Quality of Life and Functional Impairment in Individuals with Trichotillomania

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ABSTRACT

Background: Few studies have addressed quality of life (QOL) and functional impairment in trichotillomania (TTM). This study empirically documented QOL and its predictors in both non-clinical and clinical TTM samples using generic measures of QOL.

Methods: Two TTM samples (conference attendees and treatment outcome study participants) completed standardized QOL measures, the Medical Outcomes Study 36–Item Short Form Health Survey (SF-36) or the Quality of Life, Enjoyment, and Satisfaction Questionnaire (Q-LES-Q). Hair pulling severity was assessed with the Massachusetts General Hospital Hairpulling Scale (MGHHPS) and the

Psychiatric Institute Trichotillomania Scale (PITS). Depression and anxiety symptoms were assessed with the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI). Z-scores compared QOL data for our TTM cohorts with published data for normal control (NC) groups. Regression analyses identified predictors of QOL using illness duration and depression, anxiety, and hair pulling scale scores.

Results: Generic QOL measures failed to reveal significant differences between the TTM and NC groups. BDI scores were the strongest predictor of QOL when using the MGHHPS to assess TTM severity. The PITS was a stronger predictor of QOL than the BDI or BAI though the latter scales independently predicted several QOL subscale scores.

Conclusions: Hair pulling severity, depression, and anxiety independently contribute to QOL in TTM sufferers.

The lack of documented QOL differences between TTM and NC samples strongly suggests a need for TTM-specific QOL measures.

INTRODUCTION

Trichotillomania (TTM) is a chronic psychiatric disorder characterized by repetitive hair pulling and alopecia not attributable to a physical etiology (eg, dermatologic problems). Converging evidence coupled with clinical wisdom suggest impairment in the overall quality of life (QOL) and level of functioning for those suffering from TTM. To date, however, empirical investigation has been limited, with no reports in the literature utilizing standardized psychometric instruments to evaluate QOL and functional impairments in those with TTM. Accurate documentation of the hidden costs of TTM is imperative in order for clinicians to fully understand its impact and to provide comprehensive treatment.

Increasingly, TTM is viewed as a distressing and impairing illness. Significant mood and interpersonal problems accompanying the illness were catalogued in a retrospective chart review of 67 adult TTM patients.[1] In one study, nearly half of a sample of 44 patients engaged in hair extraction activities consuming more than 1 hour per day,[2] while another study described several patients who pulled from 2 to 8 hours daily.[3] Seedat and Stein[4] assessed functional impairment due to TTM symptoms during the prior 6-month period in a sample of 27 hair pullers. Of 16 student respondents, 2 missed 1 to 9 days of school, 1 was absent more than 30 days from school, and 5 discontinued their academic studies. Of 18 employed respondents, 4 missed 1 to 9 days of work, 1 missed 10 to 30 days of work, and 4 reported an inability to continue employment at some point in the past.

High rates of psychiatric comorbidity have been reported,[5] as well as significant associated physical sequelae including alopecia, scarring, infections, inflammation, pruritis, and even neuromuscular problems such as carpal tunnel syndrome.[6] Self-esteem in TTM sufferers has been reported to inversely correlate with hair pulling frequency.[7]

Recently, wider attention has been given to the contribution of QOL assessment in capturing the burden of illness conferred by a specific disease. QOL instruments have been increasingly used in both clinical and research settings to complement narrowly-defined symptom severity measures. No universal definition exists for the multidimensional construct of QOL; at a minimum, it evaluates the individual's subjective perception of his or her life quality in the domains of physical, social, and mental health well-being.

Investigating functional status in multiple arenas provides a broader-based clinical assessment and can identify foci for clinical intervention above and beyond the lessening of target symptom severity. In the case of TTM, interpersonal avoidance or conflict resulting from hair pulling symptoms, or restrictions in career choice intended to limit public visibility, may be highlighted as treatment goals. In many cases, the associated functional impairment and diminished sense of well-being accompanying specific disorders can precipitate clinical care as often as the hallmark symptoms of the illness.

Reports in the literature document the assessment of QOL in obsessive-compulsive disorder[8] and related obsessive-compulsive spectrum disorders including body dysmorphic disorder[9] and Gilles de la Tourette's Syndrome.[10] In each study, QOL was significantly worse in the patient cohort than in the matched general population sample. In some cases, greater QOL impairment was also noted in the patient cohort

than in comparison with medical and psychiatric samples. Lastly, greater illness severity was often associated with lowered QOL scores.

Our research was designed to assess QOL in TTM sufferers and benchmark these results against those for control samples. We also sought to identify variables that would predict QOL for this population. In Study 1, we evaluated QOL and functional impairment in sufferers attending a national TTM conference using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36)[11] and dichotomous self-report questions assessing TTM-related social, occupational, and leisure functioning limitations. For the SF-36, we anticipated that TTM sufferers would endorse greater functional impairment when compared to an age- and gender-matched normal control (NC) sample on the mental health subscales of the SF-36: role limitations attributable to emotional problems, social functioning, vitality, and mental health. For self-report questions assessing TTM-related functional limitations, we hypothesized that a high percentage of conference participants would endorse limitations in social, occupational, and leisure domains of functioning.

In Study 2, we assessed QOL with the Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q)[12] in a cohort of TTM sufferers enrolled in a clinic-based, treatment outcome study. Given earlier anecdotal reports and our clinical experiences with these patients, we anticipated limitations for this cohort on the Q-LES-Q subscales of feelings, leisure activities, social relationships, and school. Lastly, in both studies we conducted regression analyses with the variables of illness duration and severity of depression, anxiety, and TTM symptoms to identify which variables predict QOL (SF-36, Q-LES-Q scores) for TTM sufferers.

STUDY 1
Method
Participants
Fifty-eight volunteer participants at a national TTM conference sponsored by the Trichotillomania Learning Center were enrolled in the study. The research protocol was approved prior to study initiation by the institutional review board at Massachusetts General Hospital. All participants signed informed consent. To ensure confidentiality and reduce study demand characteristics, participants completed number-coded demographic information sheets upon completion of informed consent. Study packets with matching number codes were distributed upon collection of the demographic sheets. Demographic sheets and study packets were stored separately.

Participants were predominantly women (52 females, 3 males), reflecting commonly-cited gender ratios for this disorder. Gender was unreported for 3 participants. Mean age was 38.1 years (*SD*=11.0), with mean onset of illness at 11.4 years of age (*SD*=3.8). Twenty-six (44.8%) participants were married, 24 (41.4%) were single, and 5 (8.6%) were divorced. Marital status was unknown for 3 (5.2%) participants. Thirty-one (53.4%) participants were college-educated, 13 (22.4%) had a graduate school education, and 9 (15.9%) were high school graduates. Educational background was unknown for 5 (8.6%) individuals. Reported treatment involvement was as follows: any history of medication treatment (n=45, 77.6%), any history of behavioral treatment (n=37, 63.8%), and any history of combined medication and behavioral treatment (n=16, 27.6%). Thirty-eight (70.3%) participants reported trying non-behavioral psychotherapy or other treatment involvement (eg, hypnosis, acupuncture, support group, etc.). Four (6.9%) did not receive any treatment,

and four (6.9%) did not respond to questions about treatment history.

Fifty-five (94.8%) participants reported active hair pulling symptoms. Current symptom abstinence for 3 participants reflects the characteristic waxing and waning course of the disorder. Fifty-one (87.9%) individuals endorsed Criterion B of the DSM-IV diagnostic criteria (tension prior to pulling or when attempting to resist) and 53 (91.4%) endorsed Criterion C (pleasure, relief, or gratification upon pulling). The failure of several subjects to satisfy full diagnostic criteria is not unexpected given report that 17 to 23% of clinical TTM patients fail to fulfill Criteria B and/or C of the DSM-III-R criteria.[5] Other researchers have also reported clinically significant hair pulling symptoms in individuals failing to endorse Criterion B.[13]

The mean Massachusetts General Hospital Hairpulling Scale (MGHH-PS)[14] total score was 13.9 (*SD*=5.8; range=1-26), indicating mild to moderate symptoms. The mean Beck Depression Inventory (BDI)[15] score was 12.1 (*SD*=9.4; range=0-38), reflecting overall mild, non-clinical mood disturbance. Mean Beck Anxiety Inventory (BAI)[16] score was 9.11 (*SD*=7.2; range=0-36), reflecting overall minimal to mild anxiety symptoms.

Measures

Self-Report Questionnaire. All participants completed a brief self-report questionnaire assessing demographics, hair pulling history, DSM-IV criteria, and prior treatment. Dichotomous (yes/no) questions assessed whether TTM resulted in functional impairments (eg, "Does your hair pulling cause you significant distress or impairment in your social functioning?"). Additional dichotomous questions assessed specific limitations in each arena (eg, "Does your hair pulling affect relationships with family?", "Does your hair pulling cause avoidance of cer-tain jobs?").

Psychometric Scales. Participants also completed several paper-and-pencil self-report instruments designed to assess hair pulling severity, depression, anxiety, and QOL. The 7-item MGHHPS was used to measure the severity of hair pulling urges and behavior, efforts to resist urges, control over the problem, and associated distress. Scale items are rated from 0 to 4 with higher scores reflecting greater severity. The MGH-HPS has good reported internal consistency (coefficient alpha = 0.89)[14] and test-retest reliability (correlation coefficient = 0.97).[17] The BDI and the BAI were used to assess the presence and severity of depressive and anxiety symptoms, respectively.

The SF-36, our QOL instrument for Study 1, is a widely used and extensively researched 36-item self-report survey. It consists of 8 individual scales that measure QOL as influenced by one's mental and physical health. The role limitations due to emotional problems and mental health scales correlate most highly with the mental health component of QOL. The 3 scales of bodily pain, physical functioning, and role limitations due to physical problems correlate most highly with the physical health component of QOL. The general health, vitality, and social functioning scales affect both the mental and physical health components. Standardized scale scores range from 0 to 100, with higher scores indicative of better QOL. Internal consistency and test-retest reliability of the SF-36 has been repeatedly demonstrated for both the 8 individual scales[18] and the physical and mental health summary scores.[11]

Data Analysis

To summarize self-report of functional impairments associated with TTM, sample frequencies and percentages were reported for positive item endorsement.

Table 1. SF-36 Scores for the TTM Cohort and US Population Sample*

SF-36 Scale	Trichotillomania Sample Mean (*SD*)	Comparison Sample† Mean (*SD*)	Difference in *SD* Units‡
General Health	64.8 (23.2)	70.4 (20.1)	-0.28
Physical Functioning	86.7 (19.6)	86.3 (20.4)	0.02
Physical Role Limitation	80.6 (32.5)	82.7 (30.9)	-0.07
Bodily Pain	74.1 (22.5)	70.1 (22.6)	0.18
Mental Health	56.9 (22.8)	71.2 (18.4)	-0.78
Social Functioning	74.8 (26.8)	82.0 (23.3)	-0.31
Emotional Role Limitation	52.5 (44.7)	82.8 (30.4)	-1.00
Vitality	44.0 (25.5)	53.5 (20.9)	-0.45

*SF-36 indicates Medical Outcomes Study 36-Item Short-Form Health Survey. SF-36 scores range from 0-100 with 0 indicating poor health and 100 indicating optimal health.

†Comparison sample of US females ages 35-44 (N = 820) from Ware et al.[19]

‡Mean score for individuals with hair pulling minus mean score for comparison sample divided by the standard deviation of the comparison sample.

Scores on the SF-36 were compared to general US population scores for an age- and gender-matched sample.[19] Normative scores on the SF-36 were collected by the National Research Corporation and taken from a sample of 6,742 individuals selected to reflect 1998 US census data with respect to age, gender, race, income, household size, and geographic location. From this pool, we chose females aged 35 to 44 years (N=820) as our normative comparison sample, as it best matches the demographic profile of our TTM sample (predominantly female with a mean age of 38.1 years). Differences between the 2 groups were computed as *z*-scores by subtracting the mean scores for the comparison sample from the mean scores for the TTM sample and then dividing by the standard deviation of the comparison sample.

To determine the independent contributions of illness duration, hair pulling severity, depression, and anxiety to QOL impairment in TTM sufferers, we performed multiple regression analyses using illness duration, BDI, BAI, and MGHHPS scores to predict the individual and total SF-36 scale scores.

Results

Self-Report of TTM-Related Functional Impairments

Fifty-two (89.7%) participants endorsed distress or impairment in social, occupational, or leisure activities. Seven (12.1%) reported one area being affected, 12 (20.7%) reported 2 areas being affected, and 33 (56.9%) reported decreased functioning in all 3 areas.

Forty-six (79.3%) participants reported experiencing distress or impairment in social functioning due to their TTM. Twenty-three (39.7%) reported decreased contact with friends, 27 (46.6%) reported decreased dating, 23 (39.7%) reported a loss of intimate relationships, 29 (50.0%) reported that their TTM affected family relationships, and 27 (46.6%) reported other social distress or impairment. Eight (13.8%) endorsed TTM affecting one area of social functioning, 16 (27.6%) reported 2 areas being affected, 8 (13.8%) reported distress or impairment in 3 areas, 5 (8.6%) reported distress or impairment in four areas, and 9 (15.5%) reported decreased functioning in all social areas identified in the questionnaire.

Thirty-eight (65.5%) endorsed some form of occupational distress or impair-

Table 2. Summary of Regression Analyses for Variables Predicting SF-36 Scores*

SF-36	R^2	Duration B (P value)	MGHHPS B (P value)	BDI B (P value)	BAI B (P value)
Total SF-36 Score	.64	-0.20 (.25)	-0.21 (.56)	-1.59 (<.01)	-0.11 (.72)
General Health	.18	-0.23 (.44)	-0.58 (.36)	-0.70 (.11)	-0.37 (.50)
Physical Functioning	.12	-0.18 (.51)	0.48 (.39)	-0.72 (.07)	-0.14 (.78)
Physical Role Limitation	.37	-0.41 (.27)	0.58 (.45)	-1.72 (<.01)	-1.00 (.14)
Bodily Pain	.39	-0.43 (.09)	0.52 (.33)	-1.75 (<.01)	0.43 (.35)
Mental Health	.65	-0.18 (.35)	-0.44 (.28)	-1.61 (<.01)	-0.47 (.18)
Social Functioning	.64	-0.16 (.48)	-0.08 (.88)	-2.33 (<.01)	0.10 (.81)
Emotional Role Limitation	.47	-0.69 (.14)	-1.62 (.10)	-2.88 (<.01)	0.22 (.80)
Vitality	.54	0.00 (1.00)	0.09 (.86)	-2.00 (<.01)	-0.03 (.95)

*SF-36 indicates Medical Outcomes Study 36-Item Short-Form Health Survey; MGHHPS, Massachusetts General Hospital Hair pulling Scale; BDI, Beck Depression Inventory; and BAI, Beck Anxiety Inventory.

ment. Seventeen (29.3%) endorsed avoidance of certain jobs, 13 (22.4%) reported being late to work due to TTM, 16 (27.6%) reported having decreased contact with co-workers, 20 (34.5%) reported lowered career aspirations, and 17 (29.3%) reported other occupational distress or impairment. Thirteen (22.4%) reported distress or impairment in one area of occupational functioning, 10 (17.2%) reported 2 areas of occupational functioning being affected, 7 (12.1%) endorsed lowered functioning in 3 occupational areas, 3 (5.2%) reported 4 areas of occupational functioning being affected, and 3 (5.2%) endorsed distress or impairment in all 5 listed areas of occupational functioning.

Forty-six (79.3%) participants said TTM affected their leisure time. Forty (69.0%) endorsed avoidance of certain leisure activities.

SF-36 Scores and Comparison with a Normative Sample
Table 1 reports the raw SF-36 scores for our conference sample and our age- and gender-matched comparison sample. Z-scores comparing SF-36 total and sub-scale scores failed to reveal any significant group differences. The largest group difference was for role limitations attributable to emotional factors. The

larger standard deviation for mean SF-36 scores reported for the TTM sample (SD=44.7) vs NC sample (SD=30.4) indicates a broader potential influence of emotional factors on role functioning for TTM sufferers than for comparison controls. Thus, emotional factors may significantly impair role functioning in some TTM sufferers but not in others.

Regression Analyses with Illness Duration and BDI, BAI, and MGHHPS Scores to Predict SF-36 Scores
Table 2 reports the results of multiple regression analyses to predict SF-36 scores. Illness duration as well as MGHHPS and BAI scores failed to predict ($P \geq$.05) SF-36 total and subscale scores. BDI scores, however, significantly predicted all SF-36 total and subscale scores with the exception of general health and physical functioning.

STUDY 2
Method
Participants
Forty-five individuals enrolled in a placebo-controlled, double-blind TTM treatment outcome study completed the Q-LES-Q at baseline evaluation. The research protocol for this project was also approved prior to study initiation by the institutional review board at the

Table 3. Q-LES-Q Scores for the TTM Cohort and a US Population Control Sample[*]

Q-LES-Q	Trichotillomania Sample Mean (*SD*)	Comparison Sample[†] Mean (*SD*)	Difference in *SD* Units[‡]
Physical Health	71.4 (16.7)	78.3 (14.9)	-0.46
"Feelings"	73.6 (14.7)	83.2 (11.9)	-0.81
Work	76.6 (13.5)	80.7 (14.1)	-0.29
Household	72.2 (18.6)	77.9 (17.8)	-0.32
School	74.6 (16.6)	80.9 (14.4)	-0.44
Leisure	76.9 (12.2)	78.6 (14.3)	-0.12
Relationships	76.9 (15.9)	75.9 (14.2)	0.07
General	71.0 (14.0)	78.9 (13.7)	-0.58

[*]Q-LES-Q indicates Quality of Life, Enjoyment, and Satisfaction Questionnaire. Scores range from 0-100 with 100 indicating optimal quality of life.
[†]Comparison sample of US volunteers ages 19-85 years old (N = 89, 59.6% female) from Endicott et al.[22]
[‡]Mean score for individuals with hair pulling minus mean score for comparison sample divided by the standard deviation of the comparison sample.

first author's hospital affiliation. All participants signed informed consent.

Study inclusion criteria were: doctoral-level clinician diagnosis of DSM-IV TTM, symptom duration of at least 4 months, daily hair pulling for at least 1 month, and MGHHPS score ≥ 15 or Trichotillomania Impact Scale (TTMIS; O'Sullivan et al, unpublished scale) score ≥ 30. Study exclusion criteria were: diagnosis of bipolar disorder, psychosis, organic mental disorder, current major depression, or developmental disorder, as well as a history of substance abuse within the past 6 months. Pregnancy or breastfeeding, prior trial of study medication, current BT for TTM, anticoagulant therapy or antidepressant treatment within the past 12 months for major depression, history of seizure disorder, or serious illness such as cardiovascular or renal disease also excluded individuals from study participation.

Participants in this study were also predominantly women (41 females, 4 males). Mean age was 29.4 years (*SD*=8.5), with mean onset of illness at 13.9 years of age (*SD*=5.8). Thirteen (28.9%) participants were married, 28 (62.2%) were single, and 1 (2.2%) was divorced. Marital status was unknown for 3 (6.7%) participants. Twenty-seven (60.0%) participants were college-educated, 13 (28.9%) had a graduate school education, and 2 (4.4%) were high school graduates. Educational background was unknown for 3 (6.7%) individuals.

The mean MGHHPS total score was 19.2 (*SD*=3.4; range=11-27), indicating moderate symptoms. The mean Psychiatric Institute Trichotillomania Scale (PITS)[20] score was 24.8 (*SD*=4.7; range=13-34), consistent with scores reported in treatment outcome studies.[21] The mean BDI score was 9.1 (*SD*=7.1; range=0-28), reflecting overall mild, non-clinical mood disturbance. Mean BAI score was 6.7 (*SD*=5.5; range=0-23), reflecting overall minimal to mild anxiety symptoms.

Measures
The MGHHPS, BDI, and BAI scales (see Study 1 for scale descriptions) were used to assess self-report of hair pulling, depression, and anxiety, respectively. The PITS, a clinician-based measure of hair pulling severity, was also utilized. The PITS is a semi-structured assessment

Table 4. Summary of Regression Analyses Using Illness duration and BDI, BAI, and MGHHPS Scores to Predict Q-LES-Q Scores[*]

Q-LES-Q	R^2	Duration B (P value)	BDI B (P value)	BAI B (P value)	MGHHPS B (P value)
Total Score	.70	0.07 (.69)	-1.28 (<.01)	-0.58 (.11)	0.06 (.88)
Physical Health	.64	0.06 (.80)	-1.40 (<.01)	-1.19 (.03)	0.21 (.74)
"Feelings"	.68	0.01 (.97)	-1.52 (<.01)	-0.36 (.38)	-0.20 (.70)
Work	.49	-0.14 (.58)	-0.76 (.05)	-0.52 (.32)	-0.44 (.46)
Household	.61	0.53 (.14)	-1.45 (.01)	-0.20 (.79)	0.36 (.69)
School	.66	0.25 (.66)	-0.46 (.62)	-1.61 (.23)	-1.43 (.29)
Leisure	.22	-0.02 (.93)	-0.68 (.08)	-0.32 (.53)	0.76 (.23)
Relationships	.69	0.06 (.83)	-1.27 (<.01)	-0.65 (.25)	0.30 (.66)
General	.73	-0.06 (.73)	-1.42 (<.01)	-0.52 (.16)	-0.12 (.78)

[*]Q-LES-Q indicates Quality of Life, Enjoyment, and Satisfaction Questionnaire; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; MGHHPS, and Massachusetts General Hospital Hair pulling Scale.

tool with a guided interview format. It rates six items (sites, severity, duration, resistance, interference, and distress) on an eight-point (0-7) scale. The Q-LES-Q, our QOL instrument for Study 2, is a self-report scale that measures satisfaction in eight areas including physical health, subjective feelings of well-being, work, household duties, school, leisure, social relationships, and a measure of general life quality. Internal consistency coefficients for the eight subscales ranged from .90 to .96, indicating a high degree of reliability. Test-retest coefficients for these scales ranged from .63 to .89, demonstrating good consistency over time.[12]

Data Analysis
Scores on the Q-LES-Q were compared to available data[22] for a control comparison sample (n=89). These subjects responded to notices seeking volunteers to act as controls for studies of patients at the Columbia Presbyterian Medical Center in New York City. Subjects were 19 to 85 years old (mean=37.0, SD=14.8), and 53 (59.6%) were female. Twenty-nine (32.6%) had no history of mental illness, 38 (42.7%) reported periods of past mental disorder, and 22 (24.7%) met criteria for a "minor mental disorder" such as minor depressive disorder. Differences between the 2 groups were computed as *z*-scores by subtracting the mean scores for the comparison sample from the mean scores for the TTM sample and then dividing by the standard deviation of the comparison sample.

To determine the independent contributions of illness duration, hair pulling severity, depression, and anxiety to QOL impairment in TTM sufferers, we performed separate multiple regression analyses using illness duration, BDI, BAI, and different hair pulling severity scores (MGHHPS or PITS scores) to predict the Q-LES-Q scale scores. Given that one of the 6 PITS subscales assesses functional interference, we repeated the same regression analyses replacing total PITS scores with total PITS scores minus the interference subscale score.

Results
Q-LES-Q Scores and Comparison with a Normative Sample
Table 3 reports the raw Q-LES-Q data for both our TTM clinical sample and our comparison normative population sample. Differences between the 2 groups are reported in *z*-scores for each individual subscale. Again, no significant

Table 5. Summary of Regression Analyses Using Illness Duration and BDI, BAI, and PITS Scores to Predict Q-LES-Q Scores[*]

Q-LES-Q	R^2	Duration B (P value)	BDI B (P value)	BAI B (P value)	PITS B (P value)
Total Score	.87	0.13 (.26)	-0.44 (.06)	-0.81 (<.01)	-1.60 (<.01)
Physical Health	.79	0.12 (.53)	-0.27 (.48)	-1.63 (<.01)	-2.00 (<.01)
"Feelings"	.81	0.05 (.71)	-0.77 (.02)	-0.53 (.12)	-1.54 (<.01)
Work	.51	-0.07 (.79)	-0.43 (.37)	-0.65 (.24)	-0.81 (.19)
Household	.57	0.62 (.04)	-0.07 (.90)	-0.53 (.40)	-2.55 (<.01)
School	.66	0.14 (.82)	-0.64 (.44)	-0.11 (.95)	-2.30 (.30)
Leisure	.37	0.04 (.86)	0.21 (.63)	-0.43 (.37)	-1.50 (<.01)
Relationships	.60	0.12 (.61)	-0.32 (.50)	-0.87 (.10)	-1.74 (<.01)
General	.78	-0.02 (.88)	-0.89 (<.01)	-0.71 (<.05)	-1.02 (.01)

[*]Q-LES-Q indicates Quality of Life, Enjoyment, and Satisfaction Questionnaire; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; and PITS, Psychiatric Institute Trichotillomania Scale.

group differences emerged from our *z*-score comparisons.

Regression Analyses Using BDI, BAI, MGHHPS, and PITS Scores to Predict Q-LES-Q Scores
Table 4 reports the results of multiple regression analyses for the Q-LES-Q total and subscale scores with the variables of illness duration, BDI, BAI, and MGHHPS scores. BDI scores significantly predicted all Q-LES-Q subscale scores with the exception of school and leisure functioning. Less severe depressive symptoms consistently predicted more improved QOL. Illness duration and MGHHPS scores failed to significantly predict Q-LES-Q scores and BAI scores significantly predicted only the Q-LES-Q subscale of physical health. For this subscale, participants who endorsed less severe anxiety also reported more robust physical health.

Table 5 summarizes the results of multiple regression analyses for the Q-LES-Q total and subscales scores using illness duration and BDI, BAI, and PITS scores. Results of these analyses indicate that the PITS is the best predictor of Q-LES-Q scores, significantly predicting all subscale scores with the exception of work and school. Less severe TTM symptoms were consistently correlated with more improved QOL. Illness duration again failed to significantly predict any Q-LES-Q scores. The BDI predicted scores on the feelings and general Q-LES-Q subscales independently of the contribution from the PITS scores. The BAI independently predicted total Q-LES-Q scores and the physical health and general subscale scores. In each case, less severe depression or anxiety correlated with more improved QOL.

Table 6 repeats the multiple regression analyses for the Q-LES-Q scores using the PITS total scores minus the interference subscale scores to better identify the amount of variance accounted for by TTM severity. The adjusted PITS scores remained the best predictor of Q-LES-Q scores though did not significantly predict scores for the work, school, and relationships subscales. BDI scores significantly predicted total Q-LES-Q scores as well as the feelings and general subscale scores. The BAI scores significantly predicted total Q-LES-Q scores and the physical health subscale scores. In all cases, less severe anxiety, depression, and TTM symptoms predicted greater QOL.

Table 6. Summary of Regression Analyses Using Illness Duration and BDI, BAI, and Adjusted PITS Scores to Predict Q-LES-Q Scores*

Q-LES-Q	R^2	Duration B (*P* value)	BDI B (*P* value)	BAI B (*P* value)	Adjusted PITS B (*P* value)
Total Score	.81	0.09 (.50)	-0.66 (.02)	-0.66 (.03)	-1.71 (<.01)
Physical Health	.71	0.07 (.75)	-0.68 (.12)	-1.40 (<.01)	-1.79 (.02)
"Feelings"	.77	0.02 (.90)	-0.98 (<.01)	-0.38 (.30)	-1.66 (<.01)
Work	.56	-0.09 (.70)	-0.30 (.51)	-0.65 (.21)	-1.59 (.06)
Household	.45	0.56 (.10)	-0.64 (.31)	-0.22 (.75)	-2.17 (.05)
School	.74	0.40 (.43)	-0.04 (.96)	0.26 (.85)	-4.45 (.09)
Leisure	.32	0.00 (.99)	0.05 (.91)	-0.29 (.54)	-1.74 (.02)
Relationships	.53	0.08 (.75)	-0.64 (.20)	-0.68 (.23)	-1.63 (.06)
General	.77	-0.05 (.77)	-1.02 (<.01)	-0.61 (.09)	-1.13 (.04)

*Q-LES-Q indicates Quality of Life, Enjoyment, and Satisfaction Questionnaire; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; PITS, Psychiatric Institute Trichotillomania Scale; and Adjusted PITS, PITS total scores minus PITS Interference subscale scores.

DISCUSSION

Our results failed to document significant QOL impairment for 2 samples of TTM sufferers in comparison with control samples on two standardized QOL instruments. This finding occurred despite subjective report of significant functional limitations in social, occupational and leisure domains by study participants and multiple anecdotal reports of impaired functioning in the literature. One explanation for these findings is that our research utilized generic measures of QOL rather than disorder-specific instruments. Generic QOL measures may fail to evaluate the unique ways in which TTM impairs functioning. Careful analysis of the wording of specific scale items may illuminate the failure of generic QOL instruments to document TTM-related functional impairment. For example, item wording for the social functioning subscale of the SF-36 states, "During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your normal social activities?" Given our reported mean illness onset of 11.4 years of age, it is likely that most of our TTM sample have curtailed their social activities for a long time, possibly since adolescence. Similarly, wording for the Q-LES-Q leisure functioning subscale items addresses time involved in, and enjoyment of, self-selected leisure activities rather than avoidance of specific activities due to TTM-related concerns. Thus, it is imperative that researchers develop a disorder-specific QOL instrument that captures those QOL issues unique to this population.

Depression scores explained a large part of the variance in the QOL scores for both samples when scores on the self-rated MGHHPS scores were utilized in the regression analyses. However, when the clinician-rated PITS replaced the MGHHPS as the measure of hair pulling severity, the PITS emerged as a superior predictor to both the BDI and BAI. This finding may be explained by differences in both the content and structure of the 2 TTM severity scales. The PITS has a broader range of potential item scores (0-7) than the MGHHPS (0-4) with specific behavioral anchors for each item score. The PITS, in contrast to the MGHHPS, also assesses physical damage due to hair pulling, thus providing a broader index

of symptom severity.

When the PITS was utilized in regression analyses, the BDI and BAI were noted to independently predict several QOL subscale scores even after the variance accounted for by the PITS was removed. These results are surprising given the minimal to mild levels of depression and anxiety reported for both TTM cohorts. These findings underscore the importance of evaluating and addressing comorbid depressive and anxiety symptoms in TTM sufferers even when mild in severity. In our earlier work we reported similar findings in which higher levels of depression at baseline, and greater reductions in depressive symptoms with treatment, were associated with higher patient-rated hair pulling improvement.[23]

It is important to note that the correlative design of our current study does not afford conclusions regarding the directionality of influence between hair pulling severity, comorbid depressive and anxiety symptoms, and QOL measures. It is unclear whether more severe symptoms result in poorer QOL, poorer QOL results in more severe symptoms, or both covary simultaneously. The answers to these questions await longitudinal studies that prospectively follow TTM sufferers and measure these variables at multiple time points. However, regardless of directionality, sufferers with more severe hair pulling symptoms and/or comorbid depressive and anxiety symptoms warrant special attention given the predictive value of these variables in QOL for TTM sufferers.

We recognize several potential limitations of our research. First, in Study 1, our measures consist exclusively of self-ratings by TTM sufferers without independent corroboration by trained evaluators, treatment providers, or significant others. One may also argue that this study sample does not adequately represent all TTM sufferers given the

mild to moderate MGHHPS scores. Given our study sample selection procedures (ie, participants at a national conference willing to volunteer for our study) and high education levels reported, it is also possible that this study cohort represents a higher functioning subset of those with TTM. Nonetheless, these results importantly suggest that even mild depressive symptoms can predict QOL for TTM sufferers with mild to moderate hair pulling severity.

In Study 2, participants from a clinical setting were utilized to determine whether QOL was more impaired for TTM sufferers actively pursuing treatment than for those attending a TTM conference. Unfortunately, our NC comparison sample was not perfectly matched on age and gender, with more males and a slightly older mean age than for our patient cohort. Again, as hypothesized for Study 1, our failure to empirically document QOL impairment may be explained by our use of generic QOL instruments. Lastly, our sample size in this study is modest and these results require replication with larger-scale epidemiological studies that can more broadly examine TTM-related QOL and functional impairment.

In summary, our results indicate that severity of hair pulling and depressive symptoms, and to a lesser extent anxiety severity, make independent contributions to the aspects of QOL measured by our currently-available QOL instruments. Accurate documentation of QOL for TTM sufferers awaits the future development of a TTM-specific instrument that measures limitations unique to this population.

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