

# Quality of life and cancer-related needs in patients with choroidal melanoma

Joshua F Wiley,<sup>1</sup> Kelsey Laird,<sup>1</sup> Tammy Beran,<sup>1</sup> Tara A McCannel,<sup>2,3,4</sup>  
Annette L Stanton<sup>1,4,5</sup>

<sup>1</sup>Department of Psychology,  
University of California,  
Los Angeles, California, USA

<sup>2</sup>Department of  
Ophthalmology, University of  
California, Los Angeles,  
California, USA

<sup>3</sup>Jules Stein Eye Institute,  
University of California, Los  
Angeles, California, USA

<sup>4</sup>Jonsson Comprehensive  
Cancer Center, University of  
California, Los Angeles,  
California, USA

<sup>5</sup>Department of Psychiatry  
and Biobehavioral Sciences,  
University of California,  
Los Angeles, California, USA

## Correspondence to

Dr Annette L Stanton,  
Department of Psychology,  
University of California,  
Los Angeles, 1285 Franz Hall,  
Box 951563, CA 90095-1563,  
USA;  
astanton@ucla.edu

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## ABSTRACT

**Aims** To assess quality of life (QoL) indices and their associations with treatment modality, sociodemographics and cancer-related needs in choroidal melanoma patients.

**Methods** Patients (N=99) treated at the University of California, Los Angeles, for choroidal melanoma within the prior 5 years (M=2.05) completed questionnaires assessing demographics, cancer-related needs, vision-specific QoL, depressive symptoms and concern about recurrence. Visual acuity, comorbidities, treatment modality (radiotherapy, enucleation) and years since diagnosis were gathered from medical records. Primary analyses were multiple regressions.

**Results** Although concern about cancer recurrence was elevated, QoL was better than in other oncology samples and comparable with healthy samples on some outcomes. Enucleation was associated with worse vision-specific QoL, and presence of comorbid diseases was associated with worse vision-specific QoL, depressive symptoms and concern about cancer recurring (all  $p$  values < 0.05). Patients who experienced at least one stressful life event in the past year (vs no events) reported more depressive symptoms ( $p < 0.01$ ). Report of more unmet cancer needs was associated with worse vision-specific QoL, depressive symptoms and more concern about recurrence (all  $p$  values < 0.05), uniquely explaining 4%–12% of the variance.

**Conclusions** For choroidal melanoma patients, an average of 2 years after treatment, the number of physical comorbidities and unmet cancer needs were the strongest correlates of poorer QoL.

Choroidal melanoma is a rare intraocular malignancy with an incidence of five persons per million.<sup>1</sup> Mortality varies by tumour size and age. Unlike other cancers, the primary treatment for choroidal melanoma does not include chemotherapy, but rather involves surgery or radiotherapy, both of which can result in impaired vision. Three primary treatment types for choroidal melanoma are enucleation, brachytherapy and proton beam therapy. With the exception of a small number of studies,<sup>2–8</sup> vision-specific and general health-related quality of life (QoL) have gone largely unexplored in patients with choroidal melanoma. Moreover, little is known regarding risk and protective factors for QoL in choroidal melanoma survivors.

Studies assessing QoL in patients with choroidal melanoma suggest that vision-related QoL decreases after treatment. For example, from before treatment to 6 months later, patients decreased in nearly all domains of the National Eye Institute Visual Function Questionnaire in one study.<sup>4</sup> Both vision-related and global QoL decreased<sup>7</sup> from 2 days prior

to 3 months after plaque radiotherapy in other research. Distinct treatment modalities do not appear to produce large differences in QoL, although in one study, in the first 2 years after treatment, visual function declined more in patients who underwent enucleation compared with those treated with brachytherapy.<sup>4</sup> Studies comparing choroidal melanoma patients' QoL with age-matched non-medical samples<sup>6</sup> and other oncology samples<sup>3</sup> suggest that choroidal melanoma patients have poorer QoL compared with non-medical samples but not compared with individuals with other types of cancers an average of 3–5 years post-treatment.

Diagnosis and treatment of choroidal melanoma are associated with higher levels of depressive symptoms than found in the general population. A retrospective study<sup>3</sup> of 98 European choroidal melanoma patients treated with radiotherapy approximately 3 years before entering the study found that 23.7% of the sample scored in the borderline to pathological range on depressive symptoms compared with 11.4% in a non-clinical sample.<sup>9</sup> Among patients at an eye hospital upon uveal melanoma diagnosis confirmation, but prior to treatment, 43.8% scored in the borderline to pathological range for anxiety and 19.6% for depressive symptoms.<sup>2</sup> Symptoms of anxiety, but not depression, decreased at 2 months and 1 year after treatment. In summary, research suggests that patients with ocular melanoma have worse QoL than age-matched controls and that visual acuity and vision-specific QoL decrease following treatment. Differences in QoL by treatment modality are small, although patients with radiotherapy may experience modestly better QoL. With the exception of treatment modality, little research has examined potential risk and protective factors for QoL in ocular melanoma patients.

In the current study, we assessed several aspects of QoL: patients' views of visual function and impact of treatment, concern about cancer recurring, and depressive symptoms. We also examined potential correlates including medical treatment (enucleation vs radiotherapy), comorbidities, demographic and personal characteristics, and patient-reported cancer-related needs (ie, domains in which patients feel they need help, such as coping with fears about physical disability). Understanding the psychosocial status of this unique population, as well as potential contributors to QoL, will guide healthcare providers in helping patients adjust to this disease.

## MATERIALS AND METHODS

The University of California, Los Angeles institutional review board approved all procedures prior

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to data collection. All patients at the Ophthalmic Oncology Center of the Jules Stein Eye Institute who received diagnosis and treatment of choroidal melanoma in the 5 years prior to the study were mailed an introductory letter, consent form for research participation and medical chart review, questionnaires and a return envelope. Patients who chose to participate completed and returned the consent form and questionnaires. Detailed methods of recruitment, informed consent and assessment are described elsewhere.<sup>10</sup>

### Independent variables

Patients reported their sex, age, education in years and whether they had experienced a stressful life event (eg, death of a loved one, divorce, financial difficulties) in the past 12 months (0=no, 1=yes).

Cancer needs were assessed with the Cancer Needs Questionnaire-Short Form<sup>11</sup> (CNQ-SF), a measure with established reliability and validity<sup>12</sup> that assesses specific domains or tasks for which patients perceive an unmet need and desire assistance. The CNQ-SF has been shown to be unique from measures of depressive symptoms and QoL, although some overlap exists.<sup>12</sup> It assesses 'need for help' in five domains: *Physical and daily living needs* (six items; eg, 'dealing with lack of energy and tiredness'), *psychological needs* (11 items; eg, 'coping with fears about further physical disability or deterioration'), *communication needs* (three items; eg, 'coping with awkwardness in talking with others about the cancer'), *patient care and support needs* (five items; eg, 'for your cancer specialist to acknowledge and show sensitivity to your feelings and emotional needs'), and *health system and information needs* (seven items; eg, 'to be fully informed about the odds of treatment success'). The total score ( $\alpha=0.96$ ) was used in analyses, where higher scores indicate more unmet needs.

### Medical characteristics

All medical variables were collected from medical charts. Visual acuity for both eyes from the time closest to when patients completed the questionnaire was converted to the logarithm of the minimum angle of resolution<sup>13</sup> (logMAR) values and averaged by weighting the best seeing eye 0.75 and the other eye 0.25. For patients who received enucleation, the logMAR for the remaining eye was used. Treatment type was coded as 0=radiotherapy (brachytherapy or proton beam therapy) and 1=enucleation. Years since diagnosis and the number of physical comorbidities (eg, arthritis, diabetes; ranging from 0 to 5) were treated as continuous.

### QoL measures

Four subscales from the 25-item National Eye Institute Visual Function Questionnaire<sup>14</sup> were administered. Role Limitations ( $\alpha=0.80$ ) measures the impact of vision on performance of work or other activities; Mental Health ( $\alpha=0.77$ ) measures vision-specific mental health (eg, frustration and worry related to vision); Social Function ( $\alpha=0.66$ ) measures difficulty with social interaction due to vision loss; and Dependency ( $\alpha=0.75$ ) measures dependency on others due to vision loss. The Center for Epidemiologic Studies Depression scale<sup>15</sup> (CES-D;  $\alpha=0.89$ ) measures general depressive symptoms. The Concern about Recurrence scale<sup>8</sup> ( $\alpha=0.68$ ) measures how often participants think about their choroidal melanoma coming back or spreading (metastasising) and how upsetting they find these thoughts. Higher values indicate *lower* concern.

### Statistical analysis

Descriptive statistics were computed on all variables. The unique relationships of patient and medical characteristics with vision-related QoL, concern about recurrence, and depressive symptoms were estimated using hierarchical multiple regression and multiple imputation for a small (<5%) amount of missing data with R V.2.15.0. To facilitate comparison, standardised coefficients are reported. Effects were considered statistically significant at  $p<0.05$ . Residual plots from all models were assessed to ensure the normality assumption of regression was met. Due to incomplete responses, the exact degrees of freedom vary, so we conservatively calculated the overall model F-test using the degrees of freedom for complete cases.

## RESULTS

### Descriptive statistics

Of 224 patients identified via medical records, 14 were ineligible due to death, 26 due to inaccurate address, six due to inability to speak English, six due to incorrect diagnosis and one due to consent form not returned. Overall, 99 (58%) of the 171 eligible patients completed the questionnaires. In all, 51 participants were men and 48 were women. A total of 79 patients received brachytherapy, three received proton beam therapy and 16 received enucleation (information on treatment was unavailable for one participant).

On average, participants were 63.71 years of age (median=65, range=24–88) and had an average of 15.44 years of education (12 years=high school degree, 16=bachelor degree) (median=15, range=10–24 years of education). Participants had been diagnosed an average of 2 years prior to questionnaire completion (median=1.7, range=0.15–4.78 years), and 31 were in the first year after diagnosis. Five patients reported a recurrence of their choroidal melanoma, of whom three had received enucleation and two brachytherapy. Additional patient characteristics are reported in table 1 and descriptive statistics are reported in table 2.

### Associations of QoL with patient and medical characteristics

Table 3 contains the full regression models for the QoL outcomes. The models explained 25%–37% of the variance in the outcome measures. Of the medical characteristics, the only significant effects were treatment type and number of comorbidities. Specifically, patients who received enucleation had 0.57 SD lower scores on the VFQ Role Limitations indicating more morbidity. Each additional comorbid condition was associated with a 0.28 SD lower VFQ Role Limitations, 0.24 SD lower VFQ Mental Health, 0.24 SD higher scores on depressive symptoms and 0.39 SD more concern about recurrence.

Of the patient characteristics, education and experiencing a stressful life event in the past year were significant correlates of depressive symptoms. A 4 years higher education level was associated with a 0.30 SD lower CES-D score. Patients who had experienced a stressful life event were expected to have 0.58 SD higher CES-D scores than patients who had not. Of the 15 participants who scored at or above 16 (the value suggestive of clinically significant depression) on the CES-D, 14 had experienced a stressful life event in the past 12 months and only one had not. By contrast, of the 83 participants who scored less than 16 on the CES-D, 31 reported experiencing no stressful life events within the last 12 months.

Finally, unmet cancer-related needs were significantly related to all three outcomes, with higher unmet needs associated with lower vision-related QoL and greater depressive symptoms and concern about recurrence. Unmet cancer needs uniquely accounted for 4%, 8%, 12% and 9% of the variance in VFQ

**Table 1** Patient characteristics

Race, n (%)	
White	85 (85.9)
Other race	14 (14.1)
Relationship status, n (%)	
Married/committed	64 (66.7)
Not committed	32 (33.3)
Employment status, n (%)	
Unemployed/retired	45 (47.4)
Employed <30 h	12 (12.6)
Employed ≥30 h	38 (40.0)
Comorbid conditions, n (%)	
None	31 (31.6)
One	39 (39.8)
Two or more	28 (28.6)
Treatment type, n (%)	
Brachytherapy	79
Proton beam therapy	3
Enucleation	16
Years since diagnosis, mean (SD)	2.05 (1.47)
logMAR, mean (SD)	0.27 (0.28)

Due to non-response, n=95–99.

logMAR, logarithm of the minimum angle of resolution.

Role Limitations, Mental Health, CES-D and concern about recurrence, respectively.

We performed post hoc exploratory analyses to characterise the significant relations between unmet cancer needs and QoL. Final multiple regression models were conducted substituting the five subdomains (ie, physical and daily living needs, psychological needs, communication needs, patient care and support needs, health system and information needs) instead of the total cancer needs score. Unmet physical and daily living needs were significantly associated with lower QoL on the VFQ Role Limitations and Mental Health scales and higher depressive symptoms (*p* values<0.05). Unmet psychological needs were significantly associated with higher depressive symptoms and more concern about recurrence (*p* values<0.05). The remaining three subscales were not uniquely associated with any outcomes (all *p* values>0.05).

## DISCUSSION

Overall, this cohort of adults treated for choroidal melanoma in the previous 5 years reported high vision-specific QoL and low depressive symptoms. Concern about cancer recurrence scale score was lower ( $M=58.84$ ,  $SD=20.65$ ) in our sample

**Table 2** Descriptive statistics for study variables

Measure	M (SD)	Possible range
VFQ Role Difficulties* (two items)	72.04 (26.5)	0–100
VFQ Mental Health* (four items)	75.9 (21.81)	0–100
VFQ Social Function* (two items)	94.19 (12.41)	0–100
VFQ Dependency* (three items)	89.2 (15.88)	0–100
VFQ Total* (11 items)	82.67 (16.25)	0–100
Concern about Recurrence*	58.84 (20.65)	0–100
Depressive symptom† (CES-D)	7.69 (8.32)	0–60
Cancer Needs Questionnaire Total†	33.24 (19.95)	0–100

Sample size ranged from 94 to 99 due to missing data.

\*Higher scores on these scales indicate lower morbidity or better functioning.

†Higher scores on these scales indicate higher morbidity or worse functioning.

VFQ, Visual Function Questionnaire.

compared with a similarly aged (median age 66 years) group<sup>8</sup> of choroidal melanoma patients ( $M=74.5$ ,  $SD=19.6$ ), indicating that our sample group was more concerned. Consistent with prior research, we found no difference in concerns about recurrence between treatment groups,<sup>4</sup> although this should be interpreted with caution due to the small number of patients receiving enucleation. VFQ Role Difficulties and Dependency subscale means were comparable with another study of patients with choroidal melanoma.<sup>8</sup> The average unmet cancer-related needs score ( $M=33$ ) indicated between 'no' and 'low' need for help.

The findings suggest better general adjustment among these patients compared with other cancer populations. For example, the proportion of participants meeting the CES-D cut-off of ≥16 suggestive of clinical depression was 15.15%, which is lower than that reported in other oncology samples. Prevalence rates of clinically significant levels of depressive symptoms among prostate cancer patients, for example, range from 11% to 37%.<sup>16</sup> In a group of 708 US patients with mixed cancer diagnoses, the average score on the CES-D was 13.2,<sup>17</sup> more than 5 points higher than our mean of 7.69.

On average, choroidal melanoma survivors appeared well adjusted 2 years after treatment, perhaps reflecting the relatively brief treatment course for choroidal melanoma compared with that of other cancer types or the care received at the treatment site. Generally positive functioning, if somewhat lower than peers with no medical conditions, also is characteristic of long-term cancer survivors.<sup>18</sup>

The explanatory variables accounted for a substantial amount of variance in QoL indicators. The number of physical comorbidities and number of unmet cancer needs were the variables that explained the greatest unique variance in the outcomes. Although some overlap exists between the measures of unmet cancer needs and QoL, these results are important considering the magnitude of the effects, which ranged from a 0.24 to 0.46 SD change in outcome per additional comorbidity or unit change in cancer needs. Contextual factors, such as comorbidities, can place added burden on individuals living with a history of choroidal melanoma. These findings suggest that monitoring basic comorbidities (eg, hypertension) and querying for patients' cancer-related needs (especially physical and daily living needs and psychological needs) may help identify patients who could benefit from additional support.

There were no significant associations of visual acuity or years since diagnosis with QoL outcomes. Perhaps visual acuity was uncorrelated with QoL because binocular vision or vision in the fellow eye may be more important; however, our use of logMAR values weighting the best seeing eye more heavily at least partially rules out this explanation. In addition, the median number of days between visual acuity measurement and questionnaire completion was 48 days, which may partially explain why visual acuity was not significantly correlated with QoL.

In our sample, patients treated with enucleation versus brachytherapy had worse scores on role difficulties, consistent with previous research<sup>4</sup> that patients treated with enucleation versus brachytherapy had worse visual functioning, although the differences diminished after 2 years. Findings also are consistent with recent work<sup>4, 19</sup> demonstrating no difference in concern about recurrence between treatment types, although these results should be interpreted with caution as the sample size for between-treatment comparison was small. It is surprising that time elapsed since diagnosis was not associated with outcomes. Studies including a larger number of recently diagnosed patients are needed.

**Table 3** Linear models regressing quality of life outcomes on explanatory variables

	Role Difficulties (VFQ) B (SE)	Mental Health (VFQ) B (SE)	CES-D B (SE)	Concern about Recurrence B (SE)
Constant	0.31 (0.39)	0.75* (0.37)	-1.07** (0.35)	1.06** (0.36)
logMAR	0.31 (0.40)	-0.57 (0.37)	-0.45 (0.36)	0.24 (0.37)
Years since Dx	0.09 (0.07)	-0.02 (0.06)	0.06 (0.06)	-0.09 (0.06)
Tx type	-0.57* (0.27)	0.35 (0.25)	0.31 (0.25)	0.32 (0.25)
Sex	0.10 (0.21)	0.24 (0.20)	0.04 (0.19)	0.15 (0.19)
Age	-0.08 (0.08)	-0.08 (0.08)	-0.02 (0.08)	0.11 (0.08)
Education	0.21 (0.14)	0.15 (0.13)	-0.30* (0.13)	0.07 (0.13)
Comorbidities	-0.28** (0.11)	-0.24* (0.10)	0.24* (0.10)	-0.39*** (0.10)
Stressful events	-0.06 (0.23)	-0.14 (0.22)	0.58** (0.21)	-0.37 (0.21)
$\Delta R^2$	0.21*	0.24**	0.25**	0.26**
CNQ	-0.25* (0.12)	-0.37** (0.12)	0.46*** (0.11)	-0.40*** (0.11)
$\Delta R^2$	0.04*	0.08**	0.12***	0.09***
R <sup>2</sup>	0.25*	0.31***	0.37***	0.35***
F	F(9, 70)=2.57, p=0.013	F(9, 72)=3.62, p<0.001	F(9, 71)=4.61, p<0.001	F(9, 71)=4.28, p<0.001

Treatment type was coded as 0=radiotherapy, 1=enucleation. Sex was coded as 0=female, 1=male. Stressful events was coded as in the past 6 months, 0=no stressful life events, 1=at least one stressful life event. The CNQ was divided by 25.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001.

CES-D, Center for Epidemiologic Studies Depression scale; CNQ, Cancer Needs Questionnaire; logMAR, logarithm of the minimum angle of resolution; VFQ, Visual Function Questionnaire.

A strength of this study is its relatively large sample considering the rarity of choroidal melanoma. Additionally, it is possible to characterise QoL broadly in this sample because a variety of QoL outcomes were assessed. Although generalisability of these results to other samples may be limited because our sample came from a single treatment centre, it is also a strength that all participants had a consistent treatment and follow-up experience with a single physician (TM) administering treatment. A major limitation is its retrospective nature, which naturally excludes patients who died and does not allow causal inference. In the 5 years after diagnosis and treatment, patients treated for choroidal melanoma report QoL that is more positive than other cancer patients and generally positive. Variability in QoL is primarily explained not by vision or treatment-related variables, but rather by recent stressful life events, other physical comorbidities (such as diabetes) and perceived unmet cancer-related needs. These results are encouraging for patients receiving a diagnosis of choroidal melanoma.

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**Data sharing statement** Raw data for all scales reported in the study are available to other researchers. To request data, please contact the corresponding author.

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