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Title: Psychosocial assessment of potential retinal prosthesis trial participants

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BACKGROUND: As the field of retinal prostheses advances, volunteers are required for device trials, and optimal participant recruitment is vital for intervention success. The aims of this study were: a) to select tests that access the psychosocial aspects of visual impairment and develop a psychosocial assessment protocol for persons who may be eligible for participation in retinal prostheses trials; b) to investigate correlations between these tests; and c) to determine associations between psychosocial factors and a person's interest in participating in a retinal prosthesis (bionic eye) trial.

METHODS: Cross-sectional study of 72 adults with advanced retinal degeneration. Questionnaire assessments included personality, cognitive ability, social-support, self-efficacy, coping, optimism, depression, and quality of life (Impact of Vision Impairment Profile ([IVI], and Vision and Quality of Life Index [VisQoL]). Level of interest in a retinal prosthesis was also evaluated.

RESULTS: All questionnaires were completed without floor or ceiling effects and with minimal respondent burden. Depression correlated with decreased quality of life (rho =-0.37 and 0.40, $P < 0.001$ for IVI and VisQoL, respectively). Together, depression, gender and vision-specific coping explained 35.2% of variance in IVI quality of life ($P < 0.001$). Forty-nine percent of participants were interested in a retinal prosthesis now and 77% in the future. Although the personality trait of 'openness' was somewhat predictive of interest in retinal prostheses (OR 0.78, 95%CI 0.62 to 0.97), neither severity of vision impairment nor any of the psychosocial measures were strong predictors.

CONCLUSIONS: Several existing psychosocial questionnaires can be used for patients with advanced retinal degeneration and may be useful in exploring suitability for a retinal prosthesis or evaluating outcomes. However, the questionnaires used in this study were not good predictors of whether or not a person might be interested in a retinal prosthesis.

Retinal prostheses, or ‘bionic eyes’, are electronic or photovoltaic devices that are implanted at or near the retina to restore rudimentary visual cues to people with profound vision loss. There have been a number of clinical trials to date, and four devices have received regulatory approval: the Argus II epiretinal implant (Second Sight Medical Products, USA),[1] the Alpha IMS and Alpha AMS subretinal implants (Retina Implant AG, Germany),[2,3] and the IRIS epiretinal implant (Pixium Vision SA, France).[4] The Bionic Vision Australia research team completed the first human trials of a novel suprachoroidal retinal implant between 2012 and 2014,[5] and during preparation, discovered there was a lack of literature on which psychosocial factors were important in the selection of participants for a retinal prosthesis trial. As the visual acuity and visual field outcomes from vision prostheses are still relatively modest at this time and the impact of surgery considerable, it is important to understand more about the psychosocial factors that may relate to a person’s interest in participating in a prosthesis trial and, in time, investigate whether these tools may be useful to predict and evaluate which candidates will be successful in such studies. Measures of success should not be limited to functional vision outcomes. The impact of surgery and even small changes in vision may have a significant effect on mental health and quality of life.

Research conducted by Lane et al. identified a number of key personality traits that relate to motivation to participate in a visual prosthesis clinical trial, including altruism, adventurism, and advanced decision-making skills.[6-8] While these are undoubtedly useful considerations when screening for potential implant recipients, this current understanding is limited to findings from focus groups and interviews. The usefulness of validated questionnaires to assess the psychosocial characteristics of potential retinal prosthesis recipients has not been investigated to date. Such research could also facilitate the development of a test protocol to identify individuals who might be most suitable for retinal prosthesis trials.

Currently, the majority of people eligible for a retinal prosthesis have end-stage retinitis pigmentosa (RP), with vision of hand motion detection or worse. RP is a genetic disease affecting over 1.6 million people worldwide.[9] It has previously been reported that people with RP exhibit a higher prevalence of depression and anxiety than people with normal vision,[10] as is the case among people with vision impairment caused by other eye diseases, and that mental health is a determinant of quality of life in this population.[11]

Other prior studies of psychosocial factors in people with RP have investigated adaptation to vision loss,[12] social participation,[13] and emotional health.[14] However, to our knowledge there has not been an investigation of a comprehensive protocol that might cover the attributes that will likely be relevant to participation in retinal prostheses trials and subsequent well-being, such as personality, cognitive ability, social support, self-efficacy, coping, optimism, depression and quality of life.

There were three aims for this study: a) to develop and trial a psychosocial test battery to be used in the assessment of persons who may be eligible for participation in retinal prostheses trials; b) investigate correlations between these tests; and c) to determine associations between psychosocial factors and a person's interest in participating in a retinal prosthesis trial.

METHODS

The study was conducted at the Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital (RVEEH; East Melbourne, Australia). Ethical approval was obtained from the Human Research and Ethics Committee at the RVEEH. All patients gave informed consent for study participation. The study adhered to the tenets of the Declaration of Helsinki.

The data were collected in the early stages of development of the Australian retinal implant device (2009 – 2011), when there was negligible interest or reporting in the media. As such, it was assumed that participants would be naïve regarding the actual capability of our device, which was essentially untested and unknown at the time.

Participants

We conducted a cross-sectional study of 72 adults with advanced outer retinal degeneration. To be eligible, all participants were required to be aged 18 years or over, have been diagnosed by an ophthalmologist with advanced retinal degeneration, such as RP or choroideraemia, and be classified as legally blind by Australian criteria (best corrected visual acuity [VA] worse than 6/60, or visual field constricted to 10 degrees of arc or less around central fixation in the better eye irrespective of corrected VA). Participants were recruited from the RVEEH, Blind Citizens Australia, Vision Australia, Retina Australia

and Guide Dogs Victoria. All participants underwent a complete clinical ocular examination, including visual field testing, and the battery of psychosocial tests.

Vision assessment

Refractive error was initially estimated using an autorefractor, followed by non-mydriatic subjective refinement. Best corrected VA was measured using a standard protocol. First, participants were tested on an Early Treatment of Diabetic Retinopathy Study (ETDRS) logMAR VA chart at 4 m, and if unable to read the top row, the test was repeated at 1 m. For participants unable to read any letters at 1 m, VA was measured using the Berkeley Rudimentary Vision Test (BRVT).[15] The BRVT uses single tumbling Es of different sizes and gratings of different spatial frequencies at a test distance of 25 cm to extend the range of VA that can be measured to 6/600 (2.0 logMAR) and 6/4800 (2.9 logMAR), respectively. If unable to perform the BRVT, participants were tested for perception of light. VA was converted into logMAR for statistical analyses, with 'light perception' and 'no light perception' assigned values of 3.8 and 4.0 logMAR, respectively.[15]

Residual visual field of each eye was measured using manual kinetic Goldmann perimetry, with the largest brightest target (V4e). Twenty-four meridians were tested at least twice and the edges of any islands or scotomas further probed with tangential movements for accuracy and consistency. As per the American Medical Association (AMA) guide to the evaluation of vision impairment, a visual field score (VFS) was calculated for monocular and binocular fields based on the assignment of 50 points to the central area within 10 degrees from fixation (5 points at 1, 3, 5, 7 and 9 degrees from fixation along the 25, 65, 115, 155, 195, 225, 255, 285, 315 and 345 meridians) and 50 points to the peripheral area beyond.[16] For statistical analyses, a single functional field score (FFS) was then calculated by weighting the monocular and binocular visual field scores according to the formula, $(3xVFS_{OU} + VFS_{OD} + VFS_{OS})/5$, giving a score ranging from 0 to 100.[16]

In addition, an estimate of overall vision impairment was calculated as per the AMA guides, the functional vision score (FVS), taking into consideration both acuities and fields.[16] First, a VA score (VAS) was calculated for each eye and binocularly, based on the assignment of one point for each letter read, where 6/6 equals 100 points. As for the FFS, a single functional acuity score (FAS) was then calculated according to the formula, $(3xVAS_{OU} + VAS_{OD} + VAS_{OS})/5$, giving a score ranging from 0 to 100. Finally, the FVS was

calculated according to the formula, (FASxFFS)/100, again giving a score ranging from 0 to 100. It should be noted that this recommended method for calculating FVS is problematic in that the VAS assignment of one point per letter read results in measures of VA equal to or worse than 2.0 logMAR being assigned a score of 0. This truncated scale is not representative of important differences in functional ability for the range of measurable VA worse than 2.0 logMAR. Therefore, we calculated a second version of the FVS by assigning one point for every *two* letters read, which extends the VAS such that a score of 0 represents 4.0 logMAR. This amended VAS was then applied to the usual calculation of FAS and FVS, as above.

Psychosocial assessment

An expert panel (consisting of a rehabilitation psychologist, low-vision optometrists, ophthalmologists, questionnaire developers and experts in Rasch analysis) reviewed the literature to identify psychosocial assessments for the protocol. Questionnaires were evaluated for evidence of robust psychometric properties, administration time, ability to be administered verbally, usefulness in previous studies and suitability for assessing adults with profound vision impairment, and potential usefulness in determining the effectiveness of retinal prostheses and other new vision interventions in the future.

The selected assessment battery included: personality (NEO Five-Factor Inventory-3 [NEO-FFI-3]),[17-19] cognitive ability (Wechsler Adult Intelligence Scale-IV [WAIS-IV] subtests),[20-21] social support (Medical Outcomes Study Social Support Survey [MOS-SSS]),[22] self-efficacy (General Self-Efficacy Scale [GSE]),[23] coping (Vision Specific Optimization in Primary and Secondary Control Scale [Vis-OPS]),[24,25] optimism (Life Orientation Test – Revised [LOT-R]),[26] depression (Patient Health Questionnaire [PHQ-9]),[27,28] and quality of life (Impact of Vision Impairment Profile ([IVI],[29,30] and Vision and Quality of Life Index [VisQoL][31,32]). In addition, participant level of interest in a retinal prosthesis was investigated. All questionnaires were administered verbally (in random order) in a telephone interview of approximately 1.25 hours in duration, within four weeks of the clinical and vision assessment.

The NEO-FFI-3 is a 60-item questionnaire that measures the five domains of personality (neuroticism, extraversion, openness, agreeableness, and conscientiousness), each rated

on a five-level Likert scale from 0 to 4.[17] Raw scores and T-scores for each domain of the NEO-FFI-3 were computed for participants, with higher scores representing more of a trait.

The non-visual verbal similarities and comprehension subscales of the WAIS-IV were used to measure cognitive ability, each comprising 18 items scored on a 0 to 4 scale.[20,21] Raw scores were calculated for each subscale, with higher scores representing greater cognitive ability.

The MOS-SSS consists of 19 items scored on a five-level scale (1 to 5) that together measure overall functional social support.[22] Average scores were calculated and transformed to a 0 to 100 scale, with higher scores indicating more support.

The GSE consists of 10 items scored on a four-level scale (1 to 4) that measure general sense of perceived self-efficacy, with the aim of predicting ability to cope with daily hassles as well as adaptation to all various stressful life events.[2] Total raw scores were calculated, with higher scores representing greater self-efficacy.

Drawing from the lifespan theory of control, the Vis-OPS is a measure of coping, consisting of 31 items with four subscales: selective primary control (SPC; 6 items), compensatory primary control (CPC; 9 items), selective secondary control (SSC; 9 items), and compensatory secondary control (CSC; 7 items).[24,25] SPC refers to the investment of behavioral resources in pursuing a goal (e.g. time, effort and skills). SSC serves to enhance motivation and commitment to a goal, particularly when vision loss makes achieving it difficult. CPC refers to the recruitment of help from others or the use of assistive devices when there is difficulty attaining a goal. CSC refers to goal disengagement when the goal becomes unattainable, thereby freeing up the person to pursue other goals that are attainable. Items are rated on a four-level scale (1 to 4). Raw total and subscale scores were calculated for participants, with higher scores indicating greater use of a strategy.

The LOT-R comprises 10 items (four of which are fillers) scored on a five-level Likert scale, developed to assess individual differences in generalized optimism versus pessimism.[26] Total raw scores were calculated, with higher scores representing greater optimism.

The PHQ-9 comprises 9 items that can be used to screen for and diagnose depression.[27,28] Items are scored on a four-level scale of frequency of symptoms (0 to 3). Total raw scores were calculated, with higher scores indicating more severe depression. Any participant scoring ≥10, or answering affirmatively to the item on thoughts of suicide, was referred for appropriate care outside of the study.

The 28-item IVI was used to measure vision-specific quality of life.[29,30] Average raw scores across all items were calculated and converted to Rasch person measure scores (0 to 100 scale) using the formula 19.72log (IVI raw score/(3-IVI raw score)) + 48.29.[29] Higher scores indicate less impairment and hence, better quality of life.

The VisQoL is a vision-related utility instrument comprising six items, two rated on a four-level scale and four rated on a five-level scale, developed for the health economic evaluation of eye care and rehabilitation programs.[31,32] Total raw scores were calculated, with higher scores indicating more impairment and hence, poorer quality of life. Note that this scoring is the opposite direction to the IVI instrument.

Interest in retinal prosthetic vision

Finally, participants were asked to respond to, “How interested are you in getting a bionic eye implant NOW?” and “How interested are you in getting a bionic eye implant in the FUTURE?” on a four-level scale (very, moderately, slightly, not at all interested). The questions were not exclusive; participants were able to rank their interest at the two time points independently. No further information about the technology or clinical trials was provided to the participants.

Data analysis

Data were analysed using SPSS Statistics Version 20.0 (IBM, Armonk, NY). All analyses were 2-tailed and *P*-values less than 0.05 were considered statistically significant. Descriptive statistics were calculated for all variables and differences between groups (e.g. males and females) were analysed using the *t*-test. Univariate associations between demographics, measures of vision, psychosocial variables and quality of life were determined using the Spearman correlation coefficient. Predictive models of quality of life were evaluated using multiple linear regression analysis. Multivariate logistic regression

analysis was used to model ‘interest in a bionic eye implant’, where responses were dichotomised as being either interested (very or moderately) or not interested (slightly or not at all). Odds ratios (ORs) and corresponding 95% confidence intervals (CIs) were calculated for the following predictors: age, sex, vision, psychosocial variables and quality of life. The assumptions underlying each of the statistical tests used were verified, checks were made for outliers, and goodness of fit statistics were evaluated for regression analysis models.

RESULTS

Characteristics of participants

Sixty-five of the 72 participants had advanced retinal degeneration due to RP (two associated with Usher syndrome; both had sufficient hearing for the study protocol), four had cone-rod dystrophy, two Leber congential amaurois and one choroideraemia. Fifty-six percent of the cohort was male, and the mean age was 56 years (±15 years). Mean log VA in the better eye was 1.85 logMAR (6/380), with a range from 6/6 to no light perception. Median FFS was 16%. All analyses were conducted using both versions of the FVS, with no difference in findings for this sample with advanced ocular disease. Therefore, only results for FVS calculated using the extended range for VAS are presented. Median FVS was 9%.

All psychosocial and quality of life questionnaires were completed without floor or ceiling effects and with minimal respondent burden. Seven (9.7%) participants scored 10 or greater on the PHQ-9 for depression and were referred to their general practitioner or mental health physician for care.

Demographic, vision, psychosocial and quality of life characteristics of the participants are provided in Table 1.

Correlations between vision, psychosocial factors and quality of life

Univariate correlations between measures of vision (best-corrected VA, FVS, FFS) and measures of quality of life (IVI and VisQoL) were not statistically significant; nor were there significant correlations between the vision measures and the other psychosocial scores. However, depression (PHQ-9), some personality traits (NEO-FFI-3 neuroticism and extraversion) and coping (Vis-OPS selective primary control) were significantly correlated with quality of life (Table 2).

As expected, there was a strong correlation between the two measures of quality of life, the IVI and VisQoL (rho = -0.75, $P < 0.001$).

Predictive models of quality of life

After considering univariate correlations, age, sex, vision, personality factors, social support, coping and depression were used in stepwise multiple linear regression analyses to predict IVI and VisQoL quality of life.

The model for IVI quality of life contained three predictors and was reached in three steps with no variables removed. The model was statistically significant (F (3, 59) = 10.696, $P <$ 0.001), and accounted for approximately 35% of the variance ($R^2 = 0.352$). Better quality of life, as measured by the IVI, was primarily predicted by a lower depressive symptoms score (PHQ-9), and to a lesser extent, being male and having more positive vision-specific coping ability (VisOPS SPC). The raw and standardised regression coefficients are given in Table 3.

Similarly, the model for VisQoL quality of life contained three predictors and was reached in three steps with no variables removed (Table 3). Better quality of life, as measured by the VisQoL, was primarily predicted by less depressive symptoms (PHQ-9) and more extraversion (NEO-FFI-3), and to a lesser extent, more coping skills (VisOPS SPC). The model was statistically significant (F (3, 59) = 13.299, P<0.001), and accounted for approximately 40% of the variance ($R^2 = 0.403$).

Correlations with level of interest in retinal prosthetic vision

Of this cohort, 49% were very or moderately interested in a retinal prosthesis now and 77% were very or moderately interested in the future. Neither severity of vision impairment

nor any of the psychosocial measures were strong predictors of current or future interest in retinal prostheses. The only factor that showed a weak association with current interest in retinal prostheses was the NEO-FFI-3 Openness scale (OR= 0.78, 95% CI 0.62 to 0.97).

DISCUSSION

This study has shown that there are a number of validated questionnaires that can be of use in assessing psychosocial characteristics of persons with advanced retinal degeneration. In particular, depression and vision-specific coping are known to be associated with quality of life among people with retinitis pigmentosa,[10] and have again been shown to be correlated in the current study. However, whether or not a person might be interested in participating in a retinal prosthesis clinical trial varies considerably and is not clearly predicted by psychosocial measures, or measures of residual vision.

The first aim of this study was to develop a psychosocial test battery for use in people with advanced retinal degeneration, who may be candidates for a retinal prosthesis clinical trial. This can be challenging, as many psychosocial tests require vision to either complete the test, or for self-entry on a score sheet. The tests selected in this study were amenable to verbal administration. Furthermore, the tests were consistently administered in this mode to all participants, as different modes of administration can have different outcomes. This study has demonstrated the feasibility of administering the selected protocol via telephone interview to participants with severe and profound vision impairment, without ceiling or floor effects and with minimal respondent burden. Future work will investigate whether the results of this psychosocial test battery correlate with trial outcomes.

The second aim was to investigate correlations between visual function and psychosocial factors. Among this sample of people with advanced retinal degeneration, neither VA nor visual fields were independently associated with quality of life or any other psychosocial measure. This is in contrast to previous reports of a strong relationship between visual function (particularly visual field) and quality of life.[10,34-35] This may be because many participants in this study had late stage vision loss and personalities were heterogeneous, with some participants being much more able to cope with severe vision loss than others.

Our results, however, did confirm that depression and vision-specific coping skills are correlated with quality of life in persons with retinitis pigmentosa, consistent with previous findings.[11,35] While univariate correlations were stronger for VisQoL than for IVI, they each have merits for this population. The VisQoL is brief and can be used in cost-effectiveness studies. The IVI may be more sensitive to change and thus, more useful in evaluating the effectiveness of treatments and interventions. The VisQoL has previously been used in the Argus II retinal prosthesis trials, with significant improvements in half of the dimensions measured (injury, life and roles).[36] For these reasons, we have elected to use both the VisQoL and IVI in future selection protocols for retinal prosthesis trials.

The third aim of this study was to evaluate correlations between quantitative measures of psychosocial factors (personality, cognitive ability, social support, self-efficacy, coping, optimism, depression and quality of life) and interest in being involved in a retinal prosthesis clinical trial. To our knowledge, this is the first published study that has investigated such relationships. However, a limitation of the study was that we neither provided information nor ascertained the level of participant understanding about existing retinal prostheses and their functionality, or the potential functionality of such devices still under development. This should be done in future studies, as more is understood about the outcomes. Contrary to our hypotheses, no obvious relationships were apparent. The only correlation that we did find was a tendency for people with *less* openness on the NEO-FFI-3 inventory to be more interested in a retinal prosthesis at the present time. This odds ratio was weak (OR= 0.78, 95% CI 0.62 to 0.97), but interesting, indicating that people who were less open were 22% more likely to be interested in a retinal prosthesis. A lower score on the openness domain of the NEO-FFI-3 is associated with a person being more practical than imaginative, being more interested in routine than variety, and being more conforming than independent.[17] This is counter-intuitive to our expectations. We had hypothesised that people who would be interested in a retinal prosthesis would be more experimental and independent, given the early nature of device development. This finding should be explored more thoroughly in a larger sample size, and using more than one measure of ‘openness’.

There was also a lack of correlation between visual function and interest in obtaining a retinal prosthesis implant (either now or in the future). This is surprising, as it might be expected that people with poorer vision would have a greater desire to seek interventions.

We suggest that the lack of correlation, despite a range of visual function within the ‘legally blind’ category (from those with good central acuity but only a few degrees of visual field, to those with only bare light perception), is probably indicative of the complexity underlying the choice to be involved in novel clinical trials and also in part due to our relatively small sample size. Indeed, the lack of correlation between visual function and interest in a retinal prosthesis may support current proposals to implant patients at an earlier stage of vision loss (as it is not only people with little or no vision left who would be interested in a retinal prosthesis trial).

A limitation of the study was that we neither provided information nor ascertained the level of participant understanding about existing retinal prostheses and their functionality, or the potential functionality of such devices still under development. Given that the data collection pre-dated media communication about the development of the first retinal implant in Australia, we assumed little or no prior knowledge. However, a more detailed assessment of prior participant knowledge and expectations should be undertaken in future studies, particularly as the field progresses and more is understood about the outcomes.

In conclusion, several existing psychosocial questionnaires can be utilised to assess persons with advanced retinal degeneration. Although the psychosocial tests used in this study failed to predict interest in participating in a retinal prosthesis clinical trial, they may have a role in evaluating outcomes with a retinal prosthesis. As the number of participants involved in retinal prosthesis trials increases, it will become feasible to investigate this.

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Table 1. Characteristics of Participants[†]

Characteristic	Participants (*n* = 72)
Age, years	
mean (SD)	56 (15)
Sex, *n*	
male:female	40:32
VA better eye, logMAR	
mean (SD)	1.85 (1.41)
VA worse eye, logMAR	
mean (SD)	2.30 (1.46)
Functional Field Score, %	
median (range)	16 (0-100)
Functional Vision Score, %	
median (range)	9 (0-80)
Personality – NEO-FFI-3 Neuroticism, T-score	
mean (SD; range)	47 (11; 24-75)
Personality – NEO-FFI-3 Extraversion, T-score	
mean (SD; range)	51 (9; 27-74)
Personality – NEO-FFI-3 Openness, T-score	
mean (SD; range)	51 (9; 35-72)
Personality – NEO-FFI-3 Agreeableness, T-score	
mean (SD; range)	53 (11; 24-76)
Personality – NEO-FFI-3 Conscientiousness, T-score	
mean (SD; range)	54 (10; 24-76)
Cognitive ability – WAIS-IV Verbal Similarities, raw score	
mean (SD; range)	18 (4; 7-27)
Cognitive ability – WAIS-IV Verbal Comprehension, raw score	
mean (SD; range)	21 (6; 6-31)
Social support – MOS-SSS, score	
mean (SD; range)	80 (19; 21-100)
Self-efficacy – GSE, score	
mean (SD; range)	33 (5; 14-40)
Coping – Vis-OPS Selective Primary Control, score	
mean (SD; range)	23 (2; 17-47)
Coping – Vis-OPS Compensatory Primary Control, score	
mean (SD; range)	30 (5; 17-36)
Coping – Vis-OPS Selective Secondary Control, score	
mean (SD; range)	31 (5; 16-40)
Coping – Vis-OPS Compensatory Secondary Control, score	
mean (SD; range)	23 (4; 13-33)
Optimism – LOT-R, score	
mean (SD; range)	19 (8; 6-30)
Depression – PHQ-9, score	
mean (SD; range)	3 (4; 0-24)
Quality of life – IVI, Rasch score	
mean (SD; range)	51.9 (9.6; 32.1-76.5)
Quality of life – VisQoL, score	
mean (SD; range)	10 (4; 2-21)

[†]Abbreviations: NEO-FFI-3, NEO Five-Factor Inventory-3; WAIS, Wechsler Adult Intelligence Scale; MOS-SSS, Medical Outcomes Study Social Support Survey; GSE, General Self-Efficacy Scale; Vis-OPS, Vision Specific Optimization in Primary and Secondary Control Scale; LOT-R, Life Orientation Test - Revised; PHQ, Patient Health Questionnaire; IVI, Impact of Vision Impairment Profile; VisQoL, Vision and Quality of Life Scale.

Table 2. Correlations (Spearman) between Psychosocial Factors and Quality of Life[†]

	IVI		**VisQoL**	
	rho	*P*	rho	*P*
Functional Vision Score	0.00	0.99	0.00	0.98
Depression – PHQ-9	-0.37	<0.001	0.40	<0.001
Personality – NEO-FFI-3 Neuroticism	-0.29	0.02	0.41	0.001
Personality – NEO-FFI-3 Extraversion	0.16	0.21	-0.37	0.003
Coping – Vis-OPS Selective Primary Control	0.27	0.02	-0.34	0.003
IVI	-	-	-0.75	<0.001

[†]Abbreviations: NEO-FFI-3, NEO Five-Factor Inventory-3; PHQ, Patient Health Questionnaire; Vis-OPS, Vision Specific Optimization in Primary and Secondary Control Scale; IVI, Impact of Vision Impairment Profile; VisQoL, Vision and Quality of Life Scale.

Table 3. Predictive models of quality of life[†]

Model	Unstandardised b	Standard Error b	Beta	*P*
a) Dependent variable IVI quality of life[‡]				
Constant	24.709	14.508		0.094
PHQ-9	-0.818	0.227	-0.383	0.001
Sex	-6.662	2.151	-0.331	0.003
VisOPS-SPC	1.726	0.639	0.291	0.009
b) Dependent variable VisQoL quality of life[§]				
Constant	29.037	6.103		<0.001
PHQ-9	0.310	0.103	0.335	0.004
NEO-FFI-3 Extraversion	-0.243	0.093	-0.305	0.011
VisOPS-SPC	-0.560	0.273	-0.218	0.045

[†]Abbreviations: NEO-FFI-3, NEO Five-Factor Inventory-3; VisOPS-SPC, Vision Specific Optimization in Primary and Secondary Control Scale, Selective Primary Control subscale; PHQ, Patient Health Questionnaire; IVI, Impact of Vision Impairment Profile; VisQoL, Vision and Quality of Life Scale.
[‡]$R^2 = 0.352$; R^2 (adjusted) = 0.319
[§]$R^2 = 0.403$; R^2 (adjusted) = 0.373