

Correlates of Health Related Quality of Life in Anorexia Nervosa

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ABSTRACT

Objective: We examined the association between disorder specific factors, comorbidity and health related quality of life (HRQoL) in anorexia nervosa (AN).

Method: HRQoL was assessed using the EuroQol-5D visual analog scale (EQ-VAS) in this cross-sectional study. Three regression models were estimated to determine the association between AN subtype (restrictive vs. binge/purge), duration of the eating disorder (ED), age (adolescents vs. adults), ED pathology (EDE-Q), Body Mass Index (BMI), depressive symptoms (PHQ-9), somatic complaints (PHQ-15), anxiety (GAD-7) and EQ-VAS.

Results: The sample comprised 218 female AN patients (mean age = 23.3

years [SD = 8.2]; mean EQ-VAS score = 53.4 [SD = 21.4]). A lower BMI, higher levels of depressive symptoms, and somatic complaints were significantly associated with lower EQ-VAS scores.

Discussion: Findings of the present study suggest that BMI and comorbidity might be more relevant to HRQoL impairments in AN than age, diagnostic subtype, duration of the ED or current psychopathology. © 2016 Wiley Periodicals, Inc.

Keywords: anorexia nervosa; eating disorders; health related quality of life; duration of the eating disorder; EQ-VAS; depression; comorbidity

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Introduction

Health related quality of life (HRQoL) is an important patient related outcome in clinical trials and health care research.^{1,2} Its consideration in anorexia nervosa (AN) is of particular importance in light of the severe somatic consequences of AN.³ Still, major epidemiological studies did not determine HRQoL impairments in AN due to the low prevalence of the disorder.^{4,5}

There is evidence that individuals with AN, particularly those of the binge/purge subtype, suffer from greater HRQoL impairments than healthy individuals.⁶ AN patients of the restrictive subtype, however, may not report any QoL impairments in at least some domains.⁷ Greater HRQoL impairments have been observed in adult than in adoles-

cent eating disorder (ED) patients.⁸ Further, comorbidity predicted greater HRQoL impairments in AN⁹ and other EDs.⁶ However, results were conflicting with regard to Body Mass Index (BMI)^{10,11} and eating pathology.^{10–12}

The aim of this cross-sectional study was to examine the association between disorder related factors (AN subtype, duration of the ED, ED psychopathology, BMI), comorbidity (depressive symptoms, somatic complaints, anxiety) and HRQoL in patients being treated for AN. We hypothesized that the binge/purge subtype of AN, a longer duration of the ED, higher levels of ED psychopathology, a lower BMI as well as higher levels of depressive symptoms, somatic complaints, and anxiety would be associated with greater HRQoL impairments. Additionally, we hypothesized that adult patients would report greater HRQoL impairments than adolescents patients.

Method

Participants and Procedure

Participants were recruited within a larger observational study.¹³ The cross-sectional assessment occurred in two waves (01/2012 to 02/2013; 11/2013 to 05/2014) in all in- and outpatient institutions in the Hamburg

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metropolitan area which offer evidence-based treatment for AN. Data collection was identical in both waves. In each case, it included a questionnaire set and a subsequent semi-structured telephone interview which was administered within four weeks after completion of the self-report measures. Inclusion criteria were female gender, a minimum age of 10 years, a diagnosis of AN or atypical AN and the provision of written informed consent. Participants < 16 years needed an additional written informed consent from a parent or legal guardian. Exclusion criteria were insufficient German language skills, severe organic or psychiatric comorbidity and acute suicidal tendencies. The study procedure was reviewed and approved by the ethics committee of the Psychotherapist Chamber of Hamburg.

Measures

Health Related Quality of Life. HRQoL was operationalized with the visual analogue scale (EQ-VAS) of the EQ-5D-3 L.¹⁴ The EQ-VAS ranges from 0 to 100 (worst to best imaginable health state). The mean EQ-VAS score in a same aged female German general population sample was 84.5 (SD = 14.1).¹⁵ The applicability of EQ-VAS in AN and in adolescent samples has been proven.^{11,16} In addition to the EQ-VAS, the EQ-5D-3 L comprises five items which assess current problems in the domains of mobility, self-care, usual activities, pain/discomfort and anxiety/depression.

Eating Disorder Subtype. The ED section of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I) was applied by telephone to determine whether participants' eating pathology corresponded to the restrictive or binge/purge subtype of AN.¹⁷

Duration of the Eating Disorder. The relevant SCID items were used to determine the onset of each AN symptom. The point at which all criteria were met first was operationalized as the age of onset. Participants' duration of the ED was calculated in years by subtracting age of onset from current age.

Current Eating Disorder Psychopathology. Current ED psychopathology was assessed with the German versions of the Eating Disorder Examination Questionnaire (EDE-Q¹⁸; Ch-EDE-Q¹⁹).

Body Mass Index (BMI). BMI was calculated from self-reported body height and weight which was considered to be acceptably adequate since AN treatment mandatorily comprises weekly weight measures in the in- and outpatient sector.

Comorbidity. Symptoms of depression and anxiety as well as somatic complaints were assessed through the respective modules of the Patient Health Questionnaire

(Depression: PHQ-9, Anxiety: GAD-7; somatic complaints: PHQ-15²⁰).

Statistical Analysis

First, mean EQ-VAS scores and predictor variables were compared by age (adolescent vs. adult) and diagnostic group (restrictive vs. binge/purge) using *t* test. Then, the association between predictor variables and HRQoL (EQ-VAS) was investigated within three ordinary least squares regression models with bootstrapped standard errors (1,000 replications). Model I considered stable disorder specific factors which are unlikely to be influenced through any treatment. These were, AN subtype (restrictive vs. binge/purge), duration of the ED and age (adolescents = age ≤ 17.9 years vs. adults = age ≥ 18.0 years). In Model II, ED psychopathology and BMI were additionally considered as more variable predictors with a higher likelihood to be influenced through treatment. Finally, in Model III depressive symptoms, somatic complaints and anxiety were added as predictors which reflect comorbidity. For each model *R*² was used to determine the amount of explained variance in EQ-VAS ratings.

Analyses were performed on participants with complete data as no variable showed missing values > 5%. A *P* values < 0.05 was considered as statistically significant. Statistical analysis was performed using STATA version 14 and SPSS version 22.

Results

In total, 218 participants applied to participate and completed the questionnaire-set and the telephone interview (participation rate 74%, age range = 11–55 years).

Adolescents and adults as well as the AN subtypes did not significantly differ with regard to levels of HRQoL impairments (**Table 1**, see **Table 2** for bivariate correlations between outcome and predictor variables.).

In Model I, a longer duration of the ED but neither AN subtype nor age group were significantly associated with HRQoL impairments (**Table 3**). In Model II, additionally higher ED psychopathology and a lower current BMI were significantly associated with greater HRQoL impairments. The inclusion of comorbid psychopathology in Model III revealed different results. The associations between ED duration and ED psychopathology with HRQoL were no longer significant. However, a lower BMI, higher levels of depression and higher levels of somatic complaints now were associated significantly with higher HRQoL scores. This last regression model explained 24% of the variance in

TABLE 1. Comparison of health related quality of life, continuous predictor variables as well as sociodemographic characteristics in a female sample of 218 patients being treated for anorexia nervosa separated by age group and anorexia nervosa subtype

	Total sample N = 218	Adolescents n = 48	Adults n = 170	Adolescents vs. Adults	ES	Restrictive n = 174	Binge-purge n = 44	Restrictive vs. Binge-purge	ES
EQ-VAS Mean (SD)	53.4 (21.4)	53.2 (21.5)	53.4 (21.5)	0.947		53.6 (21.5)	52.9 (21.1)	0.842	
EDE-Q Mean (SD)	3.4 (1.4)	3.4 (1.4)	3.4 (1.4)	0.846		3.3 (1.4)	3.9 (1.1)	0.004	0.45
PHQ-9 Mean (SD)	14.1 (6.2)	13.1 (5.6)	14.4 (6.3)	0.215		13.6 (6.2)	16.1 (5.8)	0.015	0.41
PHQ-15 Mean (SD)	7.9 (4.2)	7.4 (4.0)	8.0 (4.2)	0.346		7.5 (4.0)	9.3 (4.6)	0.013	0.44
GAD-7 Mean (SD)	11.0 (5.3)	9.8 (4.8)	11.4 (5.3)	0.064		10.5 (5.3)	13.0 (4.7)	0.004	0.48
Current age Mean (SD)	23.3 (8.2)	15.6 (1.4)	25.5 (7.9)	<0.001	1.41	22.99 (8.1)	25.2 (8.1)	0.093	
Age of onset Mean (SD)	17.3 (5.2)	13.4 (2.8)	18.4 (5.2)	<0.001	1.05	17.5 (5.2)	16.7 (5.1)	0.356	
Duration of the eating disorder in years Mean (SD)	6.1 (7.4)	2.2 (2.6)	7.2 (7.9)	<0.001	0.71	5.5 (7.0)	8.7 (8.3)	0.025	0.44
Current BMI Mean (SD)	17.0 (1.7)	17.1 (1.6)	17.0 (1.8)	0.724		16.9 (1.8)	17.3 (1.6)	0.233	
Current treatment setting (%) inpatient	163 (74.8)	39 (81.3)	124 (72.9)	0.051		133 (76.9)	29 (65.9)	0.357	

Note: Adolescents, age ≤ 17.9 years; Adults, age ≥ 18 years. AN, Anorexia nervosa; BMI, Body Mass Index; EDE-Q, Eating Disorder Examination-Questionnaire; EQ-VAS, EQ visual analogue scale; PHQ-9, depression module of the Patient Health Questionnaire; PHQ-15, somatic burden module of the Patient Health Questionnaire; GAD-7, Generalized Anxiety Disorder Screener-7.

TABLE 2. Bivariate correlations between health related quality of life as measured with EQ-VAS and continuous predictor variables in a female sample of 218 patients being treated for anorexia nervosa

	1.	2.	3.	4.	5.	6.	7.
1. EQ-VAS	1						
2. Duration of the eating disorder	-0.12	1					
3. EDE-Q	-0.27**	0.04	1				
4. Current BMI	-0.19**	0.03	-0.02	1			
5. PHQ-9	-0.43**	0.08	0.63**	-0.14*	1		
6. PHQ-15	-0.30**	0.12	0.43**	0.11	0.52**	1	
7. GAD-7	-0.31**	0.16*	0.51**	-0.16*	0.74**	0.48**	1

Notes: EQ-VAS, Visual analog scale of the EQ-5D-3 L; AN, Anorexia nervosa; BMI, Body Mass Index; EDE-Q, Eating Disorder Examination-Questionnaire; EQ-VAS, EQ visual analogue scale; PHQ-9, depression module of the Patient Health Questionnaire; PHQ-15, somatic burden module of the Patient Health Questionnaire; GAD-7, Generalized Anxiety Disorder Screener-7.

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

EQ-VAS scores. These results remained unchanged when exclusively the adult subgroup was analyzed ($n = 170$, $R^2 = 24\%$).

Discussion

The aim of the present cross sectional study was to examine the associations between disorder related characteristics (AN subtype, duration of the ED, ED psychopathology, BMI), age, comorbidity, and HRQoL impairments in 218 female patients undergoing treatment for AN.

In line with our hypothesis and prior evidence a lower BMI, higher levels of depression and higher levels of somatic complaints were associated with higher HRQoL impairments.^{9–11} However, neither the duration of the ED nor ED psychopathology were associated with higher HRQoL impairments.

The assessment of HRQoL impairments through the EQ-VAS results in low response burden, is easy to

answer for adolescent participants and allows the comparison of HRQoL impairments in AN with other mental, and somatic disorders. In contrast to previous studies, we observed comparable HRQoL impairments in both AN subtypes as well as between adolescent and adult participants.^{6,8} However, the EQ-VAS scores in the present sample were substantially lower compared to the population mean,¹⁵ lower than in a patient sample suffering from schizophrenia, affective disorders or alcohol addiction,²¹ and lower than in a patient sample with multiple sclerosis.²² The EQ-VAS seems to be an appropriate tool to picture impairments in AN which might be less prone to the egosyntonic nature of the disorder.

It is a limitation of the present study that we could neither disentangle the temporal relationship between our study variables nor test mediational or causal hypotheses due to the cross-sectional design. The generalizability of our results is also limited to AN patient populations rather than to individuals with AN who do not access treatment

TABLE 3. Predictors of health related quality of life as measured with EQ-VAS within three OLS regression models in a sample of 218 female patients being treated for anorexia nervosa

	Model I Coef. (SE)	Model II Coef. (SE)	Model III Coef. (SE)
Anorexia subtype (ref. restrictive)	0.39 (3.49)	1.00 (3.33)	2.46 (3.24)
Duration of the eating disorder	−1.12 (0.56)*	−1.06 (0.52)*	−0.88 (0.49)
Age (ref. adolescents)	2.39 (3.71)	2.73 (3.49)	3.22 (3.32)
Eating disorder pathology (EDE-Q)		−4.01 (0.91)***	−0.05 (1.25)
Current Body Mass Index (BMI)		2.22 (0.88)*	2.05 (0.84)*
Symptoms of depression (PHQ-9)			−1.27 (0.37)**
Somatic complaints (PHQ-15)			−0.89 (0.43)*
Symptoms of anxiety (GAD-7)			0.37 (0.38)
Constant	53.52 (6.37)***	28.09 (16.04)	36.67 (15.34)*
N	211	210	209
R-square	0.026	0.139	0.238

Notes: EQ-VAS, Visual analog scale of the EQ-5D-3 L; AN, Anorexia nervosa; EDE-Q, Eating Disorder Examination-Questionnaire; EQ-VAS, EQ visual analogue scale; PHQ-9, depression module of the Patient Health Questionnaire; PHQ-15, somatic burden module of the Patient Health Questionnaire; GAD-7, Generalized Anxiety Disorder Screener-7.

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

for their ED. Research has shown that psychiatric patient populations tend to have more comorbid psychiatric disorders and to report higher levels of health problems.⁵ An additional aspect which could decrease the generalizability of the present findings is that our sample significantly varied in terms of age and mean duration of the ED relative to samples recruited in other studies (e.g., Ref. 11). Last, the assessment of BMI through self-reported body height and weight might be prone to overestimation which could decrease the reliability of this variable. However, we considered self-report of body height and weight to be acceptably adequate since AN treatment mandatorily comprises weekly weight measures in the in- and outpatient sector.

These limitations notwithstanding, our study was, to the best of our knowledge, the first which considered not only disorder specific but also comorbidity related aspects which are likely to be associated with HRQoL impairments in AN. The considered predictors explained one quarter of the variance in EQ-VAS scores. The large sample size and the use of standardized measures are further strengths of the present study.

Findings of the present study suggest that BMI and comorbidity might be more relevant to HRQoL impairments in AN than age, diagnostic subtype, duration of the ED or current ED psychopathology. Clinicians could benefit from an extension of the focus on weight gain and ED psychopathology in ED treatment by additionally addressing HRQoL impairments and their correlates to increase the readiness to recover in affected individuals.

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