQ-25 composite score, and GDS-S-J score.

Results
Demographic and clinical variation
A total of 225 wAMD patients were enrolled in the study (Table 1). The average age of the sample population was 77.5 years (SD = 7.4; range 52–94), $>85\%$ of patients were $\geq 70$ years old at the time of interview, and 74.2\% (n = 167) were males. All patients had wAMD in at least one eye; wAMD type was reported as polypoidal choroidal vasculopathy in 36.4\% (n = 82) and retinal angiomatous proliferation in 5.8\% (n = 13); more than half had unilateral

| Table 1 Patient demographics and characteristics, n=225 |
|---------------------------------|---|---|
| Age (years) | n | % |
| 50–59 | 4 | 1.8 |
| 60–69 | 28 | 12.4 |
| 70–79 | 107 | 47.6 |
| 80–84 | 52 | 23.1 |
| 85+ | 34 | 15.1 |
| Sex | | |
| Male | 167 | 74.2 |
| Female | 58 | 25.8 |
| Annual household income (JPY) | n | % |
| <3 million | 90 | 40.0 |
| 3–5 million | 66 | 29.3 |
| 5–7 million | 24 | 10.7 |
| $\geq$7 million or more | 20 | 8.9 |
| No answer | 25 | 11.1 |
| Type of wAMD | | |
| Typical AMD | 130 | 57.8 |
| PCV | 82 | 36.4 |
| RAP | 13 | 5.8 |
| Presence of wAMD | | |
| Unilateral | 134 | 59.6 |
| Bilateral | 91 | 40.4 |
| Most recent visual acuity (in treated eye, decimal notation) | | |
| $\geq$0.8 | 50 | 22.2 |
| 0.5–0.7 | 59 | 26.2 |
| 0.3–0.4 | 39 | 17.3 |
| 0.1–0.2 | 42 | 18.7 |
| 0.05–0.09 | 18 | 8.0 |
| <0.05 | 6 | 2.7 |
| Not available | 11 | 4.9 |
| Comorbid diseases | | |
| Cataract | 145 | 64.4 |
| Glaucoma | 7 | 3.1 |
| Diabetic retinopathy | 6 | 2.7 |

Notes: Categories are not mutually exclusive. No other comorbid diseases were assessed.

Abbreviations: JPY, Japanese yen; AMD, age-related macular degeneration; wAMD, wet age-related macular degeneration; PCV, polypoidal choroidal vasculopathy; RAP, retinal angiomatous proliferation.
wAMD (59.6%, n=134), and 40.4% (n=91) had bilateral wAMD. Among the patients who had bilateral AMD, five (2.2%) had a diagnosis of dry AMD in the other eye. Visual acuity in treated eyes was available for 214 patients; average acuity was 0.35 (SD = 0.22 lines in decimal units). The average and SD values were converted back to decimal units.19 Cataract was the most frequently reported comorbid disease (n=145, 64.4%). The income distribution was skewed toward the lower end with ~70% of respondents (n=156, 69.3%) earning <5.0 million Japanese yen or US$ 62,664 (based on 79.79 Japanese yen/US$ 1)20 (data on exact income were not collected). This is reflective of the average income of a Japanese household with persons aged ≥65 years.21

Patient-reported outcomes
The mean NEI VFQ-25 composite score for all patients was 68.4 (SD = 18.4) (Table 2). The highest average scores were observed in ocular pain (mean = 84.0; SD = 17.9) and color vision (mean = 86.9; SD = 17.3) subscales, and the lowest scores in general vision (mean = 46.4; SD = 18.3) and driving (n=95; mean = 47.1; SD = 40.8) subscales. With regard to scores on the GDS-S-J, only 28 patients (12.4%) had a score indicative of depression, and no patients scored >11, which is highly indicative of depression.

Approximately 60% of patients were satisfied with how their treatment improved vision (Question [Q]1; Table 2). In contrast, 103 patients (45.8%) were not content with the amount of time it took for the treatment to start working (Q2); among these dissatisfied patients, eight (3.6%) reported being “very dissatisfied”. A total of 132 patients (58.6%) were satisfied with their current treatment, given the amount of money they paid; however, 41.4% were dissatisfied (2.7% were “very dissatisfied”) (Q3). More than half of the patients (64.0%) wished to continue the current treatment, but 76 patients (33.8%) expressed their desire to try another treatment (Q4).

Visual acuity and QoL associations
Spearman correlations were used to assess correlations between visual acuity and QoL (NEI VFQ-25 subscales), and depression (GDS-S-J total score). Visual acuity showed significant (P<0.01) correlations with all NEI VFQ-25 subscales (correlation coefficients ranged from 0.231 [ocular pain] to 0.466 [dependency]), with the exception of general health (P=0.39). Among the former, distance activities, visual specific: dependency, and composite score showed a medium-to-large correlation coefficient of ≥0.4. Visual acuity was also significantly correlated to GDS-S-J total score (r=−0.239; P<0.01) (Table 3).

Average visual acuity, average NEI VFQ-25 composite score, and average GDS-S-J total score were also compared

**Table 2 PRO mean scores**

| PRO measure | Mean ± SD |
|-------------|-----------|
| NEI VFQ-25 subscale |          |
| General health | 49.8 (22.2) |
| General vision | 46.4 (18.3) |
| Ocular pain | 84.0 (17.9) |
| Near activities | 59.5 (26.5) |
| Distance activities | 68.5 (21.7) |
| Driving | 47.1 (40.8) |
| Color vision | 86.9 (17.3) |
| Peripheral vision | 69.3 (23.6) |
| Vision-specific |          |
| Social function | 76.0 (22.5) |
| Mental health | 64.0 (23.8) |
| Role limitation | 67.3 (27.5) |
| Dependency | 73.3 (26.1) |
| Composite score | 68.4 (18.4) |
| GDS-S-J |          |
| Total score | 2.7 (2.4) |
| PRO measure | N (%) |
| GDS-S-J |          |
| Less suggestive of depression (scores 0–5) | 195 (86.7) |
| Suggestive of depression (scores 6–10) | 28 (12.4) |
| Almost always suggestive of depression (scores 11–15) | 0 (0.0) |
| Missing | 2 (0.9) |

**Notes:** Patient’s response was categorized into two: “satisfied” if the response fell into either one of “somewhat satisfied”, “satisfied”, and “very satisfied”, and “dissatisfied” if in “very dissatisfied”, “dissatisfied”, and “somewhat dissatisfied”.

**Abbreviations:** PRO, patient reported outcomes; SD, standard deviation; NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25; GDS-S-J, Geriatric Depression Scale-Short Version-Japanese; Q, question.
Table 3 Correlation coefficient between PRO measures and visual acuity

| PRO measure          | Correlation coefficient | P-value |
|----------------------|-------------------------|---------|
| NEI VFQ-25 subscale  |                         |         |
| General health       | 0.059                   | 0.390   |
| General vision       | 0.346                   | <0.001  |
| Ocular pain          | 0.231                   | <0.001  |
| Near activities      | 0.393                   | <0.001  |
| Distance activities  | 0.404                   | <0.001  |
| Driving              | 0.394                   | <0.001  |
| Color vision         | 0.296                   | <0.001  |
| Peripheral vision    | 0.269                   | <0.001  |
| Vision specific      |                         |         |
| Social function      | 0.355                   | <0.001  |
| Mental health        | 0.355                   | <0.001  |
| Role limitation      | 0.336                   | <0.001  |
| Dependency           | 0.466                   | <0.001  |
| Composite score      | 0.439                   | <0.001  |
| GDS-S-J              |                         |         |
| Total score          | -0.239                  | <0.001  |

Abbreviations: PRO, patient reported outcomes; NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25; GDS-S-J, Geriatric Depression Scale-Short Version-Japanese.

between patients who were satisfied and dissatisfied with the current treatment (Figure 1). Although the satisfied group did not show significantly better visual acuity compared to the dissatisfied group, average NEI VFQ-25 composite scores were significantly higher in the satisfied group. A larger proportion of dissatisfied patients was observed among bilateral compared to unilateral patients (Figure 2). The bilateral group also demonstrated significantly lower NEI VFQ-25 subscale scores compared to the unilateral group.

Level of depression (average GDS-S-J total scores) was not significantly different between the satisfied and dissatisfied groups. Although bilateral patients had higher GDS-S-J scores, they were not significantly different from unilateral patients.

Treatment patterns

Patients visited the eye clinic an average of 11.4 times (SD = 4.0) during the study period (ie, the prior year), with the number of visits per individual ranging from a minimum of two to a maximum of 24 (Figure 3). Almost half of the patients (n=106, 47.1%) visited the clinics ≥12 times. Most of the patients received antivascular endothelial growth factor (anti-VEGF) treatment (n=192, 85.3%), with ranibizumab monotherapy being the most common (n=176) (Table 4). In contrast, only 15 patients (6.7%) underwent photodynamic monotherapy or photodynamic therapy together with anti-VEGF therapy. Among the ranibizumab monotherapy patients, the average number of injections was 3.0 (SD = 1.7) (Figure 3). Patients with better visual acuity received more frequent ranibizumab injections (Figure 4). The vast majority of patients followed physician’s instruction (n=194, 86.2%), and few considered medical expenses (n=4, 1.8%) in their decision of returning for treatment.

The majority of patients (95.1%) underwent a visual assessment test within the 12-month study period. The types and average number of tests applied over the past 12 months are presented in Table 4. Fundus photography was the most common test (average of 9.9 times in the past 12 months), followed by slit-lamp microscopy (8.7 times) and optical coherence tomography (6.7 times). Although being one of the most important measurements influencing wAMD treatment/retreatment decision,19 visual acuity tests were not frequently administered (6.5 times) compared to the other three exams.

Discussion

Visual acuity was significantly correlated to almost all NEI VFQ-25 subscales (with the exception of general health), which indicates that it has an influence on patient’s QoL. In particular, NEI VFQ-25 composite score and three of its subscales – near activities, distance activities, and visual specific: dependency – demonstrated a correlation coefficient of ≥0.4. Previous research has shown similar results, with these same subscales correlating most highly with visual acuity, but no statistically significant correlations were seen between general health and visual acuity.15,16 NEI VFQ-25 scores in the present study were higher than those reported among Japanese AMD patients by Suzukamo et al (composite score of 68.4 vs 51.0).19 This may be partially explained by visual acuity differences between the two populations – 0.49 in the present study vs 0.2 (20/120) on the Snellen scale in the previous study – and the fact that no treatment was available when the previous study was conducted. The Minimally Classic/Occult Trial of the Anti-VEGF Antibody Ranibizumab in the Treatment of Neovascular Age-Related Macular Degeneration (MARINA) and the Anti-VEGF Antibody for the Treatment of Predominantly Classic Choroidal Neovascularization in Age-Related Macular Degeneration (ANCHOR) studies found that lower NEI VFQ-25 scores were associated with lower visual acuity.15 However, it should be noted that Orr et al reported a higher NEI VFQ-25 composite score (72.7) among a non-Japanese
Figure 1  Average visual acuity, NEI VFQ-25 composite score, and GDS-S-J score by satisfaction.

Notes: Average visual acuity (A), NEI VFQ-25 scores (B), and GDS-S-J total scores (C) in the satisfied group and the dissatisfied group were compared for the four interview questions: Q1) “How satisfied or dissatisfied are you with the way the treatment improves your vision?”, Q2) “How satisfied or dissatisfied are you with the amount of time it takes for the treatment to start working?”, and Q3) “Taking all things into account, including the amount you paid for your prior treatment, how satisfied or dissatisfied are you with this treatment?”. Each question was provided with six response options, ranging from “very satisfied” to “very dissatisfied”. Those who responded as “very satisfied”, “satisfied”, and “somewhat satisfied” were categorized in the satisfied group, and those who responded as “somewhat dissatisfied”, “dissatisfied”, and “very dissatisfied” were categorized in the dissatisfied group. Q4 asked “With the money you paid for the treatment and your level of satisfaction with the treatment, would you prefer to continue with this treatment or try another treatment?”. *P<0.05. The average visual acuity was converted from logMAR to decimal.

Abbreviations: NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25; GDS-S-J, Geriatric Depression Scale-Short Version-Japanese; logMAR, logarithmic minimum angle of resolution; Q, question.
Patient burden and treatment patterns of wAMD in Japan

wAMD population with a similar level of visual acuity (0.5) compared to the present study. Country-specific differences may account for these disparities. Negative correlations between visual acuity and depression noted in the present research have also been reported in previous studies.

Bilateral status was found to be associated with poorer QoL and reported less treatment satisfaction than unilateral patients. Bressler et al also reported lower NEI VFQ-25 scores among patients whose treated eye was the “better-seeing eye”, suggesting that the “self-reported visual function benefits are greater when the treated eye is the better-seeing eye”.

The average number of clinic visits (11.4±4.0) corresponded with the recommended number of monthly clinic visits in the local guideline, but almost half of the patients (n=106, 47.1%) visited the clinics ≥12 times (up to 24 visits) and most visits were for monitoring purposes. Among guideline-recommended medical exams at a monthly clinic visit, slit-lamp microscopy and fundus photography were conducted 8.7 and 9.9 times over a 1-year period, respectively; however, the visual acuity exam, a common and noninvasive procedure, was conducted less frequently (mean =6.5).

The present study also indicated that the Japanese wAMD patients may be undertreated, with a mean annual number of injections of 3.0±1.7 for ranibizumab monotherapy patients. Since the patient population in this study had gone through wAMD treatments for, at least, 12 months, their disease conditions varied, rendering variability in the rate of injections. A relationship between the number of injections and the visual acuity levels is found in other observational studies. A retrospective chart review of treatment-naïve eyes in Italy found that patients who received 4.8 injections in 12 months had a decrease in visual acuity of two letters on the Early Treatment Diabetic Retinopathy Study (ETDRS) scale.

Figure 2 Average NEI VFQ-25 composite score, GDS-S-J score, and satisfaction by presence of AMD (bilateral or unilateral).

Notes: (A) Average score in NEI VFQ-25 subscales of interest by presence of AMD (bilateral or unilateral), with the significance level at \( P < 0.05 \) designated with *.
(B) Proportion of the dissatisfied patients, who answered “very dissatisfied”, “dissatisfied”, or “somewhat dissatisfied”.

Abbreviations: NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25; GDS-S-J, Geriatric Depression Scale-Short Version-Japanese; AMD, age-related macular degeneration.
Another retrospective study on previously untreated patients in France reported that patients only gained +0.7 letters on the ETDRS scale when they had an average of 3.79 injections in 12 months.25 A large, multicounty, retrospective chart review of wAMD patients, who started treatment with ranibizumab when they participated in the study, found that patients received fewer injections than in clinical trials in 2 years (a mean of 5.0 and 2.2 injections in the
The sex distribution in the sample population of the present study was comparable to the Japanese wAMD population reported in the Hisayama study, where the prevalence was found to be 1.2% for males and 0.34% for females; however, the present study has a potential generalizability limitation due to the choice of clinical settings, for example, research hospitals and private clinics rather than public clinics, which may also have an impact on the number of injections.

Although 40% of patients were not satisfied with their current treatment and 33.8% were willing to try another treatment, the treatment satisfaction assessment may pose another limitation of the present study, as the questions were not validated according to patient-reported outcome development recommendations. However, as there are no existing questionnaires specifically related to eye injections, de novo questions are required.

**Conclusion**

This is the first study to detail the visual acuity, QoL, depression level, treatment satisfaction, and treatment pattern of wAMD patients in Japan. The present study suggests that better visual acuity and unilateral (vs bilateral) disease status are associated with better QoL and less depression. Although anti-VEGF treatment is a primary choice for wAMD treatment, the current treatment pattern appears as not fully meeting the patients’ expectation, suggesting room for improvement.

![Figure 4 VA groups and number of injections.](image)

**Figure 4** VA groups and number of injections.

**Abbreviation:** VA, visual acuity.
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Disclosure

KA is an employee of Bayer Yakuhin, Ltd. ECYW is an employee of IMS Japan K.K. but conducted this research while at Adelphi Values, a consultancy that participated in the design of the study, analysis of the data, and preparation of the study report on behalf of Bayer. KF, YN, SF, AA, KT, SU, and MY report no conflicts of interest in this work.

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Supplementary material

Questions for treatment satisfaction:
1) How satisfied or dissatisfied are you with the way the treatment improves your vision?
2) How satisfied or dissatisfied are you with the amount of time it takes for the treatment to start working?
3) Taking all things into account, including the amount you paid for your prior treatment, how satisfied or dissatisfied are you with this treatment?

Each question was provided with six response options, ranging from “very satisfied” to “very dissatisfied”.

One additional question captured desire to switch to another treatment:
4) With the money you paid for the treatment and your level of satisfaction with the treatment, would you prefer to continue with this treatment or try another treatment?

Questions for caregiver situation and assistance requirement:
1) Do you need assistance with your daily tasks?
2) Do you have a caregiver or somebody to assist you day to day?
3) Did you use paid services at home because of your vision problems?