A pre- and post-treatment evaluation of vision-related quality of life in uveitis

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Aim: To study the effect of treatment on vision-related quality of life (VR-QOL) in uveitis patients.

Materials and Methods: Interviewer-administered questionnaire-based evaluation of visual function and VR-QOL in Tamil-speaking adult patients with active uveitis at presentation and follow-up by the same interviewer.

Results: Ninety-eight patients participated in this study. There was a statistically significant improvement in VR-QOL in all the scales following treatment ($P < 0.001$). Patients with chronic uveitis showed better improvement upon treatment than patients with acute uveitis. The visual symptoms scale showed moderate gains following treatment (effect size 0.56). Persons with bilateral disease had poorer mean scores compared to those with unilateral disease. Visual acuity was closely correlated with VR-QOL scores.

Conclusion: The VR-QOL measurement has shown that it is sensitive to demonstrate the problems of patients with uveitis irrespective of their demographic profile. The scores improved significantly in patients with uveitis following treatment and have shown close correlation to visual acuity thus demonstrating that VR-QOL is effective in assessing the response to treatment.

Key words: Indian vision function questionnaire, uveitis, vision-related quality of life, visual acuity

Patient-reported outcomes have been studied extensively, and are widely accepted tools for measuring patients' perceptions of their vision in a variety of diseases and are now used in clinical trials to evaluate the efficacy of medical or surgical interventions. In ophthalmological research, both health-related quality of life (QOL) and vision-related (VR) QOL are relevant measures.[1] Vision-related QOL has been evaluated in various ocular conditions[2-6] and ophthalmologic surgical interventions.[7-10]

Uveitis is composed of a diverse group of disease entities, which in aggregate have been estimated to cause approximately 10% of blindness.[11] Reports from Western populations indicate that uveitis causes a profound decrease in vision and health-related QOL and VR-QOL instruments have been used to evaluate the outcomes of treatment of ocular disease.[2,5,6] Uveitis causes vision loss both directly through inflammation and via complications such as macular edema, glaucoma, cataract and others[12] each of which is expected to affect VR-QOL measurements. Because treatment for uveitis itself can result in both ocular and systemic complications, it would be valuable to assess the impact of such treatment on QOL and VR-QOL to evaluate the presumed benefit of such treatment from patients' perspectives. Our study was planned to look at the VR-QOL issues in uveitis in the Indian subcontinent since the incidence of infective uveitis is greater and the customs and needs of this population are entirely different from that of the Western population.

Materials and Methods

It was a prospective study of changes in VR-QOL following treatment for uveitis in Tamil-speaking south Indian patients receiving care for uveitis at a large, tertiary center.

This study was a questionnaire-based assessment of VR-QOL in uveitis patients, conducted at the Uvea Clinic at a tertiary eye care center from southern India from December 2005 to June 2006. Ninety-eight consecutive Tamil-speaking adults (>15 years) who were diagnosed with active uveitis, who had not previously been treated for this condition were included in the study. The 33-item Tamil version of Indian vision function questionnaire (IND-VFQ)[13-14] was applied to all the patients by the same interviewer. A complete ophthalmic evaluation and necessary investigations were done for each individual patient, the findings were recorded, and treatment was administered as clinically indicated. Socio-demographic data were also collected. The patients repeated the same questionnaire, administered by the same interviewer, at follow-up.

Because of cultural and linguistic considerations, it is mandatory to use a questionnaire developed for a particular community and in the native language of that population, which is responsive to the experience of the population to be evaluated.[7-10] The 33-item Tamil version of IND-VFQ used in this study was developed to address these concerns in our community.[13-14] Testing of the IND-VFQ for reliability (Cronbach's alpha >0.70),[15] validity and consistency indicate that it is appropriate for use in clinical research.[14]

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The IND-VFQ (Appendix 1) has three scales, which are a 21-item section for general function, a five-item section for psychosocial impact and a seven-item section for visual symptoms. The items in the general function cover mobility, household performance, economic activity, and activities of daily living. The psychosocial scale have items concerning social, family and personal wellbeing. The visual symptoms have items like vision, photophobia and glare. A four-point response scale assesses visual symptoms and psychosocial impact: 1 (best score) to 4 (worst score). The general functioning questions have a five point scale from 1 (best score) to 5 (worst score).[13-14] For each scale, a composite score was calculated as the cumulative total of individual responses expressed as a percentage of the maximum score possible and then transformed such that 100 represented the best possible score (no difficulty with any of the items in that scale) and 0 the worst score (maximum difficulty in that scale).

Effect size (ES)[16-17] and paired t-test analysis was done comparing the pre- and post-treatment scores to establish the changes in VR-QOL associated with treatment of uveitis. The ES is defined as the mean change in IND-VFQ score at follow-up divided by its standard deviation at baseline. The ES reflects the magnitude of change in IND-VFQ in response to treatment commenced at baseline. Cohen defines an ES of 0.2 as small change, 0.5 as medium change and 0.8 or greater

a large change.[17] Demographic (age, sex, education, place of residence and occupation) and clinical characteristics (anatomical entities, pathology, laterality) were evaluated for potential relationships to change in VR-QOL. The relationship between level of visual acuity and VR-QOL was also evaluated using Spearman analysis.

The study was conducted under the supervision of the Institutional Review Board of our hospital, in accordance with the principles of the Declaration of Helsinki.

Results

Ninety-eight consecutive patients agreed to participate in the study, with no refusals. Sixty-seven (68.3%) of these returned for follow-up and completed the questionnaire a second time after an average of 30.5 days (range 24-59). The socio-demographic characteristics of these patients and those who came for follow-up are shown in Table 1.

The mean age was 35.24 years (range 16-69) and 39% of the patients were females. A total of 20 patients (20%) were illiterate. Sixty-three per cent of patients were employed.

According to the International Uveitis Study Group classification,[18-19] 51% had anterior uveitis, 10.2% had

Table 1: Socio-demographic data and clinical characteristics at baseline and follow-up

Variables	Baseline		Follow-up		Variables	Baseline		Follow-up	
	N	%	N	%		N	%	N	%
Age group					Pathology				
<25 years	31	31.6	24	35.8	Granulomatous	17	17.3		
25-50 years	50	51.0	31	46.3	Non-granulomatous	81	82.7		
>50 years	17	17.4	12	17.9	Laterality				
Gender					Unilateral	75	76.5	50	74.6
Male	60	61.2	42	62.7	Bilateral	22	23.5	17	25.4
Female	38	38.8	25	37.3	Diagnosis				
Place of residence					Idiopathic	44	44.9	29	43.3
Urban	34	34.7	25	37.3	Tuberculosis	14	14.3	11	16.4
Rural	64	65.3	42	62.7	Fuchs' Heterochromic Cyclitis	7	7.1	4	6.0
Education					Toxoplasmosis	6	6.1	5	7.5
Illiterate	20	20.4	12	17.9	HLA-B27	4	5.1	2	2.9
Primary	18	18.4	11	16.4	Herpes	4	4.1	2	2.9
High school	24	24.5	16	23.9	Sarcoidosis	4	4.1	4	6.0
Higher secondary	24	24.5	17	25.4	Infectious-Bacterial	4	4.1	3	4.5
Graduate	12	12.2	11	16.4	Traumatic	3	3.1	1	1.5
Occupation					Vogt-Koyanagi-Harada disease	3	3.1	3	4.5
Employed	62	63.3	40	59.7					
Unemployed	36	36.7	27	40.3	Leptospirosis	3	3.1	1	1.5
Onset					Psoriasis	1	1.0	1	1.5
Sudden	72	73.5	50	74.6	Parasitic	1	1.0	1	1.5
Insidious	26	26.5	17	25.4	Treatment				
Location					Topical corticosteroids	94			
Anterior	50	51.0	30	44.8	Periocular corticosteroids	7			
Intermediate	10	10.2	8	11.9	Systemic corticosteroids	25			
Posterior	19	19.4	14	20.9	Immunosuppressive agents	5			
Panuveitis	19	19.4	15	22.4	Antimicrobial therapy	30			

intermediate uveitis, 19.4% had posterior uveitis and 19.4% had pan-uveitis. Disease was idiopathic in 44.9% and tuberculosis was the most common specific disease underlying uveitis (14.3%). None of the patients had previously been treated except with topical medications since any treatment other than topical steroids was an exclusion criterion. All of them had active uveitis and required some form of treatment. Ninety-four patients needed only topical corticosteroids, seven patients needed peri-ocular corticosteroids (posterior sub-Tenon injections), 25 patients were given oral corticosteroids and five patients needed immunosuppressives. Twenty-nine patients had an infectious cause and were treated for the specific disease concerned (anti-tuberculous, anti-toxoplasma or anti-viral) with or without the other drugs mentioned previously. The binocular visual acuity range was light perception to 20/20. There was a loss to follow-up of 31 (31.6%) patients. The most common reason for failure to complete the study was planned follow-up

elsewhere. The baseline and clinical characteristics of those completing and lost to follow-up were similar [Table 1].

This 21-item general function scale showed a highly statistically significant improvement following treatment ($P < 0.001$). The ES showed a moderate improvement in general function in all subgroups of uveitis except for posterior uveitis, which had greater improvement (large ES 0.08). The mean score was 90.7 at baseline and improved to 95.5 at follow-up [Table 2].

Illiterates showed much better improvement in visual function on treatment than literates (ES: 0.47 vs. 0.32). Similarly, females showed better visual function scores at follow-up. The mean scores were lowest for the <25 years age group (94.7) and highest for the >50 years age group (96.83).

The psychosocial impact scale showed statistically significant improvement on treatment ($P < 0.001$). The ES was the least for

Table 2: VR-QOL outcomes following treatment for different subgroups

Scale	Mean ± standard deviation (SD)		Effect size	Confidence interval 95%		Scale	Mean ± standard deviation (SD)		Effect size	Confidence interval 95%	
	Pre-treatment	Post-treatment		Lower	Upper		Pre-treatment	Post-treatment		Lower	Upper
All Uveitis, *n* = 98						VS	78.98 (13.63)	88.92 (10.49)	0.729274	0.38	1.08
GF	90.77 (13.57)	95.52 (7.02)	0.350037	0.01	0.69	Non-granulomatous uveitis, *n* = 81					
PI	86.54 (15.95)	91.41 (11.99)	0.305329	−0.04	0.65	GF	90.88 (14.44)	95.83 (9.06)	0.342798	0.00	0.68
VS	83.30 (15.50)	92.02 (9.19)	0.562581	0.22	0.91	PI	86.88 (16.29)	91.82 (11.61)	0.303254	−0.04	0.64
Sudden onset uveitis, *n* = 72						VS	84.15 (15.8)	92.63 (8.89)	0.536709	0.19	0.88
GF	89.615 (15.80)	94.45 (8.07)	0.306013	−0.03	0.65	VA-20/20					
PI	85.46 (18.37)	89.81 (13.58)	0.236799	−0.10	0.58	GF	95.86 (3.78)	98.40 (3.28)	0.671958	0.32	1.02
VS	82.18 (17.21)	90.43 (9.08)	0.479372	0.14	0.82	PI	91.49 (7.16)	96.01 (7.48)	0.631285	0.28	0.98
Insidious onset uveitis, *n* = 26						VS	89.54 (11.05)	97.15 (6.03)	0.688688	0.34	1.04
GF	93.6 (4.50)	97.93 (2.06)	0.962222	0.60	1.32	VA 20/30 - 20/40					
PI	88.82 (8.33)	94.74 (6.19)	0.710684	0.36	1.06	GF	95.56 (3.5)	96.83 (4.92)	0.362857	0.02	0.70
VS	86.35 (10.43)	95.56 (6.36)	0.88303	0.53	1.24	PI	90.28 (9.27)	92.78 (12.04)	0.269687	−0.07	0.61
Anterior uveitis, *n* = 50						VS	84.79 (12.6)	89.79 (10.40)	0.396825	0.05	0.74
GF	93.61 (13.62)	98.15 (2.98)	0.333333	−0.01	0.67	VA 20/60 - 20/200					
PI	89.35 (14.17)	93.98 (10.98)	0.326747	−0.01	0.67	GF	88.46 (12.48)	93.50 (9.59)	0.403846	0.06	0.75
VS	87.27 (15.84)	95.37 (6.21)	0.511364	0.17	0.86	PI	87.50 (9.57)	90.28 (10.41)	0.290491	−0.05	0.63
Intermediate uveitis, *n* = 10						VS	80.53 (12.38)	89.18 (9.17)	0.698708	0.35	1.05
GF	90.32 (14.01)	93.17 (8.93)	0.203426	−0.14	0.54	VA < 20/200					
PI	80.56 (19.07)	87.22 (12.84)	0.34924	0.01	0.69	GF	79.76 (22.23)	91.43 (8.67)	0.524966	0.18	0.87
VS	78.96 (14.04)	87.80 (10.69)	0.62963	0.28	0.98	PI	73.21 (27.23)	83.33 (15.93)	0.371649	0.03	0.71
Posterior uveitis, *n* = 19						VS	73.75 (21.58)	89.38 (9.65)	0.724282	0.37	1.07
GF	95.04 (3.23)	99.20 (0.97)	1.287926	0.92	1.66	Bilateral					
PI	96.52 (4.09)	99.02 (0.70)	0.611247	0.26	0.96	GF	83.60 (20.23)	93.19 (9.56)	0.474048	0.13	0.82
VS	83.85 (9.15)	97.39 (3.07)	1.479781	1.10	1.86	PI	79.41 (22.36)	88.97 (16.53)	0.427549	0.09	0.77
Panuveitis, *n* = 19						VS	76.91 (19.53)	90.10 (10.29)	0.675371	0.33	1.02
GF	83.33 (15.15)	90.79 (9.10)	0.492409	0.15	0.84	Unilateral					
PI	83.10 (18.67)	88.89 (13.24)	0.310123	−0.03	0.65	GF	93.42 (9.03)	96.38 (5.72)	0.327796	−0.01	0.67
VS	77.91 (15.95)	86.88 (10.24)	0.562382	0.22	0.91	PI	89.06 (12.30)	92.27 (9.98)	0.260976	−0.08	0.60
Granulomatous uveitis, *n* = 17						VS	85.65 (13.20)	92.73 (8.76)	0.536364	0.19	0.88
GF	90.26 (8.18)	93.94 (9.06)	0.449878	0.11	0.79						
PI	84.85 (14.7)	89.39 (14.11)	0.308844	−0.03	0.65						

GF - general function, PI - psychosocial index, VS - visual symptoms

this scale compared to the visual function and visual symptoms scales. Chronic uveitis showed better improvement (ES 0.71) compared to acute uveitis (ES 0.23). The psychosocial gain was more for posterior uveitis than other anatomical entities. The difference in mean pre- and post-treatment scores was less for illiterates and females than for literates and males. Male and literate population showed better gains in this scale after treatment.

Psychosocial scale has shown that patients with chronic uveitis demonstrated comparatively better improvement in VR-QOL than those with acute uveitis, perhaps because longstanding inflammation may have had more time to affect lifestyle than recent onset disease. Self-reported visual symptoms were worse among the subgroups like those from rural communities and among illiterates and they have shown greater improvement following treatment compared to the urban and literate population.

The baseline seven-item visual symptoms scale results were lower than General Function and Psychosocial Impact scale scores in our patients with uveitis, across a wide range of subgroups, and likewise the improvement with treatment was larger. The difference was statistically significant ($P < 0.001$). Maximum gain was noted for posterior uveitis (ES 0.63) and granulomatous uveitis in their respective groupings (ES 0.73). Illiterates, rural and female populations showed better improvement than their respective counterparts. The Spearman analysis was used to correlate changes in visual acuity and VR-QOL at baseline and follow-up. All the scales showed a moderate to good correlation with visual acuity as is usual for any VR-QOL assessment ($r = 0.51$).

Discussion

This questionnaire-based assessment of uveitis patients is the first study on VR-QOL in uveitis patients in the Indian subcontinent, applying a questionnaire developed and validated specifically for the Tamil-speaking population. The study confirms results from other regions that VR-QOL is affected in patients with uveitis[2,5,6] and that treatment results in statistically significant improvement in all the scales of VR-QOL.

Patients with posterior uveitis showed more improvement than either anterior or intermediate uveitis. This may be attributed to the fact that their baseline problems were greater than the rest and hence showed better results on follow-up. The subgroups comprising employed, males and literates agreed to greater difficulties in general function, possibly because they are the traditional breadwinners in a family in India, and may have greater social and economic demands than their counterparts. It was noted that the incidence was higher among males than females as seen in other studies done in India,[20-24] but studies in the western world have shown that females have a greater incidence and prevalence.[11] This difference in a developing country may be related to various factors. One may be the social structure where males are the breadwinners of the family and hence more number of males attend the clinic.[22] A second factor may be related to higher incidence of infectious uveitis due to tuberculosis, leptospirosis and river water granulomas among males than females as a result of exposure due to their occupation in rural areas.[25-29] In spite of showing statistically significant improvement we find that the mild uveitis, especially anterior and intermediate uveitis

had scores close to the ceiling at baseline. Hence the recorded improvement may not show the real impact. This problem of floor/ceiling effect has been noted in different QOL studies done earlier. But the ceiling effect in our study is not very high to affect the reliability of this study.[30]

The study also found a greater disparity between the rural and urban populations especially on the psychosocial scales. This may be explained by the rural populations being employed in open fields and being daily wage earners and hence incur more financial burden due to the disease which in turn affects the perception of the disease. This indicates that in this subcontinent there cannot be a generalization to evaluate VR-QOL outcomes unlike the western world since there is greater disparity in the needs among different sub-sects of the population.

In our study, both granulomatous and non-granulomatous subtypes showed significant gains following treatment, but granulomatous entities fared comparatively better. Granulomatous cases often are of infectious etiology in this part of the world.[21,24,31] In our study, 30% of uveitis cases were of infectious origin. The treatment regimens available for infectious uveitis appear to result in an equally favorable impact on VR-QOL in these patients. The VR-QOL study by Gardiner *et al.* has shown that the younger populations with uveitis have poor VR-QOL than the older population.[5] This is seen in our population as well and more so for psychosocial items. The scores were worse for bilateral disease than for unilateral disease and this is similar to the observations of Brown *et al.*[32]

There are a few limitations in our study. The first limitation is the loss to follow-up and the duration of follow-up. Though not all the patients turned up for follow-up the demographics and clinical characteristics were similar and hence should not cause significant changes to the final result. The follow-up assessment was done based on clinical improvement and not treatment completion. But the disease was well controlled during the follow-up assessment and hence on tapering schedule of medications and this meant fairly similar VR-QOL. Second being the diverse nature and treatments involved in these patients. It would need a larger study to really explain the effects of each entity on VR-QOL. Third limitation is the ceiling effect as explained earlier. Long-term changes in VR-QOL such as are likely to occur in some forms of chronic uveitis could not be addressed by this study, which had only short-term follow-up. It would be of interest to evaluate QOL over a longer follow-up period, which would allow evaluation of the net QOL impact of systemic therapies known to have potential systemic side-effects.

In conclusion, this study has shown that VR-QOL is adversely affected by uveitis, even in mild anterior uveitis, and that there is significant improvement in VR-QOL following treatment.

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Appendix 1: Indian vision function questionnaire (33 items)

In the first section, I am going to ask you how much your vision problem affects you in doing your daily activities. I will read out a choice of four answers and you will choose the one you feel describes you best. If you cannot do, or don't do this activity because of vision, or other reasons, please tell me.

Question number	General functioning scale	Please tick response box				
		Not at all	A little	Quite a bit	A lot	Cannot do this because of my sight
1	Because of your vision how much problem do you have in climbing stairs?					
2	Because of your vision how much problem do you have in making out the bumps and holes in the road when walking?					
3	Because of your vision how much problem do you have in seeing if there are animals or vehicles when walking?					
4	Because of your vision how much problem do you have in finding your way in new places?					

5	Because of your vision how much problem do you have in going to social functions such as weddings?
6	Because of your vision how much problem do you have in going out at night?
7	Because of your vision how much problem do you have in finding your way indoors?
8	Because of your vision how much problem do you have in seeing the steps of the bus when climbing in or out?
9	Because of your vision how much problem do you have in recognizing people from a distance?
10	Because of your vision how much problem do you have in recognizing the face of a person standing near you?
11	Because of your vision how much problem do you have in locking or unlocking the door?
12	Because of your vision how much problem do you have in doing your usual work either in the house or outside?
13	Because of your vision how much problem do you have in doing your work up to your usual standard?
14	Because of your vision how much problem do you have in searching for things at home?
15	Because of your vision how much problem do you have in seeing outside in bright sunlight?
16	Because of your vision how much problem do you have in seeing when coming into the house after being in the sunlight?
17	Because of your vision how much problem do you have in seeing differences in colors?
18	Because of your vision how much problem do you have in making out differences in coins or notes?
19	Because of your vision how much problem do you have in going to the toilet?
20	Because of your vision how much problem do you have in seeing objects that may have fallen in the food?
21	Because of your vision how much problem do you have in seeing the level in the container when pouring?

In the next section, I am going to ask you how you feel because of your eye problem, I will read out a choice of four answers and you will choose the one you feel describes you best.

Question number	Psychosocial impact scale	Please tick response box			
		Not at all	A little	Quite a bit	A lot
22	Because of your eye problem do you feel frightened to go out at night?				
23	Because of your eye problem do you enjoy social functions less?				
24	Because of your eye problem are you ashamed that you can't see?				
25	Because of your eye problem do you feel you have become a burden on others?				
26	Because of your eye problem do you feel frightened that you may lose your remaining vision?				

In the next section, I am going to ask you to what extent do you have the following eye problems. I will read out a choice of four answers and you will choose the one you feel describes you best.

Question number	Visual symptoms scale	Please tick response box			
		Not at all	A little	Quite a bit	A lot
27	Do you have reduced vision?				
28	Are you dazzled in bright light?				
29	Is your vision blurred in sunlight?				
30	Does bright light hurt your eyes?				
31	Do you close your eyes because of light from vehicles?				
32	Does light seem like stars?				
33	Do you have blurred vision?				