








Impact of Anxiety, Depression, and Coping Strategies on Health-Related Quality of Life in Patients with Cystic Fibrosis

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Abstract

OBJECTIVE: With the significant increase in the life expectancy of cystic fibrosis (CF) patients, many individuals now reach adulthood and develop specific coping strategies to maintain their physical and mental well-being. This study aims to evaluate coping styles and their relationship with mental health and Health-Related Quality of Life (H-RQoL) in adult CF patients.

MATERIALS AND METHODS: Thirty adult CF patients completed the Hospital Anxiety and Depression Scale to assess anxiety and depression, the Cystic Fibrosis Questionnaire—Revised to evaluate quality of life, and the Brief Coping Orientation to Problems Experienced questionnaire to assess coping strategies.

RESULTS: Twelve individuals (40%) met the diagnostic criteria for being at risk of experiencing anxiety and/or depression. Anxiety risk group exhibited lower life quality scores in the domains of vitality, emotional functioning, and role limitations ($P = .027$, $P = .001$, and $P = .001$, respectively). Patients reporting depressive symptoms had lower scores in emotional functioning and role limitations domains of quality of life ($P = .005$ and $P = .018$, respectively). Multivariate analysis indicated that depression and anxiety scores were significant predictors of emotional quality of life. In terms of coping strategies, “acceptance” was the most commonly preferred, while “substance use” was the least preferred strategy among all participants. Patients at risk of anxiety and/or depression often chose “avoidance” as their coping strategy.

CONCLUSION: Anxiety and depressive symptoms are prevalent and associated with poorer H-RQoL in adult CF patients. These patients preferred to employ giving up strategy when dealing with the disease. Therefore, it is essential to screen adult CF patients for mental health risks and to work on improving their coping strategies.

KEYWORDS: Anxiety, depression, cystic fibrosis, quality of life, coping

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INTRODUCTION

Cystic fibrosis (CF) is a life-limiting genetic disorder. However, advances in medical management and treatment have enabled a growing number of patients to reach adolescence and adulthood.¹ As these individuals attain greater independence from their families, they also face increased stress related to education, employment, independence, travel, fertility, and relationships. Additionally, adults with CF frequently underestimate the severity of their condition, harboring the misconception that they are healthier than they actually are.² Therefore, it is necessary to use indicators to follow these patients in addition to physical health parameters. Health-related quality of life (H-RQoL) outcomes serve as a valuable metric for assessing the disease’s impact on both physical and psychosocial well-being.³ To date, the impact of many clinical factors on aspects of H-RQoL has been studied in the CF population such as lung function, sex, body mass index, age, and pulmonary exacerbations that were closely associated with various domains of H-RQoL.⁴

Recently, the psychological well-being of adult CF patients has come into focus because of increased risk for depression and anxiety and their negative effects on H-RQoL in this population.⁵⁻⁷ A growing body of research has identified positive mental health as a significant positive predictor of H-RQoL domains. However, there is a gap in the literature concerning the relationship between mental health and the quality of life of adult CF patients in our population. Only 1 study has been conducted in our pediatric population, revealing that depression significantly exacerbates the adverse impact of CF on the quality of life.⁸

Coping is generally understood as the comprehensive set of cognitive, emotional, and behavioral strategies employed to manage stress. Factors such as stress level, age, gender, intelligence, and cultural variations in personality types influence the selection of coping styles.^{9,10} It has been reported that long-term reliance on negative coping strategies can exacerbate mood disorders and may serve as a precursor to more serious psychological issues. An optimistic, problem-solving approach to coping has been linked to better psychological well-being, while avoidance and passivity are often considered maladaptive approaches, particularly in chronic respiratory conditions.¹¹ This information highlights the need for a

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deeper understanding of the psychological burden associated with coping styles in the CF population. Previous studies in the general population have shown that a depressive mood is often accompanied by a tendency to avoid stressful situations, along with feelings of helplessness and hopelessness.¹² Research by Taylor et al¹³ found that active coping strategies were associated with lower levels of depression and anxiety, and better psychological quality of life among CF patients awaiting lung transplants. In the same study, disengagement was linked to higher levels of depression, anxiety, and stress, as well as lower psychological H-RQoL. Staab et al¹⁴ showed that positive social coping was correlated with higher quality of life, while depressive coping was inversely related. A weak correlation was also found between cognitive avoidance and poorer quality of life in CF patients. Importantly, avoidance coping strategies were shown to be associated with higher rates of non-adherence to medical and physical therapy regimens.¹⁵ Therefore, understanding coping strategies is not just a psychological concern, but also a critical factor in the effective medical management of patients with CF. Notably, existing literature has not explored the interplay between coping mechanisms and quality of life among adult patients with CF within our population.

The central research question of this study is to define mental well-being in the adult CF population and to ascertain whether coping strategies differ between patients experiencing anxiety and/or depression and how each of these mental health conditions influences quality of life. Second, we aimed to scrutinize the relationship between quality of life and coping strategies.

MATERIAL AND METHODS

Subjects

This cross-sectional study was conducted at a tertiary CF center, and the study protocol was approved by the Marmara

University Faculty of Medicine Clinical Research Ethics Committee (number: 09.2016.341, date: May 6, 2016). Primarily, 40 adult patients with a diagnosis of CF were enrolled. Exclusion criteria included pregnancy, a history of pulmonary transplantation, pulmonary infection in the previous month, and any mental condition that could interfere with the testing procedures. One patient with a history of lung transplantation was excluded, 9 patients did not approve participation in the study, and only 30 of 39 patients completed the study. Written and verbal informed consents were obtained from all participants.

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) is a 14-item, 4-point Likert scale designed to evaluate the risk of anxiety and depression. It was initially developed to determine the risk of anxiety and depression and has been extensively used and validated in patients with different clinical problems.¹⁶ The Turkish version of the HADS scale has been proven both valid and reliable.¹⁷

Brief Coping Orientation to Problems Experienced

The Brief Coping Orientation to Problems Experienced (Brief-COPE) Inventory is a derivative of the more comprehensive Carver Coping Styles Inventory and consists of 14 distinct coping strategies, each represented by 2 items.¹⁸ Patients complete the questionnaire to describe their habitual coping mechanisms in stressful situations. The inventory has been validated and found reliable in a Turkish context.¹⁹ Patients indicate the frequency with which they employ for each strategy on a 4-point Likert scale such as “active coping” (taking direct action to get around the problem), “planning” (making a plan of action), “positive reframing/reinterpretation” (trying to see the event in a more positive light), “acceptance” (learning to live with it), “humor” (making fun of the situation), “religion” (finding comfort in religion or spiritual beliefs), “use of emotional support” (getting emotional support from others), “use of instrumental support” (getting help and advice from other people), “self-distraction” (turning to work to take mind off things), “denial” (refusing to believe that the event has happened), “venting” (expressing negative feelings), “substance use” (using alcohol/drugs to get through the event), “behavioral disengagement” (giving up trying to deal with it), “self-blame/accusation” (self-criticism). Low scores indicate that the given dimension is less used, and high scores show that the given dimension is used more often.

Health-Related Quality of Life

The CF Questionnaire—Revised (CFQ-R) is the most commonly utilized disease-specific H-RQoL instrument for CF patients. It comprises 50 items distributed across 9 quality-of-life domains and 3 symptom scales. Each item is scored on a 4-point Likert scale, with standardized scores for each subscale ranging from 0 to 100. Higher scores indicate better H-RQoL and lower scores suggest poorer H-RQoL.²⁰ Health-related quality of life was examined using the following such as physical functioning (difficulty performing vigorous activities such as running, sports, lifting and carrying heavy things, climbing stairs), vitality (feeling full of energy/tired/exhausted), emotional functioning (feeling worried/useless/sad), eating disturbances (never enjoy eating, forcing to eat), treatment burden (burdened by daily inhalation and physical

Main Points

- This is a study conducted on 30 adult patients with cystic fibrosis to investigate various aspects including coping strategies, quality of life, mental well-being, and their relationships.
- Anxiety and depressive symptoms are prevalent in this population, and these patients have poorer quality of life.
- Acceptance emerged as the most commonly used coping strategy among all participants, and this information highlights that adult individuals with cystic fibrosis actively engage in health-care decision-making. Particularly, the subgroup with depression and/or anxiety prefer avoidance coping strategy to deal with the disease.
- The patients who use more positive coping strategies can face stressful events and have a higher quality of life. This study also identified a positive correlation between the use of seeking help from others and improved emotional well-being. Social functioning positively correlated with the employment of the humor strategy.
- That is why, it is important in clinical practice to screen patients for mental well-being and to encourage the use of adaptive coping strategies to increase patient’s satisfaction with life.

therapy), health perception (better/same/deteriorated/leading a normal life), social functioning (staying at home because of health reasons), body image (thinking physically different from others, too thin), role limitations (problems at school, at work, or with other daily activities because of health reasons), weight problems (trouble gaining weight), respiratory symptoms (cough/wheezing/sputum etc), and digestive symptoms (diarrhea/abdominal pain).

Statistical Analysis

All statistical analyses were performed using the Statistical Package for the Social Sciences version 23.0 program (IBM Corp., Armonk, NY, USA). Descriptive statistics of continuous data are presented as mean±standard deviation. The chi-square test was employed for comparing categorical variables, and the Fisher's exact test was utilized when cell counts in 2 × 2 tables were fewer than 5. T-tests were applied for comparing means of normally distributed continuous variables, while the Mann-Whitney *U*-test was used for non-normally distributed data. Pearson's correlation was employed for normally distributed correlation analyses, and the Spearman rank test was utilized for non-normal distributions. A *P*-value of <.05 was considered statistically significant in all analyses. Multiple regression analyses were conducted with all HR-QoL domain scores as dependent variables, using sex, age, disease duration, anxiety and depression scores, and coping strategies as predictor variables.

RESULTS

This study was conducted on 30 adult patients diagnosed with CF. Demographic and clinical characteristics of the participants are summarized in Table 1. Of the total, 8 patients (27%) were identified as at risk for anxiety, and the same number (27%) were at risk for depression. Mean scores on the HADS were 7.4 ± 4.0 for anxiety and 5.0 ± 3.0 for depression. Anxiety scores correlated with depression scores ($r = 0.498$, $P = .005$) and depression risk increased with aging ($r = 0.366$, $P = .047$).

In the H-RQoL evaluation, the domain eating disturbances scored the highest, while the domain trouble gaining weight scored the lowest among all participants. In sociodemographic parameters, female patients exhibited lower scores in physical functioning (53.9 ± 23.9 vs. 72.4 ± 19.2 , $P = .012$, respectively) and higher scores in body image (looking different from others) when compared with males (76.6 ± 33.5 vs. 61.5 ± 21.2 , respectively, $P = .041$). The relationships between several clinical variables and quality of life domains were presented in Table 2. Body Mass Index (BMI) positively correlated with emotional functioning, social functioning, body image, and weight dimensions of H-RQoL. Modified Medical Research Council (mMRC) scores were negatively related to several H-RQoL dimensions including physical functioning, vitality, eating disturbances, treatment burden, role limitations, and respiratory symptoms. Lower FEV1 (range:26-114%) values which indicate greater respiratory disability were likely associated with lower levels of social functioning of H-RQoL. Concerning the relationship between psychological well-being and H-RQoL domains, patients at risk for anxiety showed poorer

Table 1. Patient Data

Characteristics	n (%)
Patients	30 (100)
Age (years)	24 ± 4 (18-34)
Gender	
Female	17 (57)
Male	13 (43)
Marital status	
Single	26 (87)
Married	4 (13)
Educational status	
Primary school graduate	2 (7)
High school graduate	13 (43)
University graduate	15 (50)
Occupational status	
Unemployed	10 (33)
Still student	10 (33)
Employed	10 (33)
Duration of disease (years), (range)	19 ± 8 (3-30)
FEV1 % predicted (range)	64.1 ± 23.8 (26-114)
HADS	
Anxiety	8 (27)
Depression	8 (27)
Anxiety and/or depression	12 (40)

quality of life scores in the domains of vitality (feeling energetic), emotional functioning (feeling worried), and role limitations (limit in social area, work, and personal goals), ($P = .027$, $P = .001$, and $P = .001$, respectively), (Table 3). Patients manifesting depressive symptoms similarly reported lower H-RQoL scores in the domains of emotional functioning and role limitations ($P = .005$ and $P = .018$, respectively), (Table 3). In subgroup with symptoms of depression and/or anxiety, lower quality of life in several domains was found including emotional functioning, eating disturbances, social functioning, and role limitations domains ($P = .001$, $P = .033$, $P = .024$, and $P = .001$, respectively), (Table 3). In a multivariate model focusing on emotional H-RQoL, both anxiety and depression scores emerged as significant independent predictors ($P = .003$ and $P = .04$, respectively). Additionally, depression scores were found as a predictor of eating disturbances and gender was found as a predictor of physical functioning (Table 4). The results for these 3 dimensions were given in Table 4 because other dimensions included in the study did not show any significant relationships with the predictors examined in the model.

In terms of coping strategies, "acceptance" was the most commonly employed coping strategy, while "substance use/alcohol-drug use" was the least favored among all participants. Patients at risk for depression were less likely to use "active coping/direct action to solve problems" and more likely to employ "behavioral disengagement/giving up"

Table 2. Relationship Between Clinical Variables and Health-Related Quality of Life Domain Scores

Health-Related Quality of Life Domains	Age (Years)	Duration of Disease (Years)	FEV ₁ % Predicted	BMI (kg/m ²)	mMRC
Physical functioning	-.206	.242	.299	.220	-.442*
Vitality	-.007	.215	.136	.102	-.513**
Emotional functioning	.066	.065	.267	.372*	-.445*
Eating disturbances	-.020	-.125	.215	.262	-.365*
Treatment burden	-.096	.248	.276	.187	-.424*
Health perception	.037	.358	.319	.325	-.338
Social functioning	.023	.068	.438*	.384*	-.344
Body image	-.014	.036	.252	.633**	.095
Role limitations	-.063	.224	.218	.122	-.710**
Weight problems	.107	.149	.359	.563**	-.224
Respiratory symptoms	.075	.314	.445*	.338	-.536**
Digestive symptoms	-.281	.140	.049	.254	-.273

BMI, body mass index; mMRC, Modified Medical Research Council Dyspnea Scale.
Correlation analysis **P* < .05.

***P* < .01.

Table 3. Health-Related Quality of Life Scores for the Total Sample and Anxiety/Depression Subgroups

Health-Related Quality of Life Domains	Total n = 30	Risk of Anxiety			Risk of Depression			Risk of Depression and/or Anxiety		
		Present n = 8	Absent n = 22	<i>P</i>	Present n = 8	Absent n = 22	<i>P</i>	Present n = 12	Absent n = 18	<i>P</i>
Physical functioning	61.9 ± 23.5	55.5 ± 20.6	24.0 ± 3.6	NS	54.4 ± 24.0	64.7 ± 23.3	NS	56.8 ± 21.5	65.3 ± 24.8	NS
Vitality	60.1 ± 23.2	43.9 ± 24.4	66.0 ± 20.1	.027*	52.4 ± 23.8	62.9 ± 22.8	NS	50.2 ± 25.2	66.7 ± 19.7	NS
Emotional functioning	69.8 ± 27.3	38.4 ± 20.1	81.2 ± 19.6	.001*	47.5 ± 26.5	77.9 ± 23.2	.005*	47.2 ± 23.3	84.8 ± 18.1	.001*
Eating disturbances	77.4 ± 29.5	63.9 ± 39.4	82.4 ± 24.2	NS	69.4 ± 29.7	80.4 ± 29.5	NS	64.8 ± 34.2	85.9 ± 23.1	.033*
Treatment burden	49.6 ± 21.5	36.3 ± 26.6	54.5 ± 17.6	NS	53.0 ± 13.1	48.4 ± 24.0	NS	42.8 ± 23.3	54.2 ± 19.6	NS
Health perception	58.6 ± 20.4	47.3 ± 16.9	62.7 ± 20.3	NS	57.0 ± 18.5	59.2 ± 21.4	NS	52.8 ± 19.3	62.4 ± 20.8	NS
Social functioning	63.3 ± 24.1	55.4 ± 25.6	66.1 ± 23.5	NS	56.1 ± 24.3	65.8 ± 24.1	NS	51.3 ± 21.8	71.2 ± 22.7	.024*
Body image	70.1 ± 29.4	68.3 ± 33.8	70.7 ± 28.4	NS	65.4 ± 34.9	71.8 ± 27.8	NS	67.8 ± 29.7	71.6 ± 29.9	NS
Role limitations	70.3 ± 25.9	42.8 ± 19.0	80.3 ± 20.2	.001*	52.1 ± 17.6	76.9 ± 25.5	.018*	48.6 ± 18.3	84.7 ± 19.3	.001*
Weight problems	47.9 ± 30.1	45.9 ± 35.5	48.6 ± 28.8	NS	50.0 ± 31.0	47.1 ± 30.4	NS	44.4 ± 29.7	50.2 ± 30.9	NS
Respiratory symptoms	53.9 ± 22.1	47.5 ± 22.3	56.2 ± 22.1	NS	48.1 ± 21.4	56.0 ± 22.4	NS	48.4 ± 20.6	57.5 ± 22.9	NS
Digestive symptoms	73.5 ± 19.6	61.3 ± 25.3	77.9 ± 15.4	NS	66.8 ± 26.7	75.9 ± 16.4	NS	64.9 ± 24.2	79.2 ± 13.7	NS

All data are presented as mean ± SD.
NS, non-significant; SD, standard deviation.

Table 4. Multivariate Analyses of the Ability of Potential Risk Factors for Predicting Health-Related Quality of Life Domain Scores

Health-Related Quality of Life Domains	Beta	95% CI		P
Emotional functioning domain				
Age	1.959	-.210	4.128	.075
Gender	-4.320	-19.678	11.037	.567
Anxiety score	-3.341	-5.386	-1.297	.003*
Depression score	-2.998	-5.850	-.146	.040*
Physical functioning domain				
Age	-1.359	-3.481	.763	.199
Gender	-23.897	-39.494	-8.300	.004*
Anxiety score	-.368	-2.418	1.683	.715
Depression score	-2.480	-5.378	.417	.090
Eating disturbances domain				
Age	.836	-2.268	3.940	.584
Gender	-15.651	-38.465	7.164	.170
Anxiety score	.692	-2.307	3.691	.639
Depression score	-4.280	-8.518	-.041	.048*

compared to the non-depressed group ($P = .05$ and $P = .01$, respectively). Similarly, patients at risk for anxiety were more likely to use “venting/negative feelings” and “behavioral disengagement” strategies compared to the non-anxious group ($P = .041$ and $P = .039$, respectively). In the subgroup with symptoms of depression and/or anxiety, only “behavioral disengagement” was the most frequently used coping strategy ($P = .005$) (Table 5). Both anxiety and depression scores positively correlated with the “behavioral disengagement” strategy ($r = 0.634$, $P = .001$ and $r = 0.397$, $P = .03$, respectively). Additionally, depression scores positively correlated with the “denial” coping strategy ($r = 0.409$, $P = .025$).

When correlating coping strategies with H-RQoL scores, the use of “instrumental support/seeking help and advice from others” had a positive impact, while “behavioral disengagement” had a negative impact on emotional functioning ($r = 0.409$, $P = .025$, and $r = -0.484$, $P = .007$, respectively). Social functioning positively correlated with the use of the “humor” strategy ($r = 0.393$, $P = .032$). We found a negative relationship between the vitality domain of quality of life and denial, self-blame, and planning coping styles (Table 6). However, multivariate analysis did not show any significant effect of coping skills on all H-RQoL domains.

DISCUSSION

This study offers an in-depth analysis of the prevalent coping mechanisms among adult Turkish patients with CF, while also considering essential demographic and clinical factors—most notably psychological issues—in evaluating H-RQoL. We found that 40% of participants reported elevated anxiety and/or depression symptoms and these rates are consistent with international samples of adult CF patients and these

patients had poor emotional and social functioning, eating disturbances, and limits of personal goals in quality of life domains. This research is the first study focused on identifying coping styles associated with social and emotional aspects of H-RQoL within the Turkish adult CF population, using validated assessment tools. In our cohort, adults with CF predominantly employed “acceptance” as their principal coping strategy. It is a fact that these adult individuals actively want to engage in healthcare decision-making contrary to childhood period. However, the subgroup of patients who had anxiety and/or depression preferred not to take direct action to solve problems. When examining H-RQoL in relation to coping styles, we found that “instrumental support”—which involves seeking help and advice from others—was consistently linked to improved emotional well-being. Conversely, “behavioral disengagement” was consistently correlated with diminished emotional H-RQoL. Furthermore, the use of “humor” as a coping mechanism was positively associated with better social H-RQoL among our study participants.

In a large international study, elevated rates of anxiety and depression were reported among patients with CF^{5-7,21,22} Older age, reduced lung function, lower BMI, female gender, recent incidents of hemoptysis or pneumothorax, recent use of intravenous antibiotics, and being listed for a transplant were identified as factors associated with depression and/or anxiety.⁵ In the same CF cohort, depression risk in 29% and anxiety risk in 31% of participants was reported from our country. Likewise, our study revealed similar rates, however, in the adult CF population (27% for both depression and anxiety). Additionally, we identified an increased risk of depression with advancing age—a finding corroborated by Modi et al,²³ who reported a 32% prevalence of depression among their adolescent and adult CF patients. The authors hypothesized that disease progression and diminishing self-esteem with age could contribute to the declining mental health. Similar high rates of clinically significant anxiety were also reported in adult CF populations in western countries such as UK (27%) and Belgium (30%).^{7,22} Overall, these escalating rates of anxiety and depression underscore the growing importance of understanding the psychosocial complexities facing adults with CF.

As life expectancy for individuals with CF continued to improve and decreased mental well-being, recent clinical measures predominantly focused on H-RQoL. It is a fact that respiratory symptoms can significantly impair one’s ability to perform tasks or participate in activities, leading to disruptions in daily life and functioning. In our study, we showed several clinical variables such as BMI, mMRC, lung function test affected the dimensions of H-RQoL. Despite a limited body of research exploring the relationship between mental health risks and H-RQoL in adults with CF, it is generally accepted that patients with depressive symptoms are less compliant with medical treatments and consequently report worse H-RQoL.^{6,7,15} Riekert et al⁶ found that patients exhibiting both depressive symptoms and poor lung function had significantly lower H-RQoL across all domains compared to those without depressive symptoms, irrespective of lung function.⁶ Our study demonstrated a clear link between

Table 5. Coping Scores for the Total Sample and Anxiety/Depression Subgroups

Coping Strategies	Total		Risk of Anxiety		Risk of Depression			Risk of Depression and/or Anxiety		
	n = 30	Present n = 8	Absent n = 22	P	Present n = 8	Absent n = 22	P	Present n = 12	Absent n = 18	P
Active coping	5.6 ± 1.7	5.5 ± 1.2	5.7 ± 1.9	NS	4.6 ± 1.7	6.0 ± 1.6	.050*	4.9 ± 1.4	6.1 ± 1.7	NS
Planning	5.3 ± 1.6	5.3 ± 1.8	5.3 ± 1.6	NS	5.0 ± 1.9	5.4 ± 1.6	NS	5.1 ± 1.7	5.4 ± 1.6	NS
Positive reframing	6.1 ± 1.6	5.9 ± 1.9	6.1 ± 1.5	NS	5.9 ± 1.2	6.1 ± 1.7	NS	5.7 ± 1.6	6.3 ± 1.5	NS
Acceptance	6.8 ± 1.2	7.3 ± 0.5	6.6 ± 1.4	NS	6.3 ± 1.2	7.0 ± 1.2	NS	6.7 ± 1.2	5.9 ± 1.3	NS
Humor	4.6 ± 2.1	4.1 ± 2.3	4.7 ± 2.1	NS	4.9 ± 1.9	4.5 ± 2.2	NS	4.1 ± 2.0	4.9 ± 2.2	NS
Religion	4.5 ± 2.1	4.8 ± 2.4	4.5 ± 2.0	NS	4.1 ± 1.6	4.7 ± 2.3	NS	4.5 ± 2.2	4.6 ± 2.1	NS
Use of emotional support	4.1 ± 2.0	4.1 ± 2.5	4.0 ± 1.8	NS	3.1 ± 1.7	4.4 ± 2.0	NS	3.7 ± 2.1	4.3 ± 1.9	NS
Use of instrumental support	4.0 ± 1.9	3.6 ± 2.0	4.1 ± 1.8	NS	3.1 ± 1.0	4.3 ± 2.0	NS	3.6 ± 1.7	4.2 ± 1.9	NS
Self-distraction	5.7 ± 1.9	6.0 ± 1.9	5.6 ± 1.9	NS	6.0 ± 1.8	5.6 ± 1.9	NS	5.8 ± 1.7	5.6 ± 2.0	NS
Denial	3.4 ± 1.5	4.1 ± 2.2	3.1 ± 1.1	NS	4.1 ± 2.1	3.1 ± 1.2	NS	3.8 ± 1.9	3.1 ± 1.2	NS
Venting	5.5 ± 1.5	6.4 ± 1.1	5.1 ± 1.6	.041*	5.0 ± 1.7	5.6 ± 1.5	NS	5.5 ± 1.6	5.4 ± 1.5	NS
Substance use	2.5 ± 1.6	3.5 ± 2.8	2.2 ± 0.5	NS	3.5 ± 2.8	2.2 ± 0.5	NS	3.0 ± 2.3	2.2 ± 0.5	NS
Behavioral disengagement	3.4 ± 1.9	4.6 ± 2.4	2.9 ± 1.4	.039*	5.1 ± 2.4	2.7 ± 1.1	.010*	4.6 ± 2.2	2.6 ± 1.6	.005*
Self-blame	4.3 ± 1.7	4.5 ± 2.2	4.3 ± 1.6	NS	4.8 ± 2.1	4.2 ± 1.6	NS	4.2 ± 2.0	4.4 ± 1.5	NS

All data are presented as mean ± SD.
NS, non-significant; SD, standard deviation.

psychological well-being and H-RQoL. Depression scores were related to poor emotional functioning, and role limitations in H-RQoL, while anxiety scores related to low vitality, poor emotional functioning, and role limitations. In multivariate analysis of the present study, only depression and anxiety scores were significantly linked to the emotional functioning domain of H-RQoL. Likewise, a study published in our country reported an association between depression and anxiety with poor psychosocial H-RQoL in CF patients. However, the study focused solely on children and adolescents not adult patients. Additionally, depression was associated with an increased likelihood of eating disturbances and gender was found as a significant factor in predicting physical functioning. Overall, these findings provide valuable insights into the relationships between mental health, gender, and physical functioning, highlighting the complexity of these interactions and their implications for quality of life.

Moving to adulthood, this unfavorable childhood disease experience will affect lifelong coping styles in patients with CF, even affecting survival.²⁴ In our study, “acceptance” emerged as the most commonly used coping strategy among the participants. This finding aligns with previous research on young adults transitioning to adult CF care.^{25,26} When examining the impact of coping strategies on the psychosocial dimensions of H-RQoL, we found that the use of “instrumental support/seeking help and advice from others” positively influenced emotional well-being. In contrast, “behavioral disengagement/giving up” had a detrimental effect on emotional H-RQoL. Using “humor” as a coping mechanism was positively associated with

better social functioning. These results are in accordance with prior studies, which have shown that higher levels of “optimism” are linked to better H-RQoL, whereas “distraction” correlates with poorer outcomes.²⁶ Similarly, Hugh et al²⁷ assessed 122 adult CF patients using the CFQ-R and Brief-COPE instruments. They discovered that “active coping” strategies were associated with better social H-RQoL and greater utilization of “religion” and “instrumental support,” moreover “acceptance” was positively correlated with better emotional well-being. A negative association was reported between “distraction” and both social and emotional domains; additionally, higher “substance use” and “disengagement” were associated with lower emotional quality of life.²⁷ Collectively, these findings indicate the notion that enhancing coping skills can significantly improve the quality of life for CF patients.

When we assessed the effect of psychological well-being on coping styles, we observed that “behavioral disengagement” was more likely used by patients at risk for depression and/or anxiety, while “active coping” was less commonly employed among those in the depression risk group. This study’s findings regarding the impact of coping styles on H-RQoL were consistent with similar studies conducted in other countries suggesting that these relationships are not solely influenced by cultural factors.²⁵ Clearly, individuals with mental health risks face challenges in achieving optimal H-RQoL by using different coping strategies.

This study acknowledged certain limitations, including its cross-sectional design, which may not capture temporal

Table 6. Relationship Between Coping Scores and Health-Related Quality of Life Domain Scores

Health-Related Quality of Life Domains	Coping Strategies													
	Active Coping	Planning	Positive Reframing	Acceptance	Humor	Religion	Use of Emotional Support	Use of Instrumental Support	Self-Distraction	Denial	Venting	Substance Use	Behavioral Disengagement	Self-Blame
Physical functioning	-.148	-.178	.145	.220	.140	-.040	.207	.399*	.054	-.253	.126	-.062	-.061	-.162
Vitality	-.253	-.447*	.106	.144	.207	-.352	.163	.265	-.051	-.471**	-.320	.006	-.302	-.429*
Emotional functioning	.057	-.157	.118	.160	.134	.063	.182	.409*	-.047	-.328	-.097	-.135	-.484**	-.134
Eating disturbances	.177	.059	.434*	.218	.201	-.036	.141	.148	.263	-.132	.083	.304	-.312	.257
Treatment burden	-.136	-.156	-.040	-.242	.145	-.087	.143	.208	.244	.046	-.104	.161	.204	.021
Health perception	-.068	-.381*	.097	.183	.234	-.089	.059	.287	.084	-.174	-.321	.020	-.148	-.252
Social functioning	.211	-.115	.302	.331	.393*	.305	.075	.281	.267	-.220	.126	.236	-.204	.083
Body image	.009	-.234	.218	.246	.130	-.114	-.084	-.156	.280	-.140	-.015	.042	-.250	.031
Role limitations	.026	-.155	.218	.136	.198	-.066	.274	.389*	.138	-.429*	-.104	-.056	-.317	-.032
Weight problems	.096	-.095	.156	.081	.032	.012	.051	.004	-.101	.050	.095	-.064	-.336	.050
Respiratory symptoms	-.120	-.263	.036	.134	-.105	.188	.143	.330	.060	-.355	-.077	-.050	-.286	-.302
Digestive symptoms	-.063	-.096	.274	-.036	.041	-.064	-.153	.013	-.066	-.048	.098	-.063	-.196	.193

Correlation analysis * $P < .05$, ** $P < .01$.

variations in health status and mental well-being over time. Additionally, single-center data may not be fully representative of the broader adult CF population. While self-reporting instruments are commonly used, they are subject to individual biases.

In conclusion, this study provides valuable insights into the relationship between coping strategies, psychological well-being, and H-RQoL in adult CF patients. This research indicates that patients with CF have a high risk of mental problems such as anxiety and depression. Given that maintaining a satisfactory quality of life is a central objective for healthcare providers, our study concentrated on identifying the coping strategies that serve as predictors of H-RQoL. Particularly, we found that “behavioral disengagement” was the more commonly used strategy among CF patients with risks for depression and/or anxiety, and negative mental health had an adverse impact on emotional and social aspects of H-RQoL. They tended to use less adaptive coping strategies. Finally, identifying psychological well-being and coping strategies that predict H-RQoL can help healthcare providers for better support CF patients in managing their condition and improving overall well-being.

Ethics Committee Approval: This study was approved by the Ethics Committee of Marmara University (approval number: 09.2016.341; date: May 6, 2016).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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