Patient Satisfaction of Intravitreal Bevacizumab Injection Services at a Referral Center

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Abstract

Purpose: To evaluate the patient satisfaction of intravitreal bevacizumab (IVB) injection services for ocular complications of diabetes mellitus (DM) at a referral center.

Methods: Patients with diabetic macular edema (DME) and diabetic retinopathy (DR) who had undergone IVB injections between March and September 2018 were interviewed by telephone using two questionnaires. First, demographic information, medical history, and the Patient Satisfaction Questionnaire Short Form (PSQ-18) 5-point scale were collected. Then, the Retinopathy Treatment Satisfaction Questionnaire (RetTSQ) 7-point scale was completed. Total scores are presented on a 100-point scale, with 100 indicating complete satisfaction.

Results: Two hundred and fifty patients (145 with DME and 105 with DR) were interviewed (mean age: 61 ± 10 years; male-to-female ratio: 1:1.5). The response rate was 96%. Twenty-one patients had only one injection. Two hundred and forty-eight (99.2%) patients had insurance. The mean number of total injections was 12.2 ± 11.5. Seventy (28%), forty-seven (18.8%), sixty-one (24.4%), and seventy-two (28.8%) patients underwent IVB treatment for <6 months, between 7 and 12 months, between 13 and 24 months, and >25 months, respectively. The mean total and overall scores were 90.8 ± 22.5 (completely satisfied) and 88.7 ± 16.6 (completely satisfied) based on PSQ-18 and RetTSQ, respectively. Financial problems and appointment scheduling systems were the highest cases of dissatisfaction.

Conclusion: The majority of patients were highly satisfied with IVB injections for the management of ocular complications of DM. The appointment taking procedure, waiting times, out-of-pocket expenses, and access to the hospital should be improved.

Keywords: Diabetic retinopathy, Intravitreal injections, Macular edema, Patient satisfaction

INTRODUCTION

Severe non-proliferative diabetic retinopathy (DR), proliferative DR, and diabetic macular edema (DME) are the leading causes of visual impairment and blindness in the working-age population.[1-4]

Anti-vascular endothelial growth factor (anti-VEGF) is one of the most important agents for treating retinal vascular diseases, including DME and DR.[5-7] Intravitreal anti-VEGF is the first choice for treating and preventing the progression of retinal diseases with neovascularization and retinal and choroidal leakage.[8-10] Bevacizumab (Avastin®; Genentech, Inc., South San Francisco, CA, USA) is a humanized monoclonal antibody that blocks the VEGF. After the study by Rosenfeld *et al*. in 2005 regarding the effect of bevacizumab in a patient with age-related macular degeneration (AMD), intravitreal bevacizumab (IVB) became popular in the ophthalmology field.[11-14]

Three strategies are currently being used for IVB injection management: (a) 4–6-week intervals (b) injecting

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when necessary (pro re nata [PRN]) and (c) treat and extend, progressively increasing the intervals during the treatment.[15,16] Patients may still feel anxious and stressed during the procedure even though the safety and effectiveness of intravitreal injections have been proven. In previous studies, pain reduction strategies such as changing the form of anesthesia, adjusting the needle gauze size, playing music, and comforting the patient during the injection have been investigated.[17] It is important to consider strategies that can improve patient satisfaction.

There is little information available about patient satisfaction, even though the number of patients that require intravitreal injections is increasing, and every individual needs more than one injection each year. This study aimed to evaluate the patient satisfaction of intravitreal injection services at a tertiary eye care hospital in Iran for patients with diabetic ocular complications.

METHODS

In this cross-sectional study, all patients with DR or DME who had received IVB injections at Torfeh Medical Center between March and September 2018 were interviewed. Two trained interviewers conducted interviews over the telephone. The average duration of each interview was 15–20 min. The telephone interview was conducted using two questionnaires. First, the demographic information, medical history, and Patient Satisfaction Questionnaire Short Form (PSQ-18) 5-point scale (1 = strongly agree, 5 = strongly disagree) was completed. Then, the Retinopathy Treatment Satisfaction Questionnaire (RetTSQ) 7-point scale (6 = very satisfied, 0 = very dissatisfied) was completed. All satisfaction scores were standardized on a 0–100 scale, with a score of 100 representing the highest level of satisfaction. The satisfaction spectrum was divided into five categories: (1) completely satisfied (80–100%), (2) satisfied (60–80%), (3) somewhat satisfied (40–60%), (4) dissatisfied (20–40%), and (5) completely dissatisfied (0–20%). Some aspects of the PSQ-18, such as patient satisfaction, including general skills of the medical staff, physicians' manners, quality of verbal communications, cost of treatment, overall satisfaction with the treatment course, availability of the physicians, and waiting times were not specifically considered in the RetTSQ.[18]

RetTSQ consists of two subscales: subscale one examines the positive aspects of treatment like current satisfaction, whether the treatment worked well, the influence of patients' decision on treatment planning, safety of the treatment, information provided about the treatment, encouragement of others, and whether the injections were continued. Subscale two of the RetTSQ examines the negative aspects of treatment, such as side effects, pain, discomfort, unpleasant feelings, any difficulties, apprehensiveness, and time.[19]

Based on the pilot phase of the study, we observed that the appointment scheduling system and the waste of time – specifically in the financial section and the waiting room before injection – were the sources of concern for our patients. Hence, we decided to ask these questions separately to have a better understanding of these problems. In the original format of the PSQ-18 questionnaire, these factors were evaluated under the general term of accessibility and convenience.

General information of patients was extracted from medical records. Furthermore, to establish a positive connection with patients, as well as verifying the information, some of this information was asked again during the interview.

As well as reliability, the validity of the contents of the Persian translation of the questionnaires was validated in several interviews with physicians, patients, and their companions at the pilot phase of this study. Previous studies that used these questionnaires also confirmed the content validity and reliability.[20,21]

All aspects of this study that involved patients were conducted with their approval. Informed consent was verbally received from all patients before the interview, and none of the answers affected their treatment. The study protocol was approved by the Ethical Committee at Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences (Ethical approval code: IR.SBMU.ORC.REC.1397.38). All procedures performed in this study were in accordance with the Helsinki Declaration of 1975, as revised in 2000.

The collected information was analyzed using SPSS (IBM Corp. Released in 2017. IBM SPSS Statistics for Windows, version 25.0. Armonk, NY, USA: IBM Corp.). Data are presented with the mean, standard deviation, frequency, and percentage. The reliability of the mean score estimates was assessed by 95% confidence interval. To compare the quality scores among the various demographic variables, we used the *t*-test and one-way analysis of variance. These relationships were also evaluated using an analysis of covariance. In addition, we used Pearson's correlation coefficient to examine the relationship between the satisfaction scores of the dimensions and the total satisfaction scores. A value of $P < 0.05$ was considered statistically significant.

RESULTS

Demographic and clinical characteristics of the patients

Two hundred and fifty patients with DR and DME were included in this study. Of these, 145 patients had been diagnosed with DME and 105 with DR (90 patients with proliferative DR and 15 patients with non-proliferative DR). The overall response rate was 96%. Twenty-one patients only had one injection, while the other patients had more than one injection. The mean age was 61 ± 10 years. Ninety-seven (38.8%) patients were male, and 153 (61.2%) patients were female. Two hundred and forty-eight (99.2%) patients had insurance. The mean number of total injections was 12.2 ± 11.5 injections with 6.9 ± 5.8 and 7 ± 6.3 injections in the right and left eye, respectively. In 188 (75.2%) individuals, both eyes were affected, and the patients received

bilateral injections. Seventy (28%), 47 (18.8%), 61 (24.4%), and 72 (28.8%) of the patients underwent IVB treatment for <6 months, between 7 and 12 months, between 13 and 24 months, and >25 months, respectively. Fifty-three (21.2%) patients were illiterate. Four (1.6%) patients had a physical disability due to other diabetes-related complications. One hundred and seventy-one (68.4%) individuals were residents of the capital city in which the hospital was located, and 79 (31.6%) patients were residents of other districts. In terms of the type of transport, 170 (68%) of the patients did not own a personal vehicle and used public transportation, whereas 74 (29.6%) and 6 (2.4%) patients used a personal car and motorcycle, respectively. All the patients' characteristics are summarized in Table 1.

Patient satisfaction based on Patient Satisfaction Questionnaire-18

The mean total score for the general satisfaction of the intravitreal injection services was 90.8 ± 22.5 (completely satisfied) based on PSQ-18. In addition, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, accessibility, and convenience were examined. The significance of demographic variables was analyzed and is presented in Table 2. The factors that were a source of complaint, for example, wasted time in the payment process, wasted time while waiting for their turn, and the appointment taking procedure were considered separately. The satisfaction score domains for each group are displayed in Table 3. The correlations between each domain were also evaluated and are presented in Table 4.

Patient satisfaction based on Retinopathy Treatment Satisfaction Questionnaire

The mean total score for treatment with intravitreal injections was 88.7 ± 16.6 (completely satisfied) based on RetTSQ. The mean total score for each subscale in RetTSQ was as follows, 90.6 ± 17.6 (completely satisfied) for subscale one and 86.4 ± 21.4 (completely satisfied) for subscale two.

The satisfaction of patients based on the diagnosis of the ocular problems (proliferative DR, non-proliferative DR, and DME) was analyzed, and the results are displayed in Table 5.

DISCUSSION

Intravitreal injections for preserving eyesight involve regular follow-up visits and a great deal of time and money. Even though the participants were satisfied with both the service and their treatment, financial problems were a limitation. In this survey, the financial aspect scored 74.9 ± 36.1, which was the lowest score of all of the PSQ-18 domains. Satisfaction with the financial aspects did not correlate with general satisfaction in this study. As such, overall satisfaction can be high, while financial satisfaction is low. Interestingly, satisfaction with the financial aspects was related to the socioeconomic position of the patients. In Iran, the cost of each injection is equivalent to half of the minimum wage salary based on the reports published by the statistical center of Iran. Besides, insurance covers approximately half of the cost. Therefore, the reported results could be due to the high expense of the intravitreal injections in our country. By having full insurance coverage and facilitating access to public transportation, the financial burden can be reduced, and patients may be more likely to attend follow-up sessions.

Although nearly all patients (99.9%) had insurance, financial problems were still a major cause of patient dissatisfaction. This could be related to other medical expenses, such as some prescriptions or procedures that were not covered by the insurance or the cost of accommodation or transportation. Several suggestions could help overcome these financial problems. Insurance companies should devise diverse and affordable plans designed explicitly for the needs of families or individuals. Reasonably priced accommodation options nearby medical centers should be made available for relatives or patients who require follow-up visits.

Patients' resentment at medical bills can adversely affect their overall satisfaction with the medical services received.

Table 1: Demographic characteristics, duration of diabetes, and number of injections

Parameters	Mean±SD, Median (range)
Age (year)	61±10, 62 (26-83)
Number of injections (OD)	6.9±5.8, 5 (1-22)
Number of injections (OS)	7±6.3, 5 (1-40)
Total number of injections	12.2±11.5, 8 (1-48)

Parameters	Number (%)
Sex	
Male	97 (38.8)
Female	153 (61.2)
Level of education	
Illiterate	53 (21.2)
Less than a diploma	142 (56.8)
Diploma	47 (18.8)
Higher than diploma	8 (3.2)
Laterality	
Unilateral	62 (24.8)
Bilateral	188 (75.2)
Insurance	
Yes	248 (99.2)
No	2 (0.8)
Physical disability	
Yes	4 (1.6)
No	246 (98.4)
Vehicle availability	
Motorcycle	6 (2.4)
Car	74 (29.6)
No	170 (68.0)
Duration of diabetes (year)	
≤6	70 (28.0)
7-12	47 (18.8)
13-24	61 (24.4)
25+	72 (28.8)

Table 2: General satisfaction scores based on demographics and other variables

	PSQ Score			RetTSQ Score		
	Mean±SD	Unadjsuted (*P*)	Adjusted (*P*)	Mean±SD	Unadjsuted (*P*)	Adjusted (*P*)[δ]
Age (year)						
≤55	90.7±23.7	0.332	0.665	85.9±19.2	0.167[‡]	0.254
56-65	93.6±17.6			91.4±13.7		
66-75	87.3±27.3			87.8±17.8		
76+	88.5±19.4			86±14.8		
Sex						
Male	90.6±22.5	0.93	0.72	88.8±18.3	0.9[†]	0.957
Female	90.8±22.6			88.6±15.4		
Education						
Illiterate	88.2±24.8	0.358	0.26	87.5±15.5	0.424[‡]	0.109
Less than a diploma	90.1±23.5			88.4±17.8		
Diploma	94.1±17.6			89.3±15.1		
Higher than diploma	100±0			97.8±3.1		
Laterality						
Unilateral	90.1±25	0.8	0.958	86.2±19	0.171[†]	0.187
Bilateral	91±21.7			89.5±15.7		
Physical disability						
Yes	93.8±12.5	0.789	0.759	92±9.6	0.687[†]	0.784
No	90.7±22.6			88.6±16.7		
Vehicle availability						
Motorcycle	100±0	0.223	0.477	82.1±20.3	0.602[‡]	0.505
Car	93.6±20.2			88.5±18.7		
No	89.2±23.7			89±15.5		
Duration of diabetes (year)						
≤6	90±24.6	0.888	0.723	88.4±17	0.67[‡]	0.319
7-12	89.9±25.2			86.9±19.9		
13-24	90.2±21.7			88±16.3		
25+	92.5±19.3			90.6±13.9		
Total injection						
1.0	86.3±29.6	0.377	0.634	85.7±23.4	0.033[‡]	0.009
2.0-4.0	93.9±17.5			92.8±12.4		
5.0-10.0	88.1±25.8			84.6±19.8		
11.0+	91.4±21.3			89.3±14.3		

[†]Based on *t*-test, [‡]Based on ANOVA, [δ]Based on ANCOVA. PSQ: Patient Satisfaction Questionnaire Short Form, RetTSQ: Retinopathy Treatment Satisfaction Questionnaire, ANOVA: Analysis of variance ANCOVA: Analysis of covariance, SD: Standard deviation

Health-care organizations should create new methods for explaining the treatment cost and payment plans to patients. Patients are often overwhelmed with the complicated payment process. Medical expenses should be explained in simple and easy-to-understand language. Patients should be informed about any potential charges of the medical services they receive, alternative treatment options, and the out-of-pocket expenses. Health-care services or insurance companies should make the patients aware of the medical expenses that are and are not covered by their health insurance. This information should be discussed with the patient before treatment. It is worth mentioning that some patients struggle with the high therapeutic cost of their treatment. Patient satisfaction could be improved if the health care organizations provided alternative payment strategies, for example, payable installments or low-interest loans. A positive experience

with payment methods could immensely increase patient satisfaction.[22,23]

RetTSQ questionnaire is a disease-specific questionnaire: the items included in this questionnaire are related to diagnosis and treatment. The patient satisfaction based on RetTSQ was high in all the aspects; therefore, the scores of each item was not reported separately. To inspect the other factors affecting patient satisfaction, we used the PSQ-18 questionnaire. The items included in PSQ-18 are more general and contain most of the factors associated with patient satisfaction.

The PSQ-18 items that were a source of concern for patients have been individually evaluated. Time wasted in the payment process, waiting for their turn, and the appointment scheduling through the telephone or website were the highest causes of dissatisfaction. The appointment scheduling mean score was

Table 3: Patients' satisfaction of intravitreal injection based on patient satisfaction questionnaire short form

	Scores		
	Mean±SD	95% CI	
		Lower	Upper
General satisfaction	90.8±22.5	87.9	93.6
Technical quality	98.1±8.7	97.1	99.2
Interpersonal manner	98.6±9.8	97.4	99.9
Communication	98±12	96.6	99.5
Financial aspects	74.9±36.1	70.5	79.4
Time spent with doctor	97.6±11.4	96.1	99
Accessibility	98.3±9.62	97.1	99.5
Convenience	83.7±28.92	80.1	87.3
Wasting in the time of patients	87.9±30.82	84.06	91.74
Appointment scheduling	79.5±36.09	75	84

CI: Confidence interval, SD: Standard deviation

Table 4: Correlation of each aspect and general satisfaction

	r	P*
Technical quality	0.491	<0.001
Interpersonal manner	0.416	<0.001
Communication	0.426	<0.001
Financial aspects	0.065	0.145
Time spent with doctor	0.376	<0.001
Accessibility	0.340	<0.001
Convenience	0.117	0.009
Wasting in the time of patients	0.105	0.019
Appointment scheduling	0.094	0.037

*Based on Pearson correlation

Table 5: Satisfaction scores based on the diagnosis

	Mean±SD	
	General satisfaction	RetTSQ
Diagnosis		
Proliferative DR	91.5±19.9	88.3±15.4
Non-proliferative DR	91.7±18.1	94.3±9.8
DME	90.2±24.4	88.3±17.8
P	0.893	0.402

DME: Diabetic macular edema, RetTSQ: Retinopathy Treatment Satisfaction Questionnaire, SD: Standard deviation, DR: Diabetic retinopathy

lower compared to other domains. This may be improved through enhancing the appointment system and minimizing the waiting times.

The appointment scheduling system is of utmost importance in enhancing patient satisfaction as it is the first time patients interact with the health-care system. An inefficient system can result in patients presenting to the wrong service, forcing them to return at another time. A disorganized system wastes a lot of time and money both for patients and health-care providers.

Different types of appointment scheduling techniques such as phone call centers, automated call centers, short message services, and website bookings should be made available. Web-based appointment taking systems are increasingly popular with patients. These should be developed using an accessible platform with an easy interface. The benefits of the online website/mobile applications are no human errors, time-saving, increased variability of available physicians and available times, flexibility in changing the appointment time, reduction of waiting time, decreasing staff workload, reducing non-attendance, and balancing the number of patients in each visit.[24,25]

It should be noted that a number of elderly patients are not familiar with new web-based appointment taking systems. Hence, other appointment taking options should still be made available. Educating patients about how to use applications or websites could also be considered. Furthermore, 21% of our patients were illiterate, and hence, the interface of appointment scheduling systems and also the informative brochures for patients should be more graphical.

Many patients miss their appointments due to transportation issues. Affordable and accessible transportation can also positively affect the health-care system. It will decrease the number of patients that do not present to their appointments and reduce the rate of non-adherence as well as the financial burden on patients and health insurance companies. Some suggestions with regard to alleviating patient discomfort are as follows. As 68% of our patients did not own a personal vehicle, public transportation should be available from any area in the city to every medical center. Available parking spots for patients who come with their personal vehicles should be made available. For patients with significant visual impairment, the elderly, or people with disabilities, ambulance transportation should be offered. Since 31% of the patients were residents of other districts, the development of medical centers to address related eye problems in other remote areas, not only in capital cities, should be considered. While improving transportation requires the development of infrastructure, health-care centers could help by highlighting this issue to the relevant stakeholders.[26,27]

Patient satisfaction with the quality of care provided by the ophthalmology residents of North Carolina Hospital, the United States of America, was investigated using the PSQ-18. The reported satisfaction rate was higher than 80%.[28] In other similar studies with different types of questionnaires, patients were satisfied with the injection services and were willing to continue their treatments.[29,30]

A study that investigated the burden of repetitive intravitreal injections on patients with AMD reported that the most significant psychosocial factors for patients were anxiety before the injection, pain during the treatment, cost of the treatment, transportation, and priorities of the treatment schedule over any other plans. These ranged from slight to significant burdens.[31]

Treatment satisfaction in myopic choroidal neovascularization was investigated during consecutive months (0, 1, 6, and 12 months). Over the assessment period, the patient's treatment satisfaction significantly increased. This could be because patients with good compliance experienced more improvement in their vision, and therefore, higher future satisfaction.[32]

Another method of intravitreal injection was evaluated in Great Western Hospital in the United Kingdom. In the mentioned study, intravitreal injections were performed by a trained team of five nurses. Patients were followed for 1 month, and a locally designed questionnaire was filled out. The feedback of the patients was highly positive. Anxiety and nervousness were the two main symptoms that were noticed. Although patients provided highly positive feedback regarding the intravitreal injections performed by nurses, some patients were anxious that the nurse administering injections would be unsafe.[33] The education of patients might reduce these concerns and help them adapt conveniently with the new method of injection. The preferences of patients, for example, the location that the injections are performed, cleanliness of the utilities, waiting time, informed about the procedure, accessibility, and convenience, can also affect patient satisfaction.[34] Strategies for increasing the convenience for patients have been reported based on the priorities of patients disaggregated by gender.[17]

A diagnosis-based satisfaction score in our patients did not reveal any significant difference between the proliferative DR, non-proliferative, or the DME patients in terms of satisfaction. The correlation of each aspect of the PSQ questionnaire with general satisfaction was investigated. The most important factors contributing to the general satisfaction of patients were physicians' manners, communication skills, average time spent, accessibility and convenience, technical aspects, and the quality of care. Besides, a significant statistical association was shown between the total number of injections and the satisfaction rate based on RetTSQ. This could be due to patient familiarity with the treatment procedure.

The results of this article showed that a good patient–doctor relationship positively impacted general satisfaction. This suggests that although each domain is important for patient satisfaction, this domain may compensate for the deficit of other domains.

Ever-changing technological advancements suggest that the future of healthcare is going to be integrated with technology. The positive impacts of an integrated platform based on the electronic health record (EHR) on different aspects of patient satisfaction are discussed below. An EHR stores all the patients' demographic information, medical history, drug history, laboratory test results, and radiological imaging.[35]

We suggest that policymakers use an EHR to overcome many problems regarding medical care services. The EHR of patients should be accessible in all hospitals and clinics through a cyber-platform/mobile-application. Researchers state that excessive clinical workload would lead to medical errors and suboptimal patient care.[36] An EHR would undoubtedly help improve the quality of health-care services.[37] With all the patient medical history, the app could be used to help triage prospective patients by suggesting hospitals/clinics that are specialized in the required field. The EHR could be equipped with an online consulting system for discussing the severity of a patient's situation and confirming whether they need to visit in-person. If a doctor's visit is necessary, then the appointment could be scheduled through the EHR platform as well. This function avoids unnecessary visits. Therefore, the workload of health-care specialists, medical expenses of patients, and the pressure on health insurance would be reduced. Adherence to treatment is crucial in shaping clinical outcomes. The EHR could also be used to send reminders of upcoming appointments and follow-up visits to patients.

To our knowledge, this is the first study that evaluates patient satisfaction of intravitreal injection services based on both general satisfaction and treatment satisfaction. This study could be useful as a statistical analysis of patient satisfaction to enhance the quality of services received.

A larger sample size from different settings is required to achieve more findings regarding the factors that can have a negative impact on patients' satisfaction with IVB services.

In conclusion, the majority of patients were satisfied with the IVB injection service for the management of ocular complications of diabetes mellitus. The appointment-taking procedure and waiting times should be improved. In addition, full insurance coverage for diabetic patients and easy access to public transportation could also help reduce the burden of long-term treatment.

Conflicts of interest
There are no conflicts of interest.

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