Identifying Distinct Risk Factors for Vision-Specific Distress and Depressive Symptoms in People With Vision Impairment

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Purpose. To determine the relative importance and associated risk factors of vision-specific distress and depressive symptoms in people with visual impairments.

Methods. In this cross-sectional study, 162 adult patients with visual acuity less than 6/12 were interviewed using telephone-administered questionnaires. Vision-specific distress was assessed with the emotional well-being scale of the Impact of Vision Impairment Questionnaire. Depressive symptoms were assessed with the Patient Health Questionnaire-9. Other measures including vision-specific functioning, coping, and social support were also assessed. Multiple regression and commonality analysis were used to determine the relative contribution of factors explaining variance in vision-specific distress and depressive symptoms.

Results. Vision-specific distress and depressive symptoms were strongly associated. Vision-specific functioning (βs = 0.47, $P < 0.001$), avoidant coping (βs = −0.32, $P < 0.001$), social coping efficacy (βs = −0.17, $P = 0.001$), and depressive symptoms (βs = 0.18, $P = 0.006$) were significant determinants of vision-specific distress. Vision-specific functioning accounted for 37.7% of the unique variance in this model. Vision-specific distress was an important risk factor for depression, accounting for 36.6% of the unique variance in depressive symptoms.

Conclusions. Vision-specific distress is related to a person's ability to manage the practical and social challenges of vision impairment. Further work is required to distinguish vision-specific distress and depression and to examine what interventions are best to target vision-specific distress.

Keywords: low vision, visual impairment, depression, coping, social support, vision-specific distress

It is been shown that older adults with visual impairments are 2 to 3 times more likely to experience depressive symptoms compared with those without visual impairments.[1–5] In addition, research has shown that visual impairments are associated with a decline in general emotional health such as life satisfaction and mood.[5] Research on chronic health conditions suggest that emotional distress specifically related to the condition is an important construct that may be more commonly experienced than depression and requires different treatment strategies.[6,7] For example, researchers have argued that many patients with diabetes are not clinically depressed, but suffering from "diabetes distress," which is related to the demands of dealing with diabetes and its management.[8]

A number of qualitative studies have described the strong emotional reactions to living with visual impairments, including worry, frustration, feelings of isolation, and embarrassment about eyesight.[9–12] It is possible that the heightened levels of emotional symptoms captured in self-report instruments in this population reflect distress specifically related to the difficulties of coping with vision loss. To date, however, empirical data are not available to support this hypothesis. Such vision-specific distress may be experienced alone or alongside depressive symptomatology and may precipitate a depressive disorder. A greater understanding of the distinction and association between vision-specific distress and depressive symptomatology in people with visual impairments will help inform the nature and timing of intervention to improve well-being and prevent psychopathology.

Visual impairments frequently leads to a range of pervasive personal and functional challenges, such as decreased independence and social functioning. In a previous study, we have shown that greater vision-specific distress is strongly related to the detrimental impact of visual impairments on everyday activities and functioning.[13] There is a wealth of literature demonstrating that stressful life events, in particular chronic stress, are risk factors for depression.[14] Theories of stress and the associated research indicate that a person's response to stressors is dependent upon their coping strategies and levels of support.[15] Lack of social support has shown to be a risk factor for depression,[14] and coping and social support have

Table 1. Sociodemographic and Psychosocial Characteristics of the Sample ($n = 162$)

Continuous variables	Mean ± SD
Age*	71.4 ± 13.7
Perceived availability of social support*	6.40 ± 1.99
Perceived adequacy of social support*	6.44 ± 1.96
PHQ-9 (median [IQR])	5 (9)
Vision-specific functioning*	4.90 ± 1.43
Vision-specific distress*	5.65 ± 1.85
CSI avoidance*	15.0 ± 3.79
CSI seeking social support*	18.05 ± 3.96
CSI problem solving*	16.71 ± 4.66
Coping efficacy day-to-day*	3.60 ± 1.04
Coping efficacy emotional*	3.49 ± 1.04
Coping efficacy social*	3.61 ± 0.94
Categorical variables	***n* (%)**
Sex (male)	54 (33.3)
Marital status	
Married/defacto/partner	74 (46.0)
Education*	
None/primary school equivalent	34 (21.1)
Secondary school completed	77 (47.8)
Some secondary/technical education	18 (11.2)
Trade/apprenticeship/some university or TAFE	18 (11.2)
Degree qualified	14 (8.7)
Self-reported health rating*	
Excellent	13 (8.2)
Very good	47 (29.6)
Good	62 (39.0)
Fair	25 (15.7)
Poor	12 (7.5)
Visual impairment	
Mild (<6/12–6/18)	62 (38.3)
Moderate (<6/18–6/60)	65 (40.1)
Severe (<6/60)	35 (21.6)
Eye condition	
Macular degeneration	65 (40.1)
Glaucoma	26 (16.0)
Diabetic retinopathy	17 (10.5)
Cataracts	7 (4.3)
Other	42 (25.9)
Unknown	5 (3.1)
Self-reported history of depression*	
No, never	92 (55.1)
Yes, currently/past	69 (42.9)
Negative life event in the past 12 mo (yes)	131 (80.8)

*Missing data age $n = 5$, perceived availability of social support = 1, perceived adequacy of social support = 1, vision-specific functioning = 1, vision-specific distress = 1, CSI avoidance = 5, CSI seeking social support = 5, CSI problem solving = 1, coping efficacy day-to-day = 1, coping efficacy emotional = 1, coping efficacy social = 1, education $n = 1$, self-reported health rating $n = 3$, self-reported history of depression $n = 2$.

been identified as important factors in adaptation to visual impairment and may be protective in reducing vision-specific distress.[16–18] It is not clear which coping strategies are helpful in alleviating or preventing distress in people with visual impairments, although it is generally considered that avoidant coping strategies are less adaptive than problem-oriented strategies.[18] Research from other disability areas also indicate that a person's confidence in their ability to cope (i.e., coping efficacy) is likely to be a key factor in determining psychological well-being.[19] Coping efficacy, use of social support, and other coping strategies may therefore be important predictors of vision-specific distress and/or depression.

In order to develop interventions to address vision-specific distress, a greater understanding of factors that contribute to this are required. In addition, it is important to begin to understand the distinction between vision-specific distress and depressive symptoms in people with visual impairments. This study aimed firstly to identify the risk factors for vision-specific distress and determine their relative importance, and secondly to determine if the risk factors for vision-specific distress are distinct from risk factors for depressive symptoms in individuals with visual impairments.

Methods

Participants

Participants were recruited from public outpatient eye clinics in Melbourne (Australia) and low vision rehabilitation services intake. The eligibility criteria were best-corrected visual acuity less than 6/12 in the better eye, aged 40 years or older, ability to converse in English, adequate hearing (including the use of a hearing aid if necessary), and no cognitive impairment as determined by the 6-Item Cognitive Impairment Test (6CIT).[20] Ethics approval was obtained from the Royal Victorian Eye and Ear Hospital Human Research (RVEEH) and ethics committee (09/923H), and all participants signed a consent form. This research adhered to the tenets of the Declaration of Helsinki.

Measures

Each participant completed a structured interviewer administered questionnaire via telephone that consisted of demographics, education level, general health, and medical history. Presenting visual acuity was extracted from patient files. This was assessed using logarithm of the minimum angle of resolution (logMAR) charts at Vision Australia and the Snellen chart at RVEEH.

Depressive Symptoms. The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptoms.[21] The PHQ-9 is based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)[22] criteria for depressive disorders. The PHQ-9 asks participants to report if they have been bothered with nine symptoms in the last 2 weeks. Responses are rated using a 4-category Likert scale from 0 "not at all" to 3 "nearly every day." The PHQ-9 scores of 5, 10, 15, and 20 represent valid thresholds demarcating the lower limits of mild, moderate, moderately severe, and severe depression, respectively.[21] The conventional cut-off point for the PHQ-9 is greater than or equal to 10 to define levels of depressive symptoms warranting further assessment. The PHQ-9 is recommended as the depression screening tool of choice in primary care and general medical settings.[23] We have recently validated the use of the PHQ-9 as a tool for assessing depressive symptoms in visually impaired individuals.[24] In this study we chose not to Rasch analyse the PHQ-9 so that the results are clinically valid and to ease interpretation of findings.

Vision-Specific Quality of Life. The Impact of Vision Impairment Questionnaire (IVI) is a 28-item questionnaire developed to measure vision-specific quality of life and has undergone extensive psychometric validation.[25–27] In addition to a total score, the questionnaire includes three subscales. The "mobility and independence" subscale (11 items) and the "reading and accessing information" subscale (9 items) assess levels of restriction of participation in common daily activities

Table 2. Bivariate and Partial Correlations With Vision-Specific Distress and Depressive Symptoms

Variable	PHQ-9 Score Zero Order Correlations	PHQ-9 Score Partial Correlations Controlling for Vision-Specific Distress	Vision-Specific Distress Zero Order Correlations	Vision-Specific Distress Partial Correlations Controlling for PHQ-9 Score
Age	−0.243†	−0.054	0.314‡	0.215*
Education	−0.075	−0.002	0.110	0.081
Visual acuity	0.082	−0.040	−0.184*	−0.136
Health rating	0.411‡	0.253†	−0.299‡	−0.065
Vision-specific functioning	−0.543‡	−0.010	0.774‡	0.647‡
Perceived availability of social support	−0.395‡	−0.359‡	0.246†	−0.085
Perceived adequacy of social support	−0.560‡	−0.412‡	0.480‡	0.112
CSI avoidance	0.64‡	0.356‡	−0.681‡	−0.426‡
CSI seeking social support	0.029	−0.140	−0.173*	−0.205*
CSI problem solving	0.085	−0.115	−0.241†	−0.241†
Coping efficacy day-to-day	−0.380‡	−0.071	0.419‡	0.235†
Coping efficacy emotional	−0.463‡	−0.137	0.540‡	0.312‡
Coping efficacy social	−0.317‡	0.097	0.55‡	0.465‡
PHQ-9	-	-	−0.694‡	-
Vision-specific distress	−0.694‡	-	-	-

* $P \leq 0.05$.
† $P \leq 0.01$.
‡ $P \leq 0.001$.

due to vision impairment. The third subscale comprises eight items assessing vision-specific distress.[26]

Rasch analysis was used to assess the psychometric properties of the IVI using the Andrich rating scale model with Winsteps software (version 3.74; Chicago, IL).[28,29] Rasch analysis is a form of Item Response Theory (IRT), where the ordinal ratings of the questionnaire are transformed to estimates of interval measures. Rasch analysis also provides significant insight into the psychometric properties of the scale, including (1) appropriate use of response categories, (2) measurement precision, (3) how well items "fit" the underlying trait, (4) unidimensionality, (5) targeting of item difficulty to patients' visual ability, and (6) differential item functioning (DIF). Details of these fit parameters for the IVI have been substantially demonstrated previously.[30–33] In brief, the IVI was found to be multidimensional in its full form in this study. Guided by the standardized residual loadings in principal components analysis, the IVI was split into two separate scales, namely "vision-specific distress" (items 21–28) and 'vision-specific functioning' (items 1–20). Both scales demonstrated excellent fit to the Rasch model, with good precision and targeting, and no evidence of multidimensionality, misfit, or DIF. The vision-specific distress subscale was one of the primary outcomes of this study. The questions ask participants to state how they have been feeling because of their eyesight over the last month. Items refer to embarrassment, frustration and annoyance, loneliness and isolation, feeling sad or low, worry about eyesight getting worse, coping with everyday life, being a nuisance or burden, and interference with life in general. Each item is worded to capture feelings specifically related to one's eyesight. For example, "have you felt frustrated or annoyed because of your eyesight?" The vision-specific functioning scale asks to what degree the participants eye sight has interfered with a range of functional activities in the last month (e.g., shopping, opening packaging, and going down steps, stairs, or curbs). A 4-point Likert scale is used to rate the responses, ranging from "a lot of the time" to "not at all." For ease of interpretation the logits were transformed to a 0 to 10 point scale. A high score represents greater vision-specific functioning and lower distress.

Coping. The Coping Strategy Indicator (CSI)[32] is a self-report measure of the degree to which the coping strategies of problem-solving, seeking social support, and avoidance have been used in response to a specific stressor. Participants were asked to select a stressful event related to their visual impairment that had occurred within the past 6 months and rate 33-items on a 3-point rating scale ("a lot," "a little," and "not at all") based on the extent to which they had used that coping strategy (e.g., "daydreamed about better times"). Responses to items for each scale were summed. The CSI has shown high internal consistency, test–retest reliability, and construct validity.[32,33]

Coping efficacy refers to a person's confidence in their ability to cope with various aspects of their condition. Three coping efficacy items were developed based on items used in previous research on coping with disability. Participants rated items on a 5-point scale (ranging from "strongly disagree" to "strongly agree" on the following items: "I am successfully"... "coping with the day to day problems that living with vision impairment creates"; "coping with the emotional aspects of vision impairment"; "managing social interactions with my vision impairment."[19,34]

Social Support. Two summed items assessed the perceived availability of practical and emotional support from family and friends using a 4-point Likert response scale ranging from "most of the time" to "not at all." Two summed items assessed the perceived adequacy of support using a 4-oint scale ranging from "could use a lot more help" to "got all the help needed." These items were originally designed for a study assessing depression in people with visual impairments.[35]

Data Analysis

Bivariate and partial correlations were conducted to examine continuous factors independently associated with vision-specific distress and depressive symptoms and *t*-tests were conducted to determine associations with categorical variables. The relationship between vision-specific distress, depressive symptoms, and the risk factors identified as significant in the univariate analysis was examined using a multivariable linear regression model, respectively. A plot of the residuals

Table 3. Determinants of Vision-Specific Distress in Multivariable Linear Regression Models ($n = 153$)

Variable	Model 1			Model 2			Model 3		
	β (95% CI)	βs	P	β (95% CI)	βs	P	β (95% CI)	βs	P
PHQ-9 score depressive symptoms	−0.06 (−0.09, −0.02)	−0.18	0.001	−0.06 (−0.10, −0.03)	−0.20	<0.001	−0.06 (−0.09, −0.03)	−0.20	<0.001
Age							0.005 (−0.01, 0.01)	0.05	0.22
Vision-specific functioning	0.64 (0.51, 0.77)	0.47	<0.001	0.63 (0.50, 0.76)	0.46	<0.001	0.59 (0.48, 0.71)	0.45	<0.001
CSI avoidance	−0.15 (−0.21, −0.10)	−0.32	<0.001	−0.12 (−0.17, −0.07)	−0.25	<0.001	−0.11 (−0.15, −0.06)	−0.24	<0.001
CSI problem-solving coping				−0.03 (−0.07, 0.01)	−0.09	0.06	−0.03 (−0.06, 0.01)	−0.08	0.12
Coping efficacy social	0.32 (0.16, 0.48)	0.17	<0.001	0.27 (0.11, 0.44)	0.15	0.001	0.28 (0.11, 0.44)	0.15	0.001
Coping efficacy emotional				0.13 (−0.01, 0.28)	0.07	0.08	0.11 (−0.03, 0.25)	0.07	0.12
Model fit									
R^2_{ADJ} (%)	79.43			79.94			**79.97**		
AIC	369.00			**367.16**			368.85		
BIC	**384.03**			388.19			395.88		

R^2 is the proportion of variation "explained" by the regression model, the adjusted R^2 corrected for the number of independent variables in the model. Higher values for this criterion indicate better fitting models; Lower AIC and BIC indicate better fitting models; βs, standardized regression coefficients, which representing the change in terms of SDs in the dependent variable that result from a change of 1 SD in an independent variable. Model 1 included vision-specific functioning, CSI avoidance, coping efficacy social, and PHQ-9 score depressive symptoms. Model 2 included vision-specific functioning, coping efficacy social, PHQ-9 score depressive symptoms, CSI problem-solving coping, and coping efficacy emotional. Model 3 included vision-specific functioning, CSI avoidance, coping efficacy social, PHQ-9 score depressive symptoms, CSI problem-solving coping, coping efficacy emotional, and age. Bolded values refer to best fitting model on each criteria.

compared with estimates was examined to determine if the assumptions of linearity and homoscedasticity were met. We used four relevant criteria for evaluating linear regression models: R^2_{ADJ} (adjusted), Akaike's information criterion (AIC), and Bayesian information criterion (BIC). Generally, higher variance explained by the model (R^2_{ADJ}) and lower AIC and BIC values indicate the best fitting model. We use a new Stata program, vselect (Stata Corp., College Station, TX), to perform variable selection after performing a linear regression.[36] All statistical analyses were conducted with Stata version 12.1.0 (Stata Corp.). A two-tailed P value less than 0.05 was considered statistically significant.

Commonality analysis was used to decompose the total variation into unique and common effects. Commonality analysis quantifies precisely the percentage of variance that is unique to each risk factor, and the percentage is common to all the possible combinations of the risk factors. Unique effects reflect how much variance a risk factor independently contributes to the outcome that is not shared with other risk factors. In contrast, common effects provide detailed information that identifies and quantifies the extent and pattern of the risk factors "overlap" in explaining the variance of the outcome. The relative importance of the risk factors were determined by using the percentages of unique variance explained. The variables that were significant in the final regression models were used in commonality analysis. The package relaimpo was used.

Results

Two-hundred and fifty-three participants were invited to take part in the study. Forty-five declined (18%), 2 (1%) did not pass the cognitive impairment test, 23 (9%) did not meet the visual acuity eligibility criteria (<6/12 in the better eye), and visual acuity was unknown for a further 15 (6%). Six participants were later excluded because they were under 40-years old. Participants were more likely to have moderate or severe vision impairment compared with nonparticipants ($P = 0.04$). Participants did not differ significantly to nonparticipants in age or sex (both $P > 0.05$).

The final sample consisted of 162 adults with low vision (Table 1). Participants mean age was 71.4 years (SD = 13.7, range, 42–94) and 67% of participants were female. The most prevalent eye diseases were AMD (40.1%), glaucoma (16%), and diabetic retinopathy (10.5%). Participants were more likely to have mild (<6/12–6/18) (38.3%) or moderate (<6/18–6/60) (40.1%) vision loss, rather than severe (<6/60) (21.6%). In terms of PHQ-9 thresholds for depressive symptoms, 77 (47.5%) of participants were experiencing minimal depressive symptoms (score of 0–4), 40 (24.7%) had mild depressive symptoms (score of 5–9), and 45 (27.8%) scored above the cut-off (score $\geq$ 10) point for moderate depressive symptoms. Thirty-one participants (19.1%) reported current use of antidepressants. The mean vision-specific distress score was 5.65 $\pm$ 1.85. Higher levels of depressive symptoms were strongly associated with lower vision-specific distress scores (i.e., greater vision-specific distress) ($\rho = -0.694$, $P < 0.001$). A score of 4.93 on the vision-specific distress measure was predictive of the clinical cut-off point (score $\geq$ 10) on the PHQ-9. A score of 6.68 on the vision-specific distress measure indicated minimal depressive symptoms.

In univariate analysis (Table 2) greater levels of vision-specific distress and depressive symptoms were both associated with: younger age, worse self-reported health, worse vision-specific functioning, lower perceived availability and adequacy of social support, greater use of avoidant coping, and poorer day-to-day, emotional and social coping efficacy ($P <$

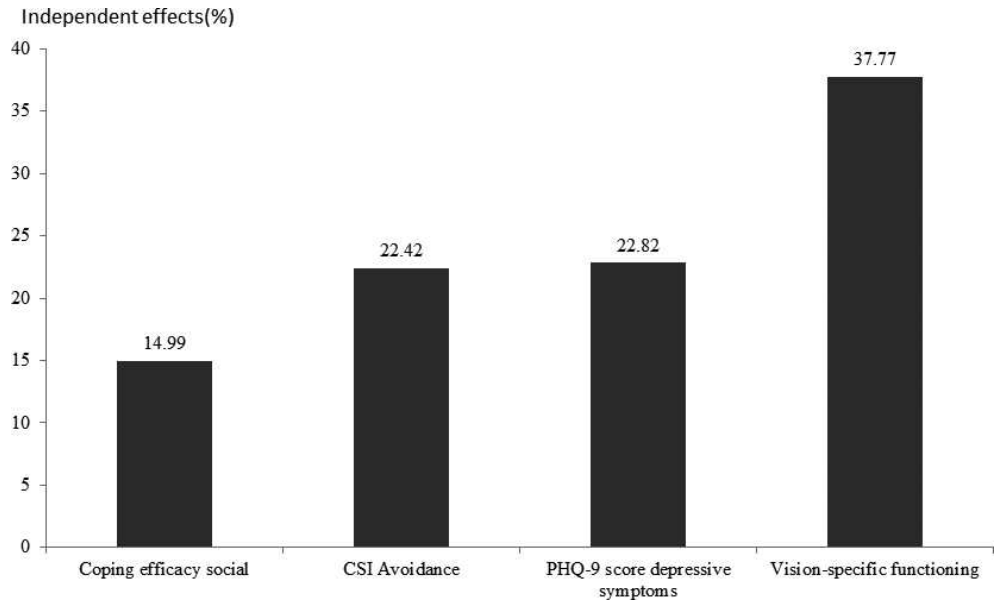

FIGURE 1. Relative importance of risk factors associated with vision-specific distress (Model 1).

0.01). Both vision-specific distress and depressive symptoms were significantly related to history of depression ($P < 0.001$). Those who reported to have experienced depression currently or in the past ($n = 69$) had significantly higher PHQ-9 scores (mean = 9.45 ± 5.59) and greater levels of vision-specific distress (mean = 4.91 ± 1.89) compared with those who reported no previous experience of depression ($n = 92$) (4.70 ± 4.97, $P < 0.001$; 6.21 ± 1.62, $P < 0.001$, respectively). Depressive symptoms and vision-specific distress were not associated with sex, marital status, or recruitment site ($P < 0.05$).

Based on the four criteria for evaluating multivariable regression models, three best-fitting models for determining vision-specific distress were chosen (Table 3). Each model accounted for just under 80% of the variance. Consistently across the models greater vision-specific distress was significantly associated with higher levels of depressive symptoms (e.g., model 1: $\beta = -0.06$; confidence interval [CI]: −0.09, −0.02, $P = 0.001$); poorer vision-specific functioning ($\beta = 0.64$; CI: 0.51,0.77, $P < 0.001$); greater avoidant coping ($\beta = -0.15$; CI: −0.21, −0.10, $P < 0.001$); and poorer efficacy in coping with the social aspects of vision impairment ($\beta = 0.32$; CI:0.16,0.48, $P < 0.001$). Commonality analysis indicated that vision-specific functioning accounted for 37.8% of unique variance in vision-specific distress (Fig. 1). Depressive symptoms, avoidant coping, and efficacy of coping with the social challenges of vision impairment accounted for 22.8%, 22.4%, and 15.0% of the unique variance, respectively.

The three best-fitting multivariable models for determining depressive symptoms consistently included vision-specific distress as a variable significantly associated with greater depressive symptoms (e.g., model 1: $\beta = -1.51$; CI: −1.89, −1.14, $P < 0.001$; Table 4). Model 1 also identified that those with a self-reported history of depression had higher levels of depressive symptoms ($\beta = 2.18$; CI: 0.92, 3.44, $P = 0.001$) and lower perceived adequacy of social support was associated with higher PHQ-9 scores ($\beta = -0.85$; CI: −1.19, −0.51, $P < 0.001$). Model 2 included all the variables shown in Model 1, in addition to health rating ($\beta = 0.66$; CI: 0.05, 1.28, $P = 0.034$) and avoidant coping ($\beta = .25$; CI: 0.01, 0.49, $P = 0.043$). Poorer self-reported health and greater avoidant coping were associated with higher levels of depressive symptoms. Model 3 included only vision-specific distress ($\beta = -1.11$; CI: −1.62, −0.61, $P < 0.001$) and avoidant coping ($\beta = 0.26$; CI: 0.05, 0.47, $P = 0.015$). Each model explained 56% to 58% of the variance in depressive symptoms. Commonality analysis showed that vision-specific distress accounted for 36.6% of the unique variance in depressive symptoms and avoidant coping explained 24.8% (Fig. 2). Perceived adequacy of social support, self-reported history of depression and health rating accounted for 20.5%, 10.23%, and 7.9% of the unique variance, respectively.

DISCUSSION

This study shows that while vision-specific distress and depressive symptoms are strongly associated, there are distinct risk factors for vision-specific distress. These include poorer vision-specific functioning and reduced confidence in managing social interactions with visual impairment. Vision-specific distress was found to explain the most unique variance in depressive symptoms confirming previous research.[13] History of depression, poor physical health, and lower perceived adequacy of social support were also risk factors for depressive symptoms in this sample. Avoidant coping was a unique determinant of both vision-specific distress and depressive symptoms. The results indicate that a person's ability to cope with both the practical, emotional, and social challenges of vision impairment are paramount for psychological well-being.

Interventions to enhance adaptive coping in individuals with vision impairment are important. However, the question of what constitutes effective coping for individuals with low vision still remains. While the negative association between avoidant coping and psychological well-being was in the predicted direction, the other coping strategies assessed in this study (seeking social support and problem-focused coping) were associated with greater vision-specific distress, counter to expectations. This highlights the importance of assessing not only what coping strategies are used, but how they are used and how effective the person finds them to be. It may be the case that ineffective attempts at problem-solving results in frustration and distress. Indeed, research in low-vision populations indicates that striving to achieve unobtainable goals can

TABLE 4. Determinants of PHQ-9 Scores in Multivariable Linear Regression Models ($n = 155$)

Variable	Model 1			Model 2			Model 3		
	β (95% CI)	βs	*P*	β (95% CI)	βs	*P*	β (95% CI)	βs	*P*
Vision-specific distress	−1.51 (−1.89, −1.14)	−0.49	<0.001	−1.21 (−1.66, −0.75)	−0.38	<0.001	−1.11 (−1.62, −0.61)	−0.35	<0.001
Health rating				0.66 (0.05, 1.28)	0.12	0.034	0.59 (−0.06, 1.24)	0.11	0.07
Self-reported history of depression	2.18 (0.92, 3.44)	0.19	0.001	1.63 (0.28, 2.98)	0.14	0.019	1.47 (−0.07, 3.02)	0.13	0.06
Perceived availability social support							−0.27 (−0.68, 0.15)	−0.09	0.208
Perceived adequacy social support	−0.85 (−1.19, −0.51)	−0.29	<0.001	−0.63 (−1.00, −0.26)	−0.22	0.001	−0.42 (−0.95, 0.11)	−0.15	0.118
CSI avoidance				0.25 (0.01, 0.49)	0.16	0.043	0.26 (0.05, 0.47)	0.17	0.015
Coping efficacy emotional							0.47 (−1.21, 0.27)	−0.09	0.207
Model fit									
R^2_{ADJ} (%)	56.26			58.00			**58.42**		
AIC	856.13			**851.80**			852.16		
BIC	**868.31**			870.06			876.51		

Model 1 included vision-specific distress, self-reported history of depression, and perceived adequacy social support. Model 2 included vision-specific distress, health rating, self-reported history of depression, perceived adequacy social support, and CSI avoidance. Model 3 included vision-specific distress, health rating, self-reported history of depression, perceived availability social support, perceived adequacy social support, CSI avoidance, and coping efficacy emotional. Bolded values refer to best fitting model on each criteria.

be detrimental to mental health and that adjusting ones goals to more reachable outcomes is more adaptive in this population.[37,38] Our results suggest the same may be true for seeking social support. If attempts to seek social support are stressful or ineffectual this may lead to heightened distress. Previous work on social support in the context of chronic illness including vision impairment has shown that the belief that one has social support available is protective; however, actually seeking or receiving social support to manage ones condition engenders feelings of dependence and subsequently increases distress.[39] This is reflected in our results, whereby lower perceived adequacy (not availability) of social support was a determinant of higher depressive symptoms. Our findings suggest that coping interventions to reduce vision-specific distress should include a focus on managing the social impact of vision impairment. This may include developing the skills and confidence required to maintain relationships and to seek appropriate support when needed.[40] While the development of social understanding and social skills is considered an important area of practice in children with low vision, this is a largely neglected need in older adults despite clear research highlighting social losses and reduced social involvement due to visual impairment.[5]

We have highlighted that vision-specific distress and depressive symptoms are strongly related, indeed the high correlation between the constructs may suggest some degree of overlap. While many self-report measures of depression tap general affective symptoms to avoid such overlap, in this study we chose to use the PHQ-9, which is specific to the diagnostic criteria for major depression according to the DSM-IV.[22] These include cognitive and physiological items rather than solely focusing on affective symptoms. Further clarity is needed on the comparative prevalence and incidence of vision-specific distress and depression in people with visual impairment. Such work would ideally include a clinical diagnostic interview to determine the presence of depression.

A number of limitations to this study need to be considered. The tool used to assess vision-specific distress in this study was developed as part of a wider quality of life tool and therefore may not capture all aspects of distress related to vision impairment. For example, distress associated with treatment of eye conditions is not assessed. Further work may be required to refine the construct and measurement of vision-specific distress. Additional data are needed to determine the level at which vision-specific distress is clinically meaningful. Our study largely included older adults, since visual impairment is most frequently the result of age-related eye conditions. It is likely that different factors are associated with vision-specific distress and depression in those with earlier onset of vision impairment. Since the majority of our sample had not yet received low vision rehabilitation services we did not assess service use. Past research suggests that low vision rehabilitation services may have a minimal impact on depressive symptoms, but may improve vision-specific quality of life outcomes, such as vision-specific distress.[41] Future research in this area should document rehabilitation services received and examine the impact on psychological outcomes. Finally, our measures of coping efficacy and perceived availability/adequacy of social support were not validated tools, but items derived from the literature. While these items suggested the importance of such constructs for determining psychological outcomes for people with vision impairment, future research should strive to use well validated measures of these constructs.

This study was cross-sectional and therefore making any firm conclusions about causality is not possible. The relations between these constructs are likely to be complex and reciprocal. Our data suggest that vision-specific distress may

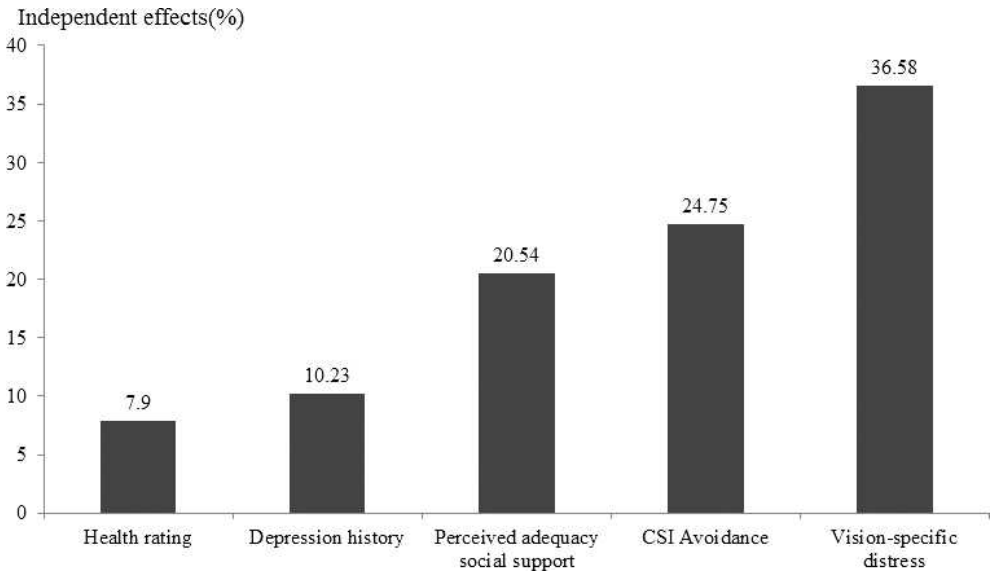

FIGURE 2. Relative importance of risk factors associated with depressive symptoms (Model 2).

contribute to the development of depressive disorders, although longitudinal data are required to support this hypothesis. In particular, there is a need to determine at what point vision-specific distress and/or depression develops and for whom, as well as the prospective relationships between vision-specific distress and depression. This information will inform the development of strategies for intervention and prevention.

In summary, this paper has highlighted the importance of vision-specific distress as a construct, which is associated with depressive symptoms, but which has discrete risk factors. Vision-specific distress is associated with a person's ability to manage the practical and social challenges of vision impairment and accounts for substantial variation in depressive symptoms in people with vision impairment. Further work is required to examine what interventions are best to minimize vision-specific distress, and if such strategies can prevent depression in people with visual impairment.

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