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RESEARCH ARTICLE

The Impact of Appearance Concerns on Depression and Anxiety in Rheumatoid Arthritis

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Abstract

Objectives. Increased levels of anxiety and depression are commonly reported by patients with rheumatoid arthritis (RA) in comparison to the general population. Rather than the clinical features of the disease, this difference has been attributed to psychosocial factors. Patients with RA can develop joint swelling and disfigurement as a direct result of the disease, and experience concerns about their altered appearance. This study aimed to identify if appearance-specific issues contribute to our understanding of mood in RA, over and above demographic, functional and generalized psychosocial measures.

Methods. A total of 89 patients with RA completed a series of psychosocial questionnaires measuring demographics, physical function, general cognitive processes and a number of appearance-specific concepts, to determine the contribution of appearance concerns to mood.

Results. Hierarchical linear regression suggested that living status, optimism, social support and appearance-related social anxiety and avoidance are associated with levels of depression. The relationship between social support and depression was found to be mediated by appearance-related social anxiety and avoidance. Optimism remained the only variable significantly associated with anxiety.

Conclusion. These findings confirm the role of optimistic cognitions and a supportive environment in determining the mood of patients with RA and also establishes a possible link between depression and appearance concerns in this population. Interventions targeting social support, optimism and social anxiety and avoidance in relation to appearance are key in the improvement of depression in this patient group. Copyright © 2012 John Wiley & Sons, Ltd.

Keywords

Rheumatoid arthritis; disfigurement; appearance concerns; anxiety; depression

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Introduction

Rheumatoid arthritis (RA) affects approximately 1.16% of the female, and 0.44% of the male UK population, which is between 350,000 and 400,000 people (Symmons et al., 2002). Treatment aims to reduce the impact of the disease by limiting symptoms, reducing inflammation and disability, and improving quality of life (Pollard et al., 2005). Intensive treatment early in the disease course aims to prevent disfigurement. However, there are a significant number of individuals with irreversible damage. Disfigurement of the hands and feet affects approximately

80–90% of patients with RA (Bal et al., 2006). These changes are not reversible medically but may be amenable to surgical correction.

The psychosocial implications of RA are clear, with self-reported levels of clinical depression far greater than those of the general population (Dickens et al., 2002). A number of studies have been conducted to identify the psychosocial variables which may exacerbate depression and anxiety in inflammatory arthritis, with constructs such as optimism and social support (Fournier et al., 2002; Treharne et al., 2007; Zyrianova et al., 2006) at the forefront of the literature. By identifying factors which impair psychological distress, targeted interventions can be developed to minimize the psychological impact of the disease.

Despite the potentially disfiguring nature of RA, research is limited in its investigation of how appearance concerns may impact upon anxiety and depression in this group. Early research on body image and attractiveness suggests that RA patients are less likely than healthy controls to describe themselves as attractive (Skevington et al., 1987), with concerns about body image focused on body parts and characteristics associated with disability (Cornwell and Schmitt, 1990). Evidence suggests that body image concerns are not only worse in people with RA when compared with individuals without the condition, but are also associated with a poor quality of life (Jorge et al., 2010). Approximately 30% of patients with arthritis report that their disease makes them feel unattractive, and these feelings have been associated with high levels of depression (Monaghan et al., 2007).

In fact, negative feelings about the appearance of hands was significantly associated with a desire for surgery in patients with RA, even when duration of arthritis, age, grip strength and objectively rated hand attractiveness were controlled for (MacSween et al., 2004; Vamos, 1990). Those experiencing higher levels of distress also report embarrassment, self-consciousness and distress specific to their appearance, and use avoiding and concealing behaviours to reduce noticeability (Rumsey et al., 2002).

There is consensus in the disfigurement literature that the severity of a disfiguring condition is not associated with psychological adjustment (Moss, 2005). Previous research has identified a number of key constructs, including cognitions related to social interactions, perceptions of social support and the perceived visibility of the difference to others (Thompson and Kent, 2001). However, the evidence to date has not provided a clear conclusion about which factors exacerbate distress and therefore has not provided the evidence base for the design of interventions to reduce this problem for patients.

More recent research in the area of disfigurement has begun to focus on how appearance concerns impact on social anxiety and the use of socially avoidant coping strategies. The majority of patients with RA report feelings of social isolation and, although this has been found to correlate significantly with physical impairment, no relationship with radiographic damage or disease severity has been found (Bugajska et al., 2010). Feelings of social isolation may be exacerbated further by a patient's concern about their changing appearance. Although patients with RA experience less social anxiety and use fewer social avoidance strategies than the majority of those with other potentially disfiguring conditions (Rumsey et al., 2004), they are more affected than the general population by these issues (Carr et al., 2005).

The goal of the current study was to examine what patients with RA think about their appearance and how they behave as a result, looking specifically at how these concerns impact upon depression and anxiety over and above demographic, functional and general psychosocial factors. In particular, this study set out to examine the potential contribution of appearance-related social anxiety and social avoidance to the link between social support and mood, an established relationship in RA (Evers et al., 1997; Fitzpatrick et al., 1991; Revenson et al., 1991). By utilizing psychosocial variables which are potentially amenable to change, it is hoped that the present study may make improvements to the screening of patients in clinic and the development of psychosocial interventions designed to promote positive adjustment.

Methods

Subjects

Outpatients seeing a clinical nurse specialist at University College Hospital, London, UK were invited to take part. Inclusion criteria were a clinical diagnosis of RA, aged ≥18 years, the ability to read and write in English and no diagnosed psychiatric illness or significant co-morbidity, defined as undergoing primary treatment for another condition. A consecutive sample of patients was recruited between August 2007 and March 2008.

Procedures

Patients meeting the inclusion criteria were invited to take part in the study prior to their appointment, when further explanation and clarification was offered. Once informed consent had been obtained, participants completed the questionnaire booklet either in the clinic or at home.

Study instruments

Demographics

All participants provided data on age, gender, living status and ethnicity.

Primary outcome measure

Depression and anxiety: The Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983) is a 14-item questionnaire measuring depression and anxiety in patients with physical health problems. Total sum scores range from 0–21, with higher scores indicating greater levels of anxiety or depression. A score of 0–7 on either subscale is classified as 'normal', 8–10 is suggestive of the presence of moderate levels of anxiety or depression, and a score of >11 indicates 'caseness', a high likelihood that a person will be diagnosed to be suffering from clinical anxiety or depression. The authors of the scale report Cronbach's alpha as being between 0.78 and 0.93 for anxiety and between 0.82 and 0.90 for depression, and the scale has been validated for use in people with a visible difference in appearance (Martin and Newell, 2004). It possesses high test-retest reliability ($r > 0.80$) after two weeks (Herrmann, 1997). Compared with commonly used depression and anxiety measures, correlations range between 0.60 (good) and 0.80 (very good) and the scales have good discriminant validity when correlated with each other (mean = 0.56; range = 0.49–0.74) (Bjelland et al., 2002).

Functional measures

The cumulative impact of RA was assessed using the Stanford Health Assessment Questionnaire-II (HAQ-II) (Wolfe et al., 2004), a valid and reliable measure of functional disability. The questionnaire asks how arthritis has affected the participant's ability to function in daily life, specifically referring to, for example, their ability to get on and off the toilet or go up two or more flights of stairs. Responses are on a four-point scale ranging from performing the task without any difficulty to being unable to do so. The scores for this ten-item questionnaire range from 0–3, with higher scores representing greater levels of disability. The authors of the scale report satisfactory reliability and good construct validity with measures of function, discriminant validity and predictive validity in terms of mortality rates.

Generalized psychosocial cognitions

Optimism: A shortened four-item version of the Life Orientation Test Revised (LOT-R) (Scheier and Carver, 1987) was utilized. The total scale score ranges from 4–20, with higher scores indicating a more optimistic outlook. The authors have demonstrated adequate internal consistency (alpha = 0.78) and test-retest reliability ($r = 0.68$ at four months, $r = 0.60$ at 12 months, $r = 0.56$ at 24 months, $r = 0.79$ at 28 months) (Scheier et al., 1994).

Social acceptance: Two items assessed the extent to which the respondent felt accepted by their social group and society in general. These were designed by the Appearance Research Collaboration (ARC) and are yet to be tested for validity. The questions reflect acceptance both from society in general and also the person's social group. Total scores range from 2–14, with higher scores indicating higher levels of acceptance.

Social support: A four-item version of the Short Form Social Support Questionnaire (SSQ) (Sarason et al., 1983) was used. Ratings of the quality of social support range from 4–24, with higher scores representing greater satisfaction with their social network. The measure has been shown to possess good test-retest reliability ($r = 0.83$ at four weeks) and good internal reliability (alpha coefficient = 0.97).

Fear of negative evaluation (FNE): The Brief FNE scale (Leary, 1983) examines whether an individual is concerned about the opinions of others. Scores range from 12–60, with higher scores indicating a greater fear of negative evaluation. The authors have demonstrated high levels of internal consistency (alpha = 0.90), good test-retest reliability ($r = 0.75$ at four weeks) and acceptable levels of construct validity.

Appearance-related cognitions

Social anxiety and avoidance: The Derriford Appearance Scale (DAS24) (Moss, 2004) is a 24-item scale measuring the impact of appearance-related distress on social

anxiety and avoidance. It has been widely used in research related to disfigurement. Total scores range from 11–96, with higher scores representing greater levels of distress. The scale also includes a question asking if the participant is concerned about any aspect of their appearance, however small (yes or no); this information was extracted and analysed as an additional variable. The author of the scale has demonstrated adequate internal consistency (alpha = 0.92), test-retest reliability ($r = 0.82$), concurrent validity with the DAS59 ($r = 0.88$) and convergent validity with other relevant psychosocial measures ($r < 0.45$).

Area and cause: Participants were asked to indicate any areas of the body which they were sensitive about and the cause of their concern. The cause responses were then grouped into RA-related, non-RA related and no concern.

Visibility when clothed: Participants rated the visibility of their area of concern when fully clothed, on a seven-point scale from 1 (not at all visible) to 7 (extremely visible). This item was designed by the ARC and is yet to be tested for validity.

Disguisability: Participants rated the difficulty of hiding or disguising any aspects of their appearance about which they were concerned, on a seven-point scale from 1 (extremely easy) to 7 (impossible). This item was designed by the ARC and is yet to be tested for validity.

Social comparison: Social comparison is measured by a brief version of the Iowa–Netherlands Social Comparison measure (INCOMM) (Gibbons and Buunk, 1999). This scale measures the frequency with which someone compares their appearance to that of others, with higher total scores indicating a tendency to compare more often. Potential scores range from 11–55. The scale possesses good internal consistency (alpha = 0.83), concurrent validity ($r = 0.88$) and adequate test-retest reliability at four weeks ($r = 0.71$) and one year ($r = 0.60$).

Physical appearance discrepancy: Measured by the Physical Appearance Discrepancy Questionnaire (PADQ) (Altabe and Thompson, 1996), this scale looks at the discrepancy between a person's perception of how they look and how they or their significant others would ideally like them to look. Total scores range from 8–56, with higher scores indicating a greater discrepancy. The measure has been shown to possess good construct validity with measures such as mood.

Centre for Appearance Research Valance and Salience scales (CARVAL, CARSAL) (Moss et al., 2008, unpublished): The CARVAL is a six-item valance questionnaire which measures how positively someone evaluates their own appearance. The CARSAL is a six-item salience questionnaire measuring how much a person values appearance as an important attribute. Total scores on both scales range from 6–36, with higher total scores indicating a more positive evaluation of appearance and a greater value placed on the importance of appearance. Both measures have demonstrated good internal consistency (alpha = 0.85–0.89) and very good test-retest reliability ($r = 0.089$–0.95 at three months).

Data analysis

Missing data were managed using multiple imputation methods in SPSS version 18. Constraints and rounding were used to ensure that the imputed scale-level data were meaningful and corresponded to possible values. The model used to generate the imputed values corresponded with that used for the analysis. Five scale-level imputation iterations were used to eliminate bias; it has been suggested that between three and ten imputations are sufficient, particularly for datasets with minimal missing data (Rubin, 1987). All analyses were performed on each of these five datasets and then pooled to give a final result. Those participants with more than 30% missing data were removed from the analysis; this cut-off was decided *a priori*.

Hierarchical linear regression was performed to determine the additional contribution of appearance-specific variables over and above other generic psychosocial variables to anxiety and depression. The demographic block was entered first (age, gender, marital status), with marital status entered as a dummy variable (three groups: living alone, living with a partner, living with relatives or friends), followed by functional disability (HAQII), then the general psychosocial measures (optimism, social support, social acceptance and fear of negative evaluation) and the appearance-specific measures in the final block [social comparison, salience, valance, self-discrepancy, visibility when clothed, disguisability, cause of concern about the area of appearance as a dummy variable (three groups: no concern, non-related RA cause, RA-related cause), DAS24]. The variance explained by each of the blocks is reported as R^2. Unstandardized coefficients (beta) are reported to indicate which of the variables had

a greater statistical association with mood, with larger beta values indicating a great association. Positive beta values suggest positive associations, and negative beta values negative associations.

The data were examined to ensure that the assumptions of normality, linearity, homoscedasticity and non-multicolinearity for the regression models were met. There was no evidence of multicolinearity when looking at the variance inflation factor (VIF) and tolerance values for the each of the predictor variables. All *p*-values were based on two-sided tests of statistical significance, set at <0.05.

In order to test for mediation analysis, the bootstrapping procedures described by Preacher and Hayes (2008) were implemented. These are particularly suited for mediation analyses with small samples (Preacher and Hayes, 2004; Shrout and Bolger, 2002) and provide a confidence interval around the indirect effect (i.e. the path through the mediator). If zero falls outside this interval, mediation is said to be present. The SPSS macros for bootstrapping (Preacher and Hayes, 2008), using a resample procedure of 5,000 bootstrap samples (bias corrected, accelerated estimates and 95% confidence interval), were used.

Ethical approval

Ethical approval for the study was granted by the UCL/UCLH Joint Research Ethics Committee.

Results

Study population

Of the 177 questionnaires distributed, 87 (49%) were not returned and one (0.5%) was missing more than 30% of the responses and was therefore excluded from the analysis. Of the 89 respondents, the majority were female (83%), living with a partner (63%) and white (81%). The average age was 58.3 years [standard deviation (SD) 14.8]. Over 80% were concerned about some aspect of their appearance, with approximately 51% concerned about their hands, 25% their knees and 44% their feet (Table 1).

Table 1. Participant characteristics

Characteristics	Study population ($n = 89$)
Demographics	
Women, *n* (%)	74 (83.10)
Age (mean, SD), years	58.26 (14.79)
Marital status, *n* (%)	
Living with a partner	58 (65.17)
Living alone	20 (22.47)
Living with friends or family	11 (12.36)
Primary outcome measure	
Anxiety, mean (SD)	7.58 (3.84)
Depression, mean (SD)	8.48 (3.31)
Function	
Functional disability, mean (SD)	0.58 (0.60)
Generalized psychosocial cognitions	
Optimism, mean (SD)	14.54 (3.05)
Social acceptance, mean (SD)	11.78 (3.03)
Social support, mean (SD)	20.57 (4.56)
Fear of negative evaluation, mean (SD)	33.77 (8.62)
Appearance-specific cognitions	
Social anxiety and avoidance, mean (SD)	33.71 (13.08)
Any aspect that concerns you, *n* (%)	
Yes	72 (80.90)
No	17 (19.10)
Area of body, *n* (%)‡	
Hands	45 (50.56)
Feet	39 (43.82)
Knees	22 (24.72)
Abdomen	16 (18.0)
Upper Arms	14 (15.73)
Thighs	11 (12.40)
Lower legs	10 (11.24)
Hips	10 (11.24)
Neck	9 (10.11)
Cause of the disfigurement, *n* (%)	
No concern	6(6.74)
RA related	60 (67.42)
Non-RA related	23 (25.84)
Visibility when clothed, mean (SD)	4.01 (2.20)
Disguisability, mean (SD)	4.31 (1.80)
Social comparison, mean (SD)	33.79 (7.62)
Self-discrepancy, mean (SD)	26.26 (12.29)
Valance, mean (SD)	18.37 (7.46)
Salience, mean (SD)	29.12 (8.06)

‡Areas of concern with >10% response

SD, standard deviation

Missing data

The amount of missing data for those who completed a questionnaire was minimal, at 1.85%, and was judged to be missing at random. Of the 89 returned questionnaires, 16 had varying degrees of data missing, ranging from 5.9–32%; the one participant with more than 30% missing data was removed from the analysis. The item relating to disguisability had the most responses missing (11.2%).

Overall levels of anxiety and depression

The mean levels of anxiety (7.58; SD 3.85) and depression (8.48; SD 3.31) indicated scores which were on, average, within the normal to moderate range. The majority of participants experienced normal levels of anxiety and

depression (49% and 50%, respectively). However, there was also a large number who reported severe symptoms, with 19% of the sample clinically anxious and 26% clinical depressed. Overall, ten participants (11%) were both clinically depressed and the anxious, seven (8%) were clinically anxious only and 13 (15%) clinically depressed. The majority (66%) were either within the normal or moderate range for both anxiety and depression.

Relationships with mood

Variables were introduced sequentially as blocks into the hierarchical regression and are presented in Tables 2 and 3.

Anxiety

The demographic block was introduced first and accounted for 10% of the variance ($p < 0.05$). An additional 3% ($p < 0.001$) of the variance was explained after adding functional disability. The introduction of the psychosocial variables explained an additional 28% ($p < 0.001$) and when the appearance-specific cognitions were added this increased the explained variance by 4% ($p < 0.001$).

Being male was associated with lower levels of anxiety (beta = −2.85; $p = 0.01$); this inverse relationship remained until the addition of the appearance-specific variables to the model, at which

Table 2. Hierarchical multivariable linear regression model for anxiety [unstandardized coefficients (β), standard error and *p*-value]

	Demographic block, Model 1			Demographic and disability block, Model 2			Demographic, disability and psychosocial block, Model 3			Demographic, disability, psychosocial and appearance block, Model 4		
	β	**Standard error**	***p***	**β**	**Standard error**	***p***	**β**	**Standard error**	***p***	**β**	**Standard error**	***p***
Demographic block												
(Constant)	11.06	1.88	0.00	10.29	1.87	0.00	18.00	3.73	0.00	13.80	4.30	0.00
Age	0.00	0.03	0.95	0.00	0.03	0.91	0.00	0.03	0.87	0.02	0.03	0.48
Gender												
Female (constant)												
Male	**−2.85**	**1.11**	**0.01**	**−2.72**	**1.09**	**0.01**	**−2.08**	**0.94**	**0.03**	−0.85	1.02	0.40
Living status												
Living with a partner (constant)												
Living alone	−1.32	0.99	0.18	−1.59	0.97	0.10	−1.49	0.83	0.07	− 1.61	0.85	0.06
Living with family or friends	2.12	1.26	0.09	1.88	1.24	0.13	1.70	1.05	0.11	1.27	1.08	0.24
Disability block												
Functional disability				**1.41**	**0.64**	**0.03**	0.57	0.56	0.31	−0.11	0.65	0.86
Psychosocial block												
Optimism							**−0.51**	**0.13**	**0.00**	**−0.51**	**0.15**	**0.00**
Social acceptance							0.00	0.13	0.99	0.14	0.15	0.35
Social support							−0.13	0.09	0.14	−0.17	0.09	0.07
Fear of negative evaluation							0.05	0.04	0.26	0.04	0.06	0.52
Appearance block												
Social anxiety and avoidance										0.04	0.05	0.44
Concern about appearance												
No (constant)												
Yes										1.14	1.21	0.34
Cause												
No concern (constant)												
RA-related cause										1.30	1.78	0.47
Non–RA-related cause										1.67	1.77	0.34
Visibility										0.09	0.22	0.67
Disguisability										−0.35	0.31	0.26
Social comparison										−0.04	0.05	0.46
Self-discrepancy										0.08	0.04	0.05
Valence										−0.02	0.07	0.76
Salience										−0.03	0.05	0.55
R^2	0.14 ($p = 0.01$)			0.19 ($p = 0.003$)			0.47 ($p < 0.001$)			0.57 ($p < 0.001$)		
Adjusted R^2	0.10			0.13			0.41			0.45		

Table 3. Hierarchical multivariable linear regression model for depression [unstandardized coefficients (β), standard error and *p*-value]

	Demographic block, Model 1			Demographic and disabilityblock, Model 2			Demographic, disability and psychosocial block, Model 3			Demographic, disability, psychosocial and appearance block, Model 4		
	β	**Standard error**	***p***	**β**	**Standard error**	***p***	**β**	**Standard error**	***p***	**β**	**Standard error**	***p***
Demographic block												
(Constant)	7.74	1.68	0.00	6.61	1.58	0.00	17.53	3.07	0.00	13.30	3.42	0.00
Age	0.03	0.03	0.21	0.03	0.03	0.21	0.03	0.02	0.16	0.04	0.02	0.07
Gender												
Female (constant)												
Male	−1.18	0.99	0.23	−0.99	0.92	0.28	−0.55	0.78	0.48	0.56	0.81	0.49
Living status												
Living with a partner (constant)												
Living alone	−0.86	0.89	0.33	−1.26	0.82	0.13	−1.33	0.69	0.05	−1.16	0.69	0.09
Living with family or friends	**2.50**	**1.13**	**0.03**	**2.15**	**1.05**	**0.04**	**1.80**	**0.87**	**0.04**	**1.79**	**0.86**	**0.04**
Disability block												
Functional disability				**2.08**	**0.54**	**0.00**	**1.29**	**0.47**	**0.01**	0.33	0.53	0.53
Psychosocial block												
Optimism							**−0.35**	**0.11**	**0.00**	**−0.32**	**0.12**	**0.01**
Social acceptance							−0.11	0.11	0.30	−0.01	0.12	0.91
Social support							**−0.19**	**0.07**	**0.01**	**−0.21**	**0.08**	**0.00**
Fear of negative evaluation							−0.01	0.04	0.74	−0.06	0.04	0.15
Appearance block												
Social anxiety and avoidance										**0.09**	**0.04**	**0.02**
Concern about appearance												
No (constant)												
Yes										−0.51	0.97	0.60
Cause												
No concern (constant)												
RA-related cause										1.89	1.43	0.19
Non–RA-related cause										1.66	1.41	0.24
Visibility										0.08	0.18	0.64
Disguisability										−0.10	0.24	0.69
Social comparison										−0.06	0.04	0.18
Self-discrepancy										0.03	0.03	0.29
Valence										0.01	0.05	0.86
Salience										0.00	0.04	0.92
R^2	0.08 ($p = 0.15$)			0.22 ($p = 0.001$)			0.51($p < 0.001$)			0.63 ($p < 0.001$)		
Adjusted R^2	0.03			0.17			0.45			0.52		

point the gender–anxiety association became non-significant. Similarly, when functional disability (beta = 1.41; $p = 0.03$) was added to the model it was significantly associated with anxiety, with greater disability associated with more anxiety. However, after inclusion of the psychosocial and then appearance-specific variables, it became non-significant. Optimism (beta = −0.51; $p < 0.001$) was inversely associated with anxiety and remained so after inclusion of the appearance-specific measures. The addition of the appearance-specific measures added very little to the overall model and none of these variables were associated significantly with anxiety.

Depression

The demographic block was introduced first and accounted for 3% of the variance, although this was not significant ($p = 0.15$). An additional 14% ($p = 0.001$) of the variance was explained after adding functional disability. The introduction of the psychosocial variables explained an additional 28% ($p < 0.001$) and when the appearance-specific cognitions were added, this increased the explained variance by 7% ($p < 0.001$).

After inclusion of all blocks, when comparing those who lived with a partner with those living with relatives or friends, the latter experienced higher levels of depression. (beta = 2.50; $p = 0.03$). Similarly to anxiety, when functional disability (beta = 2.08; $p < 0.001$) was added to the model it was significantly associated with depression, with greater disability associated with a more depressed mood. However, after inclusion of the appearance-specific variables it became non-significant. In addition, optimism (beta = −0.35; $p < 0.001$) was inversely associated with depression, as was social support (beta = −0.19; $p = 0.01$), and these variables remained significant after inclusion of the appearance-specific measures. The addition of the final block again added little to the overall variance, although this step was significant. The DAS28, a measure of social anxiety and social avoidance in relation to appearance, did contribute significantly to the overall model for depression and was positively associated (beta = 0.09; $p = 0.02$). The remaining variables failed to correlate significantly with depression.

Social support, social anxiety & avoidance and mood: Mediation analysis

We specifically set out to examine the relationship between social support and mood, and the mediating role of appearance-related social anxiety and avoidance. We hypothesized that social anxiety and avoidance in relation to appearance would mediate the relationship between satisfaction with social support and mood (see Figure 1 for a diagrammatic representation). However, as the DAS24 was not significantly associated with anxiety in the regression analysis, the mediating relationship between social support and anxiety through the DAS24 was not explored. Table 4 summarizes the results for the mediation analyses relating to depression. As the confidence interval does not contain zero, it can be concluded that there is a significant mediating effect of social support on depression through social anxiety and avoidance. An adjusted R^2 of 0.43 was observed for this significant indirect effect, indicating that approximately 43% of the total effect of social support on depression is explained by appearance-related social anxiety and social avoidance.

Discussion

Previous research has highlighted the distress of patients with RA about their appearance. The present study found that most participants reported concerns about some aspect of their body and this proportion was significantly higher than that of the general population (Carr et al., 2000). The hands, feet and knees were the most frequently reported areas of sensitivity, reflecting the potentially disfiguring nature of RA.

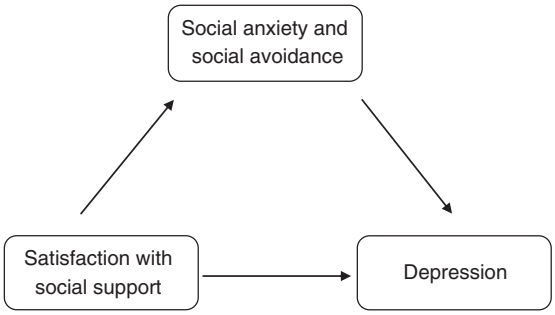

Figure 1. Potential mediation model for social support and depression

Although the majority of participants had adjusted well, others had levels of anxiety and, in particular, depression that were significantly higher than those of a non-clinical sample. This was reflected in the number of participants meeting the criteria for clinical anxiety and depression (Crawford et al., 2001) and mean levels of depression twice those of the general population (Crawford et al., 2001; Dickens et al., 2002). Being at increased risk for depression is particularly concerning in RA, given that depression has been found to increase the risk of mortality (Ang et al., 2005).

The analysis of factors associated with levels of anxiety demonstrated a link with optimism but no relationship with any appearance-specific cognitions, which reflects the results of previous research (Monaghan et al., 2007). It may be surprising that appearance-related social anxiety and avoidance failed to add any significant variance to generalized anxiety whilst contributing to depression. Worry regarding social situations has been associated in the literature with depression, more strongly than generalized anxiety, with levels similar to those of people with social phobia (Wells and Carter, 2001). It may therefore be that depression in part reflects how a person sees him- or herself in the social world, but this relationship requires further exploration. Other factors significantly associated with levels of depressed mood were social support and optimism.

The present study highlighted the importance of optimism in mood and was consistent with other studies in RA which have suggested that those who

Table 4. Mediation model

	Coefficients	Standard error	Normal theory *p*	Bootstrap 95% CI
Total effect	−0.380	0.066	<0.001	–
Direct effect	−0.273	0.063	<0.001	–
Indirect effect (via DAS24)	−0.108	0.04	<0.001	(−0.192; –0.024)
Model R^2 (*p*)	0.44 (<0.001)			
Adjusted R^2	0.43			

CI, confidence interval; DAS24, the Derriford Appearance Scale.

are more optimistic report less anxiety and depression (Treharne et al., 2005). While there are many findings indicating that optimism is adaptive in the face of adversity, research on optimism in the context of appearance has been lacking. This is particularly relevant in the context of interventions, as there is some evidence to suggest that optimism can be taught (Segerstrom, 2006).

The association between depression and appearance-related social anxiety and avoidance builds on previous work (Monaghan et al., 2007) but by using a valid and reliable measure of appearance concern and its impact on social behaviour, the findings of this study are more robust. Greater satisfaction with social support in our sample was associated with lower levels of depression. Positive support from others is widely acknowledged as a buffer to the consequences of stress and has been highlighted as an important factor in the explanation of mood (Fitzpatrick et al., 1991; Revenson et al., 1991). In fact, greater satisfaction with emotional support and social companionship are related to less distress in patients with RA (Strating et al., 2006). In a recent review of supportive interventions in RA, cognitive-behavioural interventions which included family or friends yielded better outcomes in both disease status and mood. The supportive role of a friend or family member as part of cognitive-behavioural strategies may provide more encouragement than someone who is less informed (Lanza and Revenson, 1993).

It has been suggested that factors such as social stress and isolation may be required for depression to develop in RA, with depressed patients more likely to experience social difficulties, both related to and independent of their arthritis (Dickens et al., 2003). Becoming anxious about interacting in social situations and hence avoiding them may therefore be a consequence of how a person with RA feels about their appearance. The significant relationship between social support and appearance-related social anxiety and avoidance suggests that having people around you who are supportive and positive may decrease social anxiety and encourage interaction with others. In fact, the present study indicates that the relationship between satisfaction with social support and depression is mediated by social avoidance and anxiety. This suggests either that there is a possible direct or indirect effect of social support on depression, or that other factors, in addition to social anxiety and avoidance, mediate this relationship. These interactions require larger, longitudinal designs to tease out the causal relationships between variables, including other possible explanations.

It is important, however, that, as with optimism, these factors are potentially modifiable. The way in which people think about their social interactions and interpret social situations has been the focus of social skills training. Such interventions aim to teach people how to communicate effectively and deal with the reactions of others, and have been found to be beneficial for psychosocial well-being (Robinson et al., 1996). Moss (1997) has suggested that the social context of this type of intervention and the opportunity it presents to meet similarly affected individuals are as beneficial as the strategies being taught, highlighting, again, the possible benefits of support from others.

The present study had several limitations. As only 50% of eligible patients completed questionnaires, it is possible that those for whom appearance was a greater concern or those who were more depressed or anxious chose not to participate. Data from clinical records were not collected and therefore we were unable to compare responders with non-responders. As a result of this, the generalization of these findings to the RA population is limited by the small sample size. As the study was cross-sectional, it is not possible to draw conclusions about the direction of causality. Further comprehensive longitudinal studies, with adequate power and therefore greater sample sizes, are required to understand these relationships further. Multiple regression requires a large sample size, with

the number of participants substantially exceeding the number of predictor variables included in the regression. The absolute minimum is five times as many participants as predictor variables, which was achieved in the present study, but a more acceptable ratio would have been ten participants to every independent variable (Brace et al., 2003). The lack of an objective measure of disfigurement may be seen as a limitation of this study; however, as highlighted previously, research has so far failed to find a link between objective measures of disfigurement and psychological adjustment.

Conclusion

In common with the literature in this area, the present study demonstrated the important role of optimism and social support in relation to anxiety and depression in patients with RA. To add further to the evidence, the present findings suggest that the relationship between social support and depression may be mediated by appearance-related social anxiety and the use of socially avoidant coping strategies. This emphasizes the importance of a positive supportive environment and engagement in quality social interactions to aid in the psychological adjustment of people with RA. Poor social support may lead to the avoidance of social situations and social anxiety, and thereby to increasing levels of depression. However, these increased feelings of depression may also result in a desire for social isolation, high levels of social anxiety and, hence, fewer sources of social support. This bidirectional relationship needs further exploration. The variables that appear to be driving mood in RA patients are, however, potentially amenable to change and the present findings emphasize the importance of developing psychosocial interventions aimed at improving mood in patients with RA.

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