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Improving Patient Understanding Of Their Macular Diseases And Intravitreal Treatment Through Patient-Directed Educational Improvement Interventions

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Abstract

Purpose: Sub-optimal patient knowledge of their macular diseases may lead to poor adherence to anti-VEGF intravitreal injections (IVT). We aimed to assess baseline knowledge and effectiveness of 4 education interventions on knowledge and adherence.

Methods: This was an interventional cohort study of treatment-naïve patients/caregivers >21 years of age with macular disease requiring IVT. There were 4 interventions (SC, I1, I2 and I3) assessed using a 10-item pre-, post- intervention patient-knowledge questionnaires administered to 4 groups of patients; Group 1 –SC: existing, standard-of-care patient-education materials; Group 2–I1: Education provided by dedicated trained nurse counsellors (DNCs) with existing materials; Group 3–I2: DNCs education with novel patient-directed education material (PDEM), and Group 4–I3: Educated via a custom digital application based on the PDEM. Mean change in questionnaire score was analysed using one-way ANOVA, and IVT adherence rates compared in Group 1 versus 4.

Results: 163 participants were enrolled (150 patients, 13 care-givers; 51.6% males, mean age 60.7 (SD:12.1) years). Mean pre-intervention questionnaire scores were similar (Group1 6.02 (n=45), Group2 6.45(n=38), Group3 6.03(n=40), Group4 6.93(n=40), (p=0.065). Significant improvements were observed between mean pre- and post-intervention scores in all groups. (p<0.001). Mean score change was significantly higher in groups 2 to 4 versus 1. Pair-wise comparisons showed no differences between groups 2-4. Non-adherence rates to IVT trended lower in Group 4 (6.45%) versus Group 1 (13.2%), however was not significant (p=0.446).

Conclusions: The counselling interventions resulted in significant improvements to patient knowledge, with a trend towards better IVT adherence for Group 4 – I3

INTRODUCTION

Macular diseases are leading causes of blindness worldwide[1] and their associated vision impairment (VI) has been found to significantly impair the patient's ability to carry out activities of daily living, leading to a reduced quality of life (QoL)[2]. Major prevalent macular diseases include age-related macular degeneration (AMD) and cystoid macular oedema (CMO) related to retinal vascular diseases, such as diabetic retinopathy (diabetic macular oedema [DMO]) and retinal vein occlusion (RVO). These are chronic diseases that require long term treatment and follow-up to prevent vision loss[1].

Intravitreal therapy (IVT) with anti-vascular endothelial growth factor (VEGF), is the mainstay of treatment for neovascular AMD (nAMD) and CMO from retinal vascular diseases, and adherence to long-term treatment and follow-up is crucial to maintain vision and prevent irreversible VI [3–5]. However, non-adherence is a common problem in the management of these patients (25–44%)[6], and limits clinical treatment outcomes under real-world conditions, with a higher risk for significant and permanent VI[6]. Real world studies have shown that patients received fewer IVTs as compared to RCTs which largely had

fixed dosing regimes [7–9], however comparably fewer studies have looked at patient adherence to IVT. A systematic review[10] regarding IVT in nAMD patients found that 50% of patients stopped treatment by 24 months, which was defined as non-persistence. In Singapore, a study of 286 eyes found that a longer delay between detection of active disease and re-treatment, which was associated with poorer vision outcomes (0.02-letter decrease/day)[11].

A study conducted in Germany showed that patients had some knowledge deficiencies regarding their underlying disease, IVT treatment goals and potential complications. These patients who had previously been educated and consented frequently could not recall important details, such as the name of the medication (42%), and the possible risk of endophthalmitis (69%). 64% also expected an improvement in visual acuity after IVT, which may not always be in line with their visual prognosis [12]. In our tertiary centre, we conducted a multi-disciplinary focus group together with AMD patients, doctors, nurses, and quality service staff to understand the important issues faced by IVT patients. Patients wanted to understand their condition better, and some reported despite explanation by the doctor, they still did not understand their condition. Thus, we hypothesised that patient-directed, personalised education is crucial for improving understanding, setting realistic expectations, removing barriers and improving adherence to therapy, therefore preventing significant and permanent loss of vision.

Hence the aims of this study was first to assess the baseline level of disease knowledge among patients with macular diseases (and their caregivers) in a tertiary ophthalmic referral centre in Singapore using existing standard-of-care patient education materials. Second, to determine the effectiveness of selected patient-education counselling interventions in improving the level of knowledge. Thirdly, we investigated if improved disease knowledge among patients/caregivers with macular disease was associated with better adherence to IVT treatment. We hypothesized that improvements in patient education and counselling interventions could improve the level of disease knowledge among study participants, which would help with adherence to IVT treatment.

SUBJECTS/METHODS

This was a single centre, stepwise interventional cohort study conducted between September 2019 and Jan 2023 at the Singapore National Eye Centre (SNEC), Singapore. Inclusion criteria were patients > 21 years old, who were treatment naïve and presented with macular diseases (nAMD, DMO, or CMO related to RVO), requiring the initiation of IVT. Where patients were unable to complete the questionnaire or educational intervention, e.g., due to cognitive impairment/failure to communicate in English or Mandarin, their caregivers were enrolled as study participants.

Human Ethics and Consent to Participate declarations

The study adhered to the tenets of the Declaration of Helsinki and was approved after review by the Singhealth Centralised Institutional Review Board (Ref no. 2019–2851). Informed consent was taken from study participants and consent forms were signed and collected.

Assessing the baseline level of disease knowledge

Eligible patients were recruited from the Retina sub-specialty outpatient clinics of SNEC. After obtaining informed consent, a standardized hard copy questionnaire was then administered to study participants (patients/caregivers) to assess their level of disease knowledge with regards to their diagnosis, the need for IVT treatment, potential side effects and expectations after IVT treatment. This questionnaire was developed by local ophthalmologists and a retina specialist to test disease- and treatment-related knowledge specific to the Singapore context, including intricacies related to our local healthcare financing structure for each of the IVT anti-VEGF agents used. The questionnaire consisted of 10 equally weighted questions, producing a total score from 0 to 10 with higher scores representing higher levels of patient knowledge, and was available in both English (Supplement 1) and Mandarin (Supplement 2).

After being administered the questionnaire for the first time, participants were provided with existing, standard-of-care patient education materials, which consisted of hard copy information sheets, and a patient education video screened prior to IVT treatment. Thereafter, participants were re-administered the same questionnaire.

In this study, “standard-of-care” level of disease knowledge referred to questionnaire scores before and after the administration of these standard-of-care patient education materials.

Patient education and counselling interventions

Interventions included: 1) personalized counselling by dedicated trained nurse counsellors (DNCs), 2) a revised updated comprehensive hard copy patient-directed education material (PDEM), that were based on information gained from previous patient-focus groups, and 3) a custom digital interactive patient education application based on PDEM content. These interventions were implemented based on a plan, do, study, act (PDSA) model with consecutive cohorts of different patients studied with the 3 interventions introduced in a stepwise approach:

- Group 1 (standard-of-care): Using existing standard-of-care patient-education materials (Supplement 3)
- Group 2 (intervention 1): Personalised counselling by DNCs
- Group 3 (intervention 2): Personalised counselling by DNCs with novel PDEM
- Group 4 (intervention 3): DNCs administered interactive digital patient education application with PDEM. Nurses had minimal interaction with the patients, other than to guide them to the app on the computer.

For each group, the disease knowledge questionnaire was administered before and after the assigned educational intervention. The mean change in questionnaire score after each assigned educational intervention was the **primary outcome** of the study.

Measuring adherence to IVT treatment after interventions

Our **secondary outcome** was to determine the intervention effect on adherence to IVT treatment. Groups 2 and 3 were excluded from this part of the study, as the enrollment of these groups coincided with the Covid-19 pandemic, which introduced many confounding factors that could have affected adherence to follow-up and treatment. For Group 1 and Group 4, we assessed the adherence rates to IVT treatments over the first 4 months after initiation. All patients in these two treatment-naive groups were prescribed 3 monthly loading doses of IVT anti-VEGF at the time of initiation, as per standard of care. Adherence to IVT was defined as patients who received all 3 prescribed IVT treatments and attended all their appointments within the first 4 months after treatment commencement. Most treatment naïve patients would be prescribed a monthly IVT loading regime for at least 3 months. However, based on the clinician's discretion some may discontinue injections and move to an as-needed regimen earlier – these patients would be considered adherent if they were compliant to follow-up and IVT treatment within 4 months. Non-adherence was defined as patients that did not complete their prescribed IVT treatments within 4 months or missed at least 1 of their planned appointments within the first 4 months after treatment commencement.

Statistical methods

Questionnaire scores pre- and post-intervention were compared using paired T tests in all groups.

The mean change in questionnaire score after each assigned educational intervention was compared using one-way ANOVA testing. Mean age between the 4 groups was compared using one-way ANOVA, and gender and proportion of caregivers was compared using chi-squared test.

Our sample size calculation assumed a standard deviation of 4, to achieve a power of 80% and a level of significance of 5% (two sided), for detecting a mean clinically significant change in scores to be 2 points, hence a minimum sample size of 34 patients were required in each group.

Statistical analysis for non-adherence rates was performed using Fisher's exact test, $p < 0.05$ significant. We also performed the Independent Welch's t-test for unequal variances in Group 4 to find out if there was a significant difference in the adherent vs the non-adherent group in terms of the pre- and post-intervention questionnaire scores, and the change in mean questionnaire scores ($p < 0.05$).

RESULTS

We enrolled 163 participants in this study (150 patients, 13 care-givers; 51.6% males, mean age 60.7 (SD = 12.1) years). There were 4 consecutive cohorts to assess the effectiveness of current baseline IVT counselling program (Group 1 (Standard care-SC) = 45 patients), after introducing intervention 1 (Group 2 = 38 patients), intervention 2 (Group 3 = 40 patients) and intervention 3 (Group 4 = 40 patients) (Table 1). There were no significant differences in age or gender between the 4 groups ($p > 0.05$)

(Table 1). There was a significant difference in the proportion of caregivers answering on the patient's behalf between the 4 groups (p = 0.038).

Table 1
Summary of demographics, questionnaire scores, and non-adherence rate

Age (mean (SD))	**Group 1 (n = 45)**	**Group 2 (n = 38)**	**Group 3 (n = 40)**	**Group 4 (n = 40)**	**p - value**
	64.5 (13.6)	**62.9 (9.88)**	**64.2 (9.34)**	**59.8 (10.8)**	**0.210**
Gender (n, % male)	20/45 (44.4)	20/38 (52.6)	24/40 (60)	21/40 (52.5)	0.559
No. of caregivers answering on patient's behalf (n, %)	8/45 (17.8)	2/38 (5.26)	2/40 (5.00)	1/40 (2.50)	0.038
Pre-counselling score (mean (SD))	6.02 (1.73)	6.45 (2.20)	6.03 (1.80)	6.93 (1.53)	0.065
Post-counselling score (mean (SD))	6.64 (0.252)	7.74 (1.66)	8.05 (1.78)	8.63 (1.51)	< 0.001
Post-counselling score improvement (mean (SD))	0.62 (1.75)	1.29 (2.76)	2.02 (2.53)	1.7 (2.15)	0.213
Non-adherence rate (%)	12.5	-	-	5.13	0.287

Patient knowledge and understanding

Mean pre-counselling questionnaire scores in all 4 groups were similar (One-way ANOVA, p = 0.065), ranging from group average scores of 6.02–6.93 out of 10. Patients did poorly in answering a few important questions such as Q4 "Severe eye infection leading to blindness is a possible complication of intravitreal injections.". Only an average of 49.7% patients correctly answered this question of all 163 patient's pre-intervention (Group 1–51%; Group 2–50%; Group 3–45%; Group 4–52.5%). For Q7 "A red patch of blood on the white part of the eye is a common, mild complication after intravitreal injection to the eye.", an average of only 54.6% correctly answered this (Group 1–53%; Group 2–42%; Group 3–52.5%; Group 4–67.5%). Similarly, Q8 "Treatment with intravitreal injections for most common conditions only needs to be given 1 to 2 times per year.", had an average of 66.9% correctly answered (Group 1–60%; Group 2–76.3%; Group 3–50%; Group 4–82.5%).

Significant improvements were observed between pre- and post-counselling mean scores for all groups (Group 1 = 0.62; Group 2 = 1.29; Group 3 = 2.02; Group 4 = 1.7; paired T-test, all p < 0.001). Compared to using existing patient-education materials (standard-of-care), Interventions 1–3 resulted in a significantly higher post-counselling score (Group 1 = 6.64; Group 2 = 7.74; Group 3 = 8.05; Group 4 = 8.63; ANOVA with post hoc Bonferroni correction, all p < 0.05).

The highest improvement of the scores was observed after Intervention 2 (+ 2.02 points) (Table 1), however using pair-wise comparisons, no statistically significant differences were observed between interventions 1–3. One-way ANOVA testing showed differences between the 4 groups in terms of mean post-counseling score improvement (p = 0.0355), however after post hoc Bonferroni correction for pair-wise comparison, this was not significant (p = 0.213).

Adherence rates to IVT

Adherence rate to IVT of Group 1 versus Group 4 was compared. In group 1, 7 patients did not complete 3 IVTs within 4 months as they were planned for an as required/PRN treatment regimen, hence they were considered adherent to treatment. For Group 4, 8 patients were planned for an as required/PRN treatment regimen. In Group 1, 6/48 (12.5%) did not adhere to IVT treatment. In Group 4, 2/39 (5.13%) did not adhere to IVT treatment. Non-adherence was lower in Group 4 (2/39 = 5.13%) compared to Group 1 (6/48 = 12.5%), but the difference between the 2 groups was not significant (fisher's exact, p = 0.287).

When comparing Group 4's adherent vs non-adherent patients, there was a notable difference in mean score change between the 2 groups, with the adherent patients having a mean score change of 1.84 improvement, and the non-adherent group having a mean score change of -0.50 (Table 2). This suggests that better knowledge and understanding of their macula condition is associated with treatment adherence. The p-value of 0.062 showed that the difference in mean score change approaches statistical significance but did not meet the 0.05 threshold. This could be due to the small sample size in the non-adherent group.

Table 2
Comparing adherent vs non-adherent patients' scores in Group 4

Group 4	**Adherent (37/39)**	**Non-adherent (2/39)**	**p-value**
Pre-counselling mean score (SD)	6.92 (1.57)	7.00 (1.41)	0.949
Post-counselling mean score (SD)	8.76 (1.44)	6.50 (2.12)	0.369
Mean score change (SD)	+ 1.84 (1.89)	-0.50 (0.707)	0.062

DISCUSSION

In this study, our results showed that patient knowledge of their condition and treatment plan was suboptimal (average group scores of 6.02–6.93 out of 10), despite having had explanation and informed consent taken by the ophthalmologist beforehand. We found that they did not have a good understanding of the possible severe risk of post-IVT endophthalmitis, the common complication of post-IVT subconjunctival haemorrhage, and a significant proportion had the misconception that they only required 1–2 IVTs per year. We also found that improving their knowledge via interventions 1–3 resulted in significant improvement in patients' understanding of their macula diseases and treatment. Specifically, our novel I2, illustrated how multi-disciplinary focus groups involving patient can produce

relevant patient directed material for more widespread use. Furthermore, our nurses reported that the usage of the digital education application in intervention 3 was more self-directed and less time-consuming for the nurses, hence this intervention shows potential to be manpower- and cost-saving, although this was not measured in our study. Therefore, our results suggest that clinics should adopt any of these 3 interventions to improve patient understanding of their macula disease and treatment plan. However out of the 3, it is likely that the digital education application could be more self-directed, manpower-saving and cost-saving in the long run, although may more studies will need to assess its effectiveness in target populations.

Additionally, our study found an improvement in adherence rates to IVT in Group 4 which used the digital education application compared to the 'standard-of-care' Group 1; however, this difference was not found to be statistically significant, likely because our study was underpowered to measure this outcome. Even though our study may suggest that improving patient knowledge has the potential to improve adherence to IVT treatment, the association between the improvement in patients' knowledge about their treatment and adherence rates will require more long-term studies with larger sample sizes to establish.

The barriers to treatment are paramount to address in such a prevalent and important disease. Recently in January 2025, Loewenstein[13] published findings from a questionnaire done by 4558 patients, 659 doctors/providers, and 1208 clinic staff. Main challenges associated with the clinical management of macular diseases included insufficient comprehension, and a key area of improvement identified was educational. Elhken[14] also reported that significant barriers to IVT adherence included disappointed patient expectations, and fear and anxiety. Other barriers to adherence to treatment reported by various studies[15] include patient burden to family/friends[13], lack of finances[13,16], patient mobility and transportation[13,17], lack of time/long waiting time[13,17], and side-effects of IVT[18]. Hence, to promote adherence, all these need to be addressed via a multidisciplinary team that include clinicians, nurse educators and medical social workers. Furthermore, a key driver for adherence was the doctor-patient relationship[18]. Engaging ophthalmologists and nurses to communicate openly and clearly with patients to empower patients to be more involved in their care will also encourage long-term adherence[18].

This study is one of the few available in literate that investigates patient knowledge and IVT adherence. Strengths of this study includes investigating different interventions to improve patient knowledge of their macula condition and treatment. The limitations of the study include only testing the patients' knowledge immediately after counselling, and not testing again on subsequent follow ups, hence it is uncertain whether patients will be able to retain the knowledge of their condition and reason for IVT. Other limitations include the sample size, as perhaps with a larger sample it might be possible to demonstrate a significant difference in improving IVT adherence rates after our interventions. The questionnaire that was used to measure patients' understanding of their macula disease was also not validated.

Conclusion

In conclusion, this study demonstrated that our stepwise novel personalised patient-directed education interventions improved patients and caregivers' understanding of their condition and IVT treatment plan and can potentially improve adherence to IVT treatment. Plans to scale up are underway. Potential areas for future research are extensive and varied and include: further studying reasons for non-adherence to IVT, interventions to improve IVT adherence, measuring cost-effectiveness of patient-education, measuring improvement of patients' macula disease and correlating it to the patient-education, or validating our questionnaire for other clinicians to evaluate their own patient counselling methods.

Declarations

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. There are no relevant financial relationships to disclose.

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Author Contribution

A.T and T.T.E contributed to the study conception and design. Material preparation and data collection was done by T.T.E, N.S., L.Y.H, L.C.Y, and nurses J.T., B.C., M.S., and T.K.W. The first draft of the manuscript was written by L.C.Y. and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data Availability

The data are not publicly available due to privacy and ethical restrictions, as participant consent did not include public sharing.

References

1. Causes of blindness and vision impairment (2021) in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study. Lancet Glob Health Feb 9(2):e144–e160. 10.1016/s2214-109x(20)30489-7
2. Lotery A, Xu X, Zlatava G, Loftus J (2007) Burden of illness, visual impairment and health resource utilisation of patients with neovascular age-related macular degeneration: results from the UK cohort of a five-country cross-sectional study. Br J Ophthalmol Oct 91(10):1303–1307. 10.1136/bjo.2007.116939
3. Fleckenstein M, Schmitz-Valckenberg S, Chakravarthy U (2024) Age-Related Macular Degeneration: A Review. Jama Jan 9(2):147–157. 10.1001/jama.2023.26074
4. Romano F, Lamanna F, Gabrielle PH et al (2023) Update on Retinal Vein Occlusion. Asia Pac J Ophthalmol (Phila) Mar-Apr 01(2):196–210. 10.1097/apo.0000000000000598
5. Zhang J, Zhang J, Zhang C et al (2022) Diabetic Macular Edema: Current Understanding, Molecular Mechanisms and Therapeutic Implications. Cells Oct 25(21). 10.3390/cells11213362
6. Ehlken C, Helms M, Böhringer D et al (2018) Association of treatment adherence with real-life VA outcomes in AMD, DME, and BRVO patients. Clin Ophthalmol 12:13–20. 10.2147/opth.S151611
7. Ciulla TA, Hussain RM, Pollack JS, Williams DF (2020) Visual Acuity Outcomes and Anti-Vascular Endothelial Growth Factor Therapy Intensity in Neovascular Age-Related Macular Degeneration Patients: A Real-World Analysis of 49 485 Eyes. Ophthalmol Retina Jan 4(1):19–30. 10.1016/j.oret.2019.05.017
8. Ciulla TA, Pollack JS, Williams DF (2021) Visual acuity outcomes and anti-VEGF therapy intensity in diabetic macular oedema: a real-world analysis of 28 658 patient eyes. Br J Ophthalmol Feb 105(2):216–221. 10.1136/bjophthalmol-2020-315933
9. Ciulla T, Pollack JS, Williams DF (2021) Visual acuity outcomes and anti-VEGF therapy intensity in macular oedema due to retinal vein occlusion: a real-world analysis of 15 613 patient eyes. Br J Ophthalmol Dec 105(12):1696–1704. 10.1136/bjophthalmol-2020-317337
10. Okada M, Mitchell P, Finger RP et al (2021) Nonadherence or Nonpersistence to Intravitreal Injection Therapy for Neovascular Age-Related Macular Degeneration: A Mixed-Methods Systematic Review. Ophthalmology Feb 128(2):234–247. 10.1016/j.ophtha.2020.07.060
11. Chong Teo KY, Saxena N, Gan A et al (2020) Detrimental Effect of Delayed Re-treatment of Active Disease on Outcomes in Neovascular Age-Related Macular Degeneration: The RAMPS Study. Ophthalmol Retina Sep 4(9):871–880. 10.1016/j.oret.2020.03.017
12. Enders C, Ryszka J, Lang GE et al (2021) [Patient's Knowledge after Informed Consent for Intravitreal Injections]. Klin Monbl Augenheilkd Jun 238(6):721–726 Intravitreale Injektionen – welche Informationen aus dem Aufklärungsgespräch bleiben Patienten im Gedächtnis?. 10.1055/a-0886-6507

13. Loewenstein A, Sylvanowicz M, Amoaku WM et al (2025) Global Insights from Patients, Providers, and Staff on Challenges and Solutions in Managing Neovascular Age-Related Macular Degeneration. Ophthalmol Ther Jan 14(1):211–228. 10.1007/s40123-024-01061-3
14. Ehlken C, Ziemssen F, Eter N et al (2020) Systematic review: non-adherence and non-persistence in intravitreal treatment. Graefe's Archive Clin Experimental Ophthalmol 10(10):2077–2090. 10.1007/s00417-020-04798-2. /01 2020
15. Choi A, Nawash BS, Du K et al (2024) Barriers to care in neovascular age-related macular degeneration: Current understanding, developments, and future directions. Surv Ophthalmol Jan-Feb 69(1):160–164. 10.1016/j.survophthal.2023.09.001
16. Shahzad H, Mahmood S, McGee S et al (2023) Non-adherence and non-persistence to intravitreal anti-vascular endothelial growth factor (anti-VEGF) therapy: a systematic review and meta-analysis. Syst Rev Jun 2(1):92. 10.1186/s13643-023-02261-x
17. Müller S, Junker S, Wilke T et al (2021) Questionnaire for the assessment of adherence barriers of intravitreal therapy: the ABQ-IVT. Int J Retina Vitreous Jun 2(1):43. 10.1186/s40942-021-00311-x
18. Giocanti-Aurégan A, García-Layana A, Peto T et al (2022) Drivers of and Barriers to Adherence to Neovascular Age-Related Macular Degeneration and Diabetic Macular Edema Treatment Management Plans: A Multi-National Qualitative Study. Patient Prefer Adherence 16:587–604. 10.2147/ppa.S347713

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