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# Evaluation of Quality of Life, Anxiety and Depression in People Living with HIV

## HIV ile Yaşayan Kişilerde Yaşam Kalitesi, Anksiyete ve Depresyonun Değerlendirilmesi

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### Abstract

**Introduction:** The topic of health-related quality of life (HRQoL) has become increasingly significant due to the advancements in antiretroviral therapies and the increase in life expectancy among individuals living with people living with human immunodeficiency virus (PLWH). We aimed to ascertain the levels of anxiety, depression, and HRQoL in PLWH.

**Materials and Methods:** This study was conducted between March and November 2020 at Mersin University Hospital, a tertiary level hospital in Turkey. The HRQoL was evaluated using the 36-Item Short Form Health Survey (SF-36), while depression and anxiety were assessed using the Beck Depression Scale (BDS) and Beck Anxiety Scale (BAS), respectively. Based on the univariate analysis results, all candidate variables with a p value of  $<0.25$ , which may clinically be a risk factor for SF-36 physical component summary (PCS) and mental component summary (MCS), were selected and evaluated using multivariate logistic regression analysis.

**Results:** The PCS and MCS scores were significantly lower ( $p<0.05$ ), while the BDS and BAS scores were significantly higher ( $p<0.05$ ) in the PLWH group. The depression and anxiety rates were 31.7% and 22.1%, respectively. Anxiety and depression adversely affected the quality of life ( $p<0.05$ ). Multivariate analysis demonstrated that female sex [ $p=0.040$ , odds ratios (OR): 3.115, 95% confidence interval (CI): 0.109-0.949 for PCS;  $p=0.033$ , OR: 4.200, 95% CI: 0.063-0.893 for MCS], missed outpatient clinic appointments ( $p=0.025$ , OR: 2.397, 95% CI: 1.114-5.159 for PCS;  $p=0.017$ , OR: 3.407, 95% CI: 1.250-9.282 for MCS), depression ( $p=0.001$ , OR: 3.479, 95% CI: 1.612-7.508 for PCS; The risk on MCS could not be calculated), and anxiety ( $p=0.042$ , OR: 2.597, 95% CI: 1.035-6.518 for PCS;  $p=0.001$ , OR: 6.74, 95% CI: 2.153-21.124 for MCS), were factors related to both low PCS and MCS scores.

**Conclusion:** High anxiety and depression levels among the PLWH in our study had an adverse impact on their HRQoL.

**Keywords:** Anxiety, depression, human immunodeficiency virus, acquired immunodeficiency syndrome, health-related quality of life

### Öz

**Giriş:** Antiretroviral tedavilerdeki ilerlemeler ve insan immün yetmezlik virüsü ile yaşayan kişilerde (HİYK) beklenen yaşam süresindeki artışla birlikte, sağlıkla ilişkili yaşam kalitesi (SİYK) giderek daha önemli bir konu haline gelmiştir. Bu çalışmada, HİYK'de anksiyete, depresyon ve SİYK'yi belirlemeyi amaçladık.

**Gereç ve Yöntem:** Bu çalışma; Mart - Kasım 2020 tarihleri arasında Türkiye'deki bir 3. basamak hastane olan Mersin Üniversitesi Hastanesi'nde gerçekleştirilmiş olup 208 HİYK ve 100 sağlıklı birey çalışmaya katılmıştır. SİYK, Kısa Form-36 (SF-36) kullanılarak, depresyon ve anksiyete ise sırasıyla Beck Depresyon Ölçeği (BDÖ) ve Beck Anksiyete Ölçeği (BAÖ) kullanılarak değerlendirilmiştir. Univariate analiz sonuçlarına göre p değeri  $<0,25$  olan ve klinik olarak SF-36 fiziksel bileşen skoru (FBS) ve mental bileşen skoru (MBS) üzerinde risk etmeni olabilecek tüm aday değişkenler seçilerek multivariate lojistik regresyon analizi ile değerlendirildi.

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## Öz

**Bulgular:** İnsan immün yetmezlik virüsü ile yaşayan kişilerde FBS ve MBS anlamlı derecede düşük ( $p<0,05$ ), BDÖ ve BAÖ skorları ise anlamlı derecede yüksekti ( $p<0,05$ ). Depresyon ve anksiyete oranları sırasıyla %31,7 ve %22,1 idi. Anksiyete ve depresyon yaşam kalitesini olumsuz yönde etkilemişti ( $p<0,05$ ). Multivarite analiz sonucuna göre, kadın cinsiyet [FBS için  $p=0,040$ , odds oranı (OR): 3,115, %95 güven aralığı (CI): 0,109–0,949; MBS için  $p=0,033$ , OR: 4,200, %95 CI: 0,063–0,893], poliklinik kontrollerine gelmeme (FBS için  $p=0,025$ , OR: 2,397, 95% CI: 1,114–5,159; MBS için  $p=0,017$ , OR: 3,407, 95% CI: 1,250–9,282), depresyon (FBS için  $p=0,001$ , OR: 3,479, %95 CI: 1,612–7,508; MCS üzerindeki risk hesaplanamamıştır) ve anksiyete (FBS için  $p=0,042$ , OR: 2,597, 95% CI: 1,035–6,518; MBS için  $p=0,001$ , OR: 6,745, 95% CI: 2,153–21,124) hem düşük FBS hem de MBS ile ilişkili faktörlerdir.

**Sonuç:** Çalışmamızda, HİYK'de anksiyete ve depresyon düzeyleri yüksekti ve SİYK üzerinde olumsuz etkisi olmaktadır.

**Anahtar Kelimeler:** Anksiyete, depresyon, insan immün yetmezlik virüsü, AIDS, sağlıkla ilişkili yaşam kalitesi

## INTRODUCTION

As of 2021, approximately 38.4 million people worldwide are estimated to be infected with human immunodeficiency virus (HIV). Of these, 1.8 million individuals reside in Eastern Europe and Central Asia, including Turkey<sup>[1]</sup>. Although the prevalence of HIV infection in Turkey is low, it is one of the regions that is experiencing an increase in the disease prevalence. According to official data, nearly 34,000 people are currently living with HIV in Turkey, and between January and November 2022, approximately 3,000 new HIV diagnoses have been made<sup>[2]</sup>.

Advancements in antiretroviral therapy (ART) have transformed acquired immunodeficiency syndrome (AIDS) from a fatal illness into a manageable chronic condition, allowing patients to attain a normal life expectancy<sup>[3]</sup>. Consequently, the health-related quality of life (HRQoL) for people living with HIV (PLWH) has become increasingly significant. It is widely acknowledged that optimal treatment outcome objectives should encompass improvements in HRQoL<sup>[4]</sup>. Studies report that PLWH typically experience a lower HRQoL compared to the general population<sup>[5,6]</sup>. Therefore, the enhancement of HRQoL has been suggested as a key goal in addition to the 90-90-90 targets set by UNAIDS<sup>[7]</sup>.

The World Health Organization defines quality of life as an individual's perception of their position in life within the context of their culture and value systems, encompassing their goals, expectations, standards, and concerns<sup>[8]</sup>. It is a multidimensional concept that incorporates physiological, psychological, and social aspects. Health-related quality of life specifically assesses the impact of a disease and its treatment on an individual's quality of life<sup>[9,10]</sup>. Measuring HRQoL is valuable as it can help predict behaviors detrimental to health<sup>[11]</sup>. Furthermore, identifying HRQoL determinants for PLWH can have a substantial impact on their social and medical well-being.

Sociodemographic and clinical variables are linked to the HRQoL in PLWH. In addition, to physical health challenges, PLWH experience psychological issues, such as depression and anxiety, which are more prevalent in this demographic than in the

general public. Depression and anxiety significantly influence the HRQoL in PLWH<sup>[11,12]</sup>.

The national multicenter study assessing UNAIDS targets revealed that Turkey has essentially achieved the last two goals of the 90-90-90 targets, but lacks data for the initial 90-target, i.e., 90% of PLWH will know their HIV status<sup>[13]</sup>. Similar to the findings of other studies conducted in Turkey, although the 2<sup>nd</sup> and 3<sup>rd</sup> 90-target were almost achieved, the success rate for the first 90-target was reported as 48-50%<sup>[14,15]</sup>.

Although these targets have been nearly achieved, studies on depression, anxiety, and HRQoL among PLWH in Turkey, which could provide valuable insights from a biopsychosocial perspective, are limited<sup>[16-21]</sup>.

This study aimed to examine and contrast the levels of anxiety, depression, and HRQoL among PLWH and healthy volunteers in Turkey. The objective is to comprehend the impact of HIV infection on these outcomes and to explore the factors that influence HRQoL. The findings of this study are anticipated to optimize comprehensive treatments for PLWH and improve clinical outcomes by offering insights into the specific challenges encountered by PLWH in our country.

Given the limited number of studies on this topic in Turkey, we believe that our findings will be beneficial.

## Materials and Methods

### Study Design and Population

This single-center, cross-sectional study, conducted between March and November 2020, involved 208 PLWH and 100 healthy volunteers who met the inclusion and exclusion criteria.

Exclusion criteria for PLWH:

- Age under 18.
- Human immunodeficiency virus diagnosis within the first six months of enrollment.
- Patients with cognitive impairment that prevents them from understanding and filling out the study forms.

Exclusion criteria for healthy volunteers:

- Age under 18.
- Those with a chronic disease.
- Those with cognitive impairment that prevents them from understanding and filling out the study forms.

The participants of this study were PLWH who were treated and monitored at a Mersin University Hospital, a tertiary-level hospital in Turkey between March and November 2020. We aimed to maintain the highest feasible number of HIV-infected patients in this study. Therefore, there was no sampling in the PLWH group. This study included HIV-infected patients older than 18 years who were willing to participate in the current study and who visited the routine outpatient clinic control. Thus, the study included 208 of the 320 patients who had been regularly monitored by the department of infectious diseases.

The study included one hundred healthy volunteers who met the exclusion and inclusion criteria and resided in the city where the study was conducted. The study was approved by the Mersin University of Clinical Research Ethics Committee (protocol number: 2020/168, date: 20.02.2020).

### Data Collection

Demographic and epidemiological variables, including age, sex at birth, marital status, educational status, occupation, and monthly income, were requested from participants in both groups on a self-completed form. The sociodemographic characteristics of all participants are outlined in Table 1.

The PLWH group was provided with an additional form detailing the epidemiological and clinical characteristics of the disease. Information regarding sexual orientation, route of transmission, time since diagnosis, duration of HIV treatment, baseline and current HIV RNA levels, and current CD4 counts was included in this form. In addition, data on the presence of comorbidities, smoking and alcohol habits, the quantity of ART tablets, regular ART use, ART adverse effects, and the transition from a multitablet regimen to a single-tablet regimen were evaluated. The definitions of the other queries in this form are as follows:

**Outpatient visit attendance:** Indicates whether the participant had missed at least two appointments within the past year (yes or no).

**Presence of lipodystrophy:** The individual's self-perception and self-report for lipodystrophy was used to ascertain the presence of lipodystrophy in our study participants.

**History of psychiatric illness:** Determined by whether the participant had been diagnosed with a psychiatric disorder by a psychiatrist prior to the commencement of our study.

**Satisfaction with communication with the doctor:** assessed by the participant's feedback regarding their communication experiences with their healthcare provider.

The socioepidemiological data in the form was provided by the participant. The physician who conducted the study completed the medical information by reviewing the medical record. The epidemiological and clinical characteristics of the PLWH are illustrated in Table 2.

The 36-Item Short Form Health Survey (SF-36) scale, the Beck Depression Scale, and the Beck Anxiety Scale were administered to both the PLWH and healthy volunteers to evaluate the quality of life, depression, and anxiety status, respectively.

**Table 1. Comparison of the sociodemographic characteristics of the study participants**

	PLWH (n=208)	Healthy (n=100)	P
Age (mean±SD) (minimum-maximum)	39.8±13.74 (18-74)	40.31±14.35 (18-69)	0.770
Sex at birth n (%)			
Female	21 (10.1)	9 (9.0)	0.761
Male	187 (89.9)	91 (91)	
Education n (%)			
College/university	77 (37.0)	39 (39.0)	
High school	47 (22.6)	25 (25.0)	0.410
Secondary school	25 (12.0)	16 (16.0)	
Illiterate/elementary school	59 (28.4)	20 (20.0)	
Marital status n (%)			
Single	107 (51.4) <sup>†</sup>	34 (34.0) <sup>†</sup>	
Married	73 (35.1) <sup>†</sup>	55 (55.0) <sup>†</sup>	0.004
Widow/divorced	28 (13.5)	11 (11.0)	
Occupation n (%)			
Student	20 (9.6)	8 (8.0)	
Tradesmen	56 (26.9)	30 (30.0)	
Civil servant	22 (10.6) <sup>†</sup>	25 (25.0) <sup>†</sup>	0.007
Housewife	16 (7.7)	8 (8.0)	
Private sector worker	94 (45.2) <sup>†</sup>	29 (29.0) <sup>†</sup>	
Monthly incomen n (%)**			
Above the poverty line (≥1220 \$)	23(11.1) <sup>†</sup>	22 (22.0) <sup>†</sup>	
Between the minimum wage and poverty threshold	86 (41.3) <sup>†</sup>	54 (54.0) <sup>†</sup>	0.0002
Minimum wage and below (≤373 \$)	99 (47.6) <sup>†</sup>	24 (24.0) <sup>†</sup>	

\*\*01 March 2020 official minimum wage and poverty line are used as reference. The difference between the ratio marked with <sup>†</sup> and the ratio marked with <sup>‡</sup> is statistically significant.

PLWH: People living with human immunodeficiency virus, SD: Standard deviation

**Table 2. Clinical and epidemiological characteristics of the people living with HIV**

	n	%
Sexual orientation		
Opposite sex	139	66.8
Both opposite and the same sex	27	13.0
Same sex	42	20.2
Comorbidity		
No	161	77.4
Yes	47	22.6
The mode of transmission of the disease		
Sexually	152	73.1
Unknown	43	20.7
By other means (blood/surgical/perinatal)	13	6.3
Baseline CD4?		
≥500	79	38.0
201-499	88	42.3
<200	41	19.7
Current CD4		
≥500	160	76.9
201-499	44	21.2
<200	4	1.9
Baseline HIV RNA levels		
<100.000 cp/ml	100	48.3
≥100.000 cp/ml	107	51.7
Current HIV RNA levels		
Undetermined (<50 cp/ml)	146	83.4
Identifiable (≥50 cp/ml)	29	16.6
How long has he/she been receiving HIV treatment?		
More than 1 year	162	78.6
Less than 1 year	44	21.4
Number of tablets		
Single tablet	161	78.2
Multiple tablets	45	21.8
Have you switched from multitablet to a single tablet?		
Yes	55	26.4
No	153	73.6
Have you missed outpatient clinic appointments at least twice in the last year?		
No	163	78.4
Yes	45	21.6
Discontinuation or irregular use of ART?		
No	179	86
Yes	29	14
Are you satisfied with your doctor's communication?		
Yes	178	85.6
No	30	14.4

**Table 2. Continued**

	n	%
Self-report of lipodystrophy?		
No	167	81.1
Yes	39	18.9
ART side effect?		
No	162	77.9
Yes	46	22.1
Smoking status		
No	88	42.3
Quit	19	9.1
Yes	101	48.6
Alcohol consumption?		
No	145	69.7
Yes	63	30.3
History of psychiatric diagnosis?		
No	190	91.3
Yes	18	8.7
Duration of illness (month) median [Q1-Q3]		36 (16.25-60)

PLWH: People living with human immunodeficiency virus, SD: Standard deviation, ART: Antiretroviral therapy

## Assessment Tools

### Short Form-36 Scale

This quality-of-life scale was developed by Ware and Sherbourne<sup>[22]</sup> and comprises 36 questions that address eight categories: physical functioning, role physical, bodily pain (BP), general health, vitality (VT), social functioning (SF), role emotional, and mental health (MH). This scale evaluates health on a scale of 0 to 100, with higher scores indicating better quality of life. The sub-scales can be combined to generate two summary measures: physical component summary (PCS) and mental component summary (MCS) scores. The SF-36 is an extensively used and validated instrument for HRQoL evaluation. Prior studies have reported equal use of both generic and HIV-specific instruments. Studies that compared PLWH with individuals without HIV were more likely to utilize generic instruments such as the SF-36 scale. Generic instruments were preferred for comparative studies because they effectively capture the differences in HRQoL between those with and without the disease<sup>[23]</sup>. Therefore, we used SF-36 in our study.

Several studies have confirmed that individuals with PCS and MCS >50 experience an improved quality of life<sup>[24-26]</sup>. In our study, PCS and MCS were classified as ≤50 and >50, respectively, in accordance with the existing literature.

### Beck Depression Scale

It is a 21-question, self-assessment scale developed by Beck in which each item is scored between 0 and 3<sup>[27]</sup>. Higher scores suggest that depressive symptoms are more severe, with the maximum possible score being 63. Hisli<sup>[28]</sup> conducted a validity and reliability investigation for Turkey, and the cutoff point for clinically significant depression in the Turkish language version was established as 17. Beck Depression Scale was utilized because it can be applied to both healthy volunteers and PLWH.

### Beck Anxiety Scale

It is a self-assessment scale developed by Beck, consisting of 21 questions, in which each item is scored between 0 and 3<sup>[29]</sup>. The maximum attainable score is 63, with higher scores indicating greater severity of anxiety symptoms. A validity and reliability study for the Turkish version was conducted by Ulusoy<sup>[30]</sup>. The recommended minimal score for diagnosing clinically significant anxiety in BAS is 16<sup>[31]</sup>. Beck Anxiety Scale was used as it can be applied to both healthy volunteers and PLWH.

### Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences 26 software (trial version). The Kolmogorov-Smirnov test was used to verify the normal distribution of the data. The age was the sole variable summarized in terms of mean±standard deviation. The other numerical variables were summarized using the median (Q<sub>1</sub>-Q<sub>3</sub>) values. Categorical variables are presented as numbers and percentages (n, %).

The age means were compared using the Student's t-test. The Mann-Whitney U test was utilized to compare the median of the groups. Box and whisker plots were drawn in accordance with the group's scores. Categorical variables were compared using the chi-square test. The two ratio Z test was implemented for ratio comparisons in accordance with the results of the chi-square test.

Multivariate logistic regression analysis was conducted using the backward stepwise method to evaluate all candidate variables with  $p < 0.25$  and potential clinical risk factors for PCS and MCS, as determined by the univariate analysis results. Odds ratios (ORs) and 95% confidence intervals (CIs) were also calculated. The odds ratio, which did not include a CI of 1, was considered statistically significant.

For all statistical comparisons, a  $p \leq 0.05$  was considered statistically significant.

## Results

The study comprised 308 participants, including 208 PLWH, four of whom were AIDS patients, and 100 healthy volunteers.

The mean age of the PLWH group participants was  $39.8 \pm 13.74$  (minimum-maximum: 18-74), while that of the healthy group participants was  $40.3 \pm 14.3$  (minimum-maximum: 18-69). Males comprised 89.9% (n=187) of the PLWH participants, while females comprised 10.1% (n=21). Among the healthy group participants, 91% (n=91) were male and 9% (n=9) were female. The groups demonstrated comparable distribution in terms of age, sex, and educational status, and there were no statistically significant differences between them ( $p > 0.05$ ).

There was a statistically significant correlation between marital status and the groups ( $p < 0.05$ ). The rate differences contributing to this relationship are as follows: The proportion of singles in the PLWH group (51.4%) was significantly higher than that of the healthy individuals' group (34%); the percentage of married individuals was significantly lower (35.1%) in the PLWH group than in the healthy individuals's group (55%). The differences between these rates are statistically significant ( $p < 0.05$ ). Conversely, the proportions of widowed/divorced individuals were comparable in both groups ( $p > 0.05$ ).

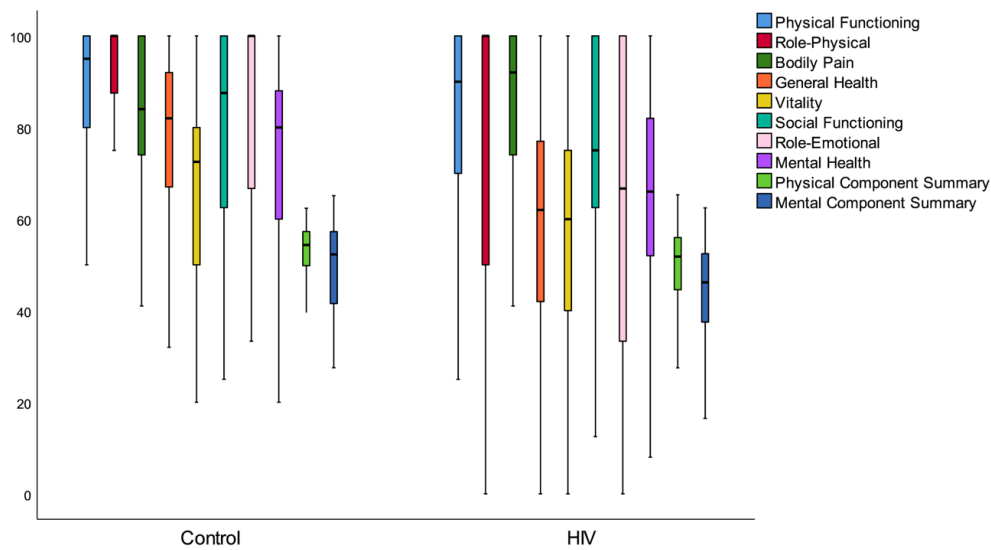
There was a statistically significant relationship between the groups in terms of the participants' occupation ( $p < 0.05$ ). In the PLWH group, the proportion of public employees was substantially lower (10.1%) than in the healthy individuals' group (25%). Conversely, the percentage of participants employed in the private sector was significantly higher (45.2%) in the PLWH group than in the group of healthy individuals (29%).

A statistically significant relationship was observed between the groups in terms of the monthly income of the participants ( $p < 0.05$ ). The PLWH group comprised a significantly lower proportion (11.1%) of individuals with a monthly income above the minimum wage compared to those in the healthy individuals' group (22%). The percentage of individuals with a monthly income between the minimum wage and the poverty threshold was significantly lower (41.3%) in the PLWH group than in the healthy individuals' group (54%). However, the proportion of individuals with an income equivalent to the minimum wage and below ( $\leq 373$  \$) was significantly higher ( $p < 0.05$ ) in the PLWH group (47.6%) than in the healthy individuals's group (24%).

The statistical comparisons of the sociodemographic characteristics of PLWH and healthy volunteers are illustrated in Table 1.

The HRQoL scores among the PLWH group participants ranged from 60 (VT) to 100 (BP). In the PLWH group, the scores were low in all subgroups except for BP. The scores of the seven subgroups of SF-36 (except BP subgroup) and PCS-MCS scores among the PLWH group participants were significantly lower than those of the healthy volunteers. Anxiety and depression scores were higher than those of the healthy volunteers (Figure 1, Table 3). The PLWH group demonstrated higher median scores for





**Figure 1.** Median scores of healthy volunteers and people living with HIV on Short Form-36 survey  
HIV: Human immunodeficiency virus

**Table 3. Comparison of the Short Form-36, Beck Depression Scale, and Beck Anxiety Scale Scores of people living with HIV and healthy volunteers**

		PLWH (n=208) Median (Q <sub>1</sub> -Q <sub>3</sub> )	Healthy group(n=100) Median (Q <sub>1</sub> -Q <sub>3</sub> )	p
Physical functioning		90.00 (70.00-100.00)	95.00 (80.00-100)	<b>0.009</b>
Role physical		100.00 (50.00-100.00)	100.00 (81.25-100)	<b>0.001</b>
Bodily pain		92.00 (74.00-100.00)	84.00 (74.00-100)	0.086
General health perception		62.00 (42.00-77.00)	82.00 (67.00-92.00)	<b>&lt;0.001</b>
Vitality		60.00 (40.00-75.00)	72.50 (50.00-80.00)	<b>0.001</b>
Social functioning		75.00 (62.50-100.00)	87.50 (62.50-100.00)	<b>0.040</b>
Role emotional		66.67 (33.33-100.00)	100.00 (66.67-100.00)	<b>&lt;0.001</b>
Mental health		66.00 (52.00-83.00)	80.00 (60.00-88.00)	<b>0.001</b>
Physical component summary		51.81 (44.57-56.00)	54.35 (49.74-57.28)	<b>0.003</b>
Mental component summary		46.18 (37.48-52.45)	52.29 (41.24-57.28)	<b>&lt;0.001</b>
Beck Depression Scale		11.00 (5.00-19.00)	3.50 (0.0-9.00)	<b>&lt;0.001</b>
Beck Anxiety Scale		7.00 (3.00-15.00)	4.00 (1.00-7.00)	<b>&lt;0.001</b>
Depression*	No n (%)	142 (68.3)	92 (92.0)	<b>&lt;0.001</b>
	Yes n (%)	66 (31.7)	8 (8.0)	
Anxiety**	No n (%)	162 (77.9)	91 (91.0)	<b>0.005</b>
	Yes n (%)	46 (22.1)	9 (9.0)	

\*: Those with a Beck Depression Scale score of 17 or above were considered as "yes." \*\*: Those with a Beck Anxiety Scale score of 16 or above were considered as "yes".

PLWH: People living with human immunodeficiency virus

depression and anxiety ( $p < 0.0001$ ) than the healthy volunteers group. Depression was diagnosed in 31.7% and anxiety in 22.1% of the patients, and the co-occurrence rate of depression and anxiety was revealed to be 15.9%. The depression and anxiety rates were higher in the PLWH group than in the healthy group participants ( $p < 0.05$ ) (Table 3). The univariate analysis results revealed that lipodystrophy, number of tablets, ART adverse

effects, missed outpatient clinic appointments, and the presence of depression and anxiety were the factors affecting both PCS and MCS scores among the PLWH group participants. Tables 4 and 5 illustrate the univariate analysis outcomes of the factors that influence PCS and MCS scores among the PLWH group participants.

**Table 4. Univariate analysis of factors affecting the physical component summary and mental component summary scores of people living with HIV**

	PCS ≤50 (n=88)	PCS >50 (n=120)	p	MCS ≤50 (n=141)	MCS >50 (n=67)	p
Age (mean±SD)	43.6±14.1	37.05±12.6	<b>0.001</b>	39.5±13.8	40.5±13.7	0.609
Sex at birth						
Female	14 (15.9)	7 (5.8)	<b>0.021</b>	18 (12.8)	3 (4.8)	0.064
Male	74 (84.1)	113 (94.2)		123 (87.2)	64 (95.2)	
Marital status						
Single	34 (38.6)	73 (60.8)	<b>0.007</b>	75 (53.2)	32 (47.8)	0.757
Married	39 (44.3)	34 (28.3)		48 (34)	25 (37.3)	
Widow/divorced	15 (17)	13 (10.8)		18 (12.8)	10 (14.9)	
Education						
Primary school	36 (40.9)	21 (17.5)	<b>0.001</b>	41 (29.1)	16 (23.9)	0.836
Secondary school	12 (13.6)	14 (11.7)		18 (12.8)	8 (11.9)	
High school	14 (15.9)	33 (27.5)		30 (21.3)	17 (25.4)	
University	26 (29.5)	52 (43.3)		52 (36.9)	26 (38.8)	
Occupation						
Student	2 (2.3)	18 (15)	<b>0.001</b>	14 (9.9)	6 (9)	0.795
Self-employed	19 (21.6)	37 (30.8)		35 (24.8)	21 (31.3)	
Civil servant	11 (12.5)	11 (9.2)		17 (12.1)	5 (7.5)	
Housewife	12 (13.6)	4 (3.3)		11 (7.8)	5 (7.5)	
Private sector	44 (50)	50 (41.7)		64 (45.4)	30 (44.8)	
Monthly income*						
Minimum wage and below (≤373 \$)	47 (53.4)	53 (44.2)	0.402	73 (51.8)	27 (40.3)	0.130
Between the minimum wage and poverty threshold	34 (38.6)	57 (47.5)		55 (39)	36 (53.7)	
Above the poverty line (≥1220 \$)	7 (8)	10 (8.3)		13 (9.2)	4 (6)	
Comorbidity?						
Yes	31 (35.2)	16 (13.3)	<b>0.001</b>	35 (24.8)	12 (17.9)	0.265
No	57 (64.8)	104 (86.7)		106 (75.2)	55 (82.1)	
Missed outpatient clinic appointments <sup>#</sup>						
Yes	27 (30.7)	18 (15)	<b>0.010</b>	39 (27.7)	6 (9)	<b>0.002</b>
No	61 (69.3)	102 (85)		102 (72.3)	61 (91)	
Sexual orientation						
Opposite sex	67 (76.1)	72 (60)	<b>0.047</b>	90 (63.8)	49 (73.1)	0.242
Both opposite and the same sex	9 (10.2)	18 (15)		18 (12.8)	9 (13.4)	
Same sex	12 (13.6)	30 (25)		33 (23.4)	9 (13.4)	
Mode of disease transmission?						
Sexually	66 (75)	86 (71.7)	0.415	107 (75.9)	45 (67.2)	0.314
By other means (blood/surgical/perinatal)	7 (8)	6 (5)		9 (6.4)	4 (6)	
Unknown	15 (17)	28 (23.3)		25 (17.7)	18 (26.9)	
History of psychiatric illness?						
Yes	13 (14.8)	5 (4.2)	<b>0.007</b>	15 (10.6)	3 (4.5)	0.140
No	75 (85.2)	115 (95.8)		126 (89.4)	64 (95.5)	
Beck Depression Scale**						
Yes	46 (52.3)	21 (17.5)	<b>&lt;0.001</b>	67 (47.5)	0	<b>&lt;0.001</b>
No	42 (47.7)	99 (82.5)		74 (52.5)	67 (100)	

**Table 4. Continued**

	PCS ≤50 (n=88)	PCS >50 (n=120)	p	MCS ≤50 (n=141)	MCS >50 (n=67)	p
Beck Anxiety Scale***						
Yes	32 (36.4)	12 (10)	<b>&lt;0.001</b>	40 (28.4)	4 (6)	<b>&lt;0.001</b>
No	56 (63.6)	108 (90)		101 (71.6)	63 (94)	

The data are summarized as n (%). \*01 March 2020 official minimum wage and poverty line are used as reference. †At least twice in the last year. \*\*Those with a Beck Depression Scale score of 17 or above were considered "yes". \*\*\*Those with a Beck Anxiety Scale score of 16 or above were considered "yes".

PCS: Physical component summary of Short Form-36, MCS: Mental component summary of the Short Form-36, PLWH: People living with human immunodeficiency virus, SD: Standard deviation

**Table 5. Univariate analysis of factors affecting the physical component summary and mental component summary scores of people living with HIV**

	PCS ≤50 (n=88)	PCS >50 (n=120)	p	MCS ≤50 (n=141)	MCS >50 (n=67)	p
ART side effect						
Yes	26 (29.5)	20 (16.7)	<b>0.027</b>	38 (27)	8 (11.9)	<b>0.015</b>
No	62 (70.5)	100 (83.3)		103 (73)	59 (88.1)	
Baseline HIV RNA (cp/ml)						
≥100.000	48 (54.5)	59 (49.6)	0.480	65 (46.4)	42 (62.7)	<b>0.029</b>
<100.000	40(45.5)	60 (50.4)		75 (53.6)	25 (37.3)	
Current CD4 count (c/mm <sup>3</sup> )						
≥500	69 (78.4)	91 (75.8)	<b>0.017</b>	112 (79.4)	48 (71.6)	0.382
200-499	15 (17)	29 (24.2)		26 (18.4)	18 (26.9)	
<200	4 (4.5)	0		3 (2.1)	1 (1.5)	
Current HIV RNA (cp/ml)						
Undetermined (<50 cp/ml)	63 (84)	83 (83)	0.860	100 (83.3)	46 (83.6)	0.960
Identifiable (≥50 cp/ml)	12 (16)	17 (17)		20 (16.7)	9 (16.4)	
Duration of the treatment						
Less than 1 year	18 (20.5)	26 (22)	0.784	27 (19.3)	17 (25.8)	0.290
More than 1 year	70 (79.5)	92 (78)		113 (80.7)	49 (74.2)	
Number of tablets						
Single tablet	62 (70.5)	99 (83.9)	<b>0.021</b>	104 (74.3)	57 (86.4)	<b>0.050</b>
Multiple tablets	26 (29.5)	19 (16.1)		36 (25.7)	9 (13.6)	
Switch from multitablet to single tablet						
Yes	23 (26.1)	32 (26.7)	0.932	32 (22.7)	23(34.3)	<b>0.075</b>
No	65 (73.9)	88 (73.3)		109 (77.3)	44 (65.7)	
Discontinuation or irregular use of ART						
Yes	15 (17)	14 (11.7)	0.269	23 (16.3)	6 (9)	0.152
No	73(83)	106 (88.3)		118 (83.7)	61 (91)	
Self-report of lipodystrophy?						
Yes	23 (26.4)	16 (13.4)	<b>0.019</b>	32 (23)	7 (89.6)	<b>0.031</b>
No	64 (73.6)	103 (86.6)		107 (77)	60 (10.4)	
Smoking						
Yes	45 (51.1)	56 (46.7)	0.802	76 (53.9)	25 (37.3)	0.079
Quit	8 (9.1)	11 (9.2)		11 (7.8)	8 (11.9)	
No	35 (39.8)	53 (44.2)		54 (38.3)	34 (50.7)	



**Table 5. Continued**

	PCS ≤50 (n=88)	PCS >50 (n=120)	p	MCS ≤50 (n=141)	MCS >50 (n=67)	p
Alcohol consumption						
Yes	23 (26.1)	40 (33.3)	0.264	47 (33.3)	16 (23.9)	0.166
No	65 (73.9)	80 (66.7)		94 (66.7)	51 (76.1)	
Are you satisfied with your doctor's communication?						
Good	70 (79.5)	108 (90)	<b>0.034</b>	118 (83.7)	60 (89.6)	0.261
Bad	18 (20.5)	12 (10)		23 (16.4)	7 (10.4)	

The data are summarized as n (%).

PCS: Physical component summary of Short Form-36, MCS: Mental component summary of Short Form-36, PLWH: People living with human immunodeficiency virus, ART: Antiretroviral therapy

Multivariate analysis revealed that female sex (p=0.040, OR: 3.115, 95% CI: 0.109-0.949 for PCS; p=0.033, OR: 4.200, 95% CI: 0.063-0.893 for MCS), missed outpatient clinic appointment (p=0.025, OR: 2.397, 95% CI: 1.114-5.159 for PCS; p=0.017, OR: 3.407, 95% CI: 1.250-9.282 for MCS), depression (p=0.001, OR: 3.479, 95% CI: 1.612-7.508 for PCS. The risk on MCS could not be calculated), and anxiety (p=0.042, OR: 2.597 95% CI: 1.035-

6.518 for PCS; p=0.001, OR: 6.745 95% CI: 2.153-21.124 for MCS) were factors linked to low PCS and MCS scores.

Table 6 summarizes the association between sociodemographic and clinical factors and PCS and MCS as indicated by the multivariate analysis.

**Table 6. Multivariate logistic regression analysis results of factors affecting the physical component summary and mental component summary scores of people living with HIV**

Independent variables	PCS		MCS	
	OR (95% CI)	p	OR (95% CI)	p
Sex at birth				
Female	3.115 (0.109-0.949)	0.040	4.200 (0.063-0.893)	0.033
Male*				
Education				
Primary school	2.500 (1.100-5.684)	0.029		
Secondary school	1.344 (0.489-3.691)	0.567		
High school	0.645 (0.264-1.574)	0.335		
University*				
Comorbidity?				
Yes	3.424 (1.591-7.371)	0.002		
No*				
Missed outpatient clinic appointments**				
Yes	2.397 (1.114-5.159)	0.025	3.407 (1.250-9.282)	0.017
No*				
Beck Depression Scale <sup>+</sup>				
Yes	3.479 (1.612-7.508)	0.001		
No*				
Beck Anxiety Scale <sup>§</sup>				
Yes	2.597 (1.035-6.518)	0.042	6.745 (2.153-21.124)	0.001
No*				

**Table 6. Continued**

Independent variables	PCS		MCS	
	OR (95% CI)	p	OR (95% CI)	p
ART side effect				
Yes	2.121 (0.990–4.546)	0.053	2.835 (1.112–7.228)	0.029
No*				
Baseline HIV-RNA (cp/ml)				
≥100.000				
<100.000*			0.448 (0.230–0.873)	0.018
From multitablet to a single-tablet switch				
Yes				
No*			2.881 (1.367–6.072)	0.017
Smoking				
Yes			2.088 (1.026–4.246)	0.042
Quit			0.624 (0.202–1.921)	0.411
No*				

∗: Reference category for multivariate logistic regression. †: At least twice in the last year. ‡: Those with a Beck Depression Scale score of 17 or above were considered "yes." §: Those with a Beck Anxiety Scale score of 16 or above were considered "yes".

OR: Odds ratio, CI: 95% confidence interval for OR, PCS: Physical component summary of Short Form-36, MCS: Mental component summary of Short Form-36, PLWH: People living with human immunodeficiency virus

## Discussion

In our study, we noted significantly lower scores in all SF-36 subgroup scores (except BP) as well as PCS and MCS scores among the PLWH group participants compared to the healthy volunteers. The HRQoL scores among the PLWH group participants ranged from 60 (VT) to 100 (BP), indicating a general decrease in scores in all subgroups except for BP. This emphasizes the decrease in HRQoL resulting from HIV infection. Various studies have consistently documented similar negative effects of HIV on HRQoL<sup>[5,6,26,32,33]</sup>. Similarly, studies in Turkey have discovered lower SF-36 subgroup scores in PLWH than in the general population<sup>[17,18]</sup>. Barger et al.<sup>[34]</sup> reported that only ~63% of PLWH reported experiencing a good or very good QoL, although they attained the 90-90-90 UNAIDS target in the late 2010s. To summarize, even when viral suppression was achieved and immunity was good, PLWH experienced a poor HRQoL compared with the general population<sup>[5,6]</sup>. However, certain studies conducted in countries like the Netherlands, the United Kingdom, Romania, and Spain have reported higher HRQoL among PLWH, indicating that progress has been made in these regions<sup>[11,12]</sup>. This is a positive and prospective improvement; however, the HRQoL in many different territories remains low. Due to numerous potential factors, including higher income, easier access to medical facilities, as well as reduced stigma and unemployment concerns, it appears that it is more feasible to achieve a higher HRQoL in patients from developed countries.

Given the variability in HRQoL across various countries and societies, understanding the contributing factors is crucial for developing effective interventions for PLWH. In our study, multivariate analysis identified depression, anxiety, female sex, and missed outpatient clinic appointments as factors influencing both PCS and MCS in PLWH. Additionally, univariate analysis detected lipodystrophy, number of tablets, ART adverse effects, and the presence of depression and anxiety as variables associated with low PCS and MCS scores among PLWH.

We observed higher rates of depression (31.7%) and anxiety (22.1%) among PLWH compared to the control group, with both conditions strongly correlating with lower MCS and PCS scores, respectively. These findings are consistent with the existing literature, which emphasizes the importance of depression and anxiety as significant determinants of HRQoL in PLWH<sup>[11,12,35,36]</sup>. Popping et al.<sup>[11]</sup> reported that anxiety and depression are primary contributors to lower HRQoL, noting a prevalence approximately twice as high among PLWH compared to the general population. Similarly, a collaborative study conducted by Kall et al.<sup>[12]</sup> in Romania and Spain highlighted significantly elevated levels of anxiety and depression among PLWH compared to the general population. Anxiety was diagnosed in 25.7% of 307 PLWH in a web-based questionnaire study conducted in Turkey using BAS<sup>[16]</sup>. In a study conducted in Turkey using the Hospital Anxiety and Depression Scale, anxiety was identified in 12.9% of the 217 PLWH, while depression was identified in 27.6% of the same group<sup>[20]</sup>. Another study using the Hospital Anxiety and

Depression Scale found depression in 56% and anxiety in 37% of PLWH<sup>[21]</sup>. In our study, the prevalence rates of depression and anxiety among PLWH are in close agreement with the current literature. Although making precise comparisons is challenging, studies conducted from the 1990s on the present report elevated levels of depression and anxiety among PLWH<sup>[11,12,16,37,38]</sup>.

However, the reported rates of these MH conditions are subject to significant variation across studies. This may be attributed to diverse factors, including variations in patient clinical profiles, access to treatment, environmental and social contexts, the use of diverse assessment scales for depression and anxiety, and discrepancies in scale scoring methods.

Despite significant advancements in HIV diagnosis and treatment, the persistently high prevalence of anxiety and depression highlights the critical confluence of HIV and psychiatric comorbidities. This emphasizes the ongoing necessity for comprehensive care strategies that encompass both the medical and psychological components of HIV management.

Our study revealed that the female gender was associated with worse PCS and MCS scores in PLWH. In various studies, female sex has been linked to lower HRQoL<sup>[35,36,39]</sup>. It has been reported that there is no relationship between sex and HRQoL in PLWH<sup>[40]</sup>. There is no consensus on the effect of sex on HRQoL<sup>[41]</sup>. The influence of gender on HRQoL in PLWH remains debated and may differ depending on the social and cultural context.

In our study, missed outpatient clinic appointments were one of the factors associated with poor HRQoL. Optimizing adherence to treatment and improving health outcomes in PLWH necessitates consistent patient follow-up. It is essential to monitor ART adherence, prevent the progression of HIV infection, and identify complications at an early stage. Overall, consistent patient monitoring constitutes a cornerstone of HIV care, contributing substantially to the treatment efficacy and HRQoL in PLWH.

Rodriguez-Penney et al.<sup>[42]</sup> used the Charlson index to evaluate the burden of comorbidities and discovered that it negatively affected physical QOL in PLWH. This is in agreement with the results of our research and those of other investigations<sup>[34]</sup>. The comorbidities can reduce the quality of life due to the diminished physical capacity, multi-drug use, and related adverse effects.

Poorer HRQoL has been linked to low educational status in numerous studies, similar to our investigation<sup>[34,43]</sup>. Conversely, the level of education is not related to the quality of life, according to certain studies<sup>[12,26]</sup>. The influence of educational success on PLWH can be multifaceted. Education frequently influences employment opportunities, socioeconomic status, and the extent of one's understanding of the disease. Higher education levels may improve an individual's ability to

manage HIV, enhance their knowledge about the disease, and consequently improve various domains of HRQoL.

In our study, smokers exhibited a lower QOL. This finding is corroborated by several other studies in the literature<sup>[34,44-46]</sup>. Although some studies have reported lower PCS among smokers due to the detrimental effects of smoking on physical health, our research specifically noted a decline in MCS scores<sup>[34,46]</sup>. Smoking has a detrimental impact on numerous organs, increases the risk of comorbidities, and diminishes physical capacity. Therefore, while low PCS can be expected, our study highlighted a notable impact on MCS. We hypothesize that smoking may be linked to the notion of coping with the social and psychological problems resulting from the disease.

### Study Limitations

There were various limitations of our study. Our study was a single-center, cross-sectional study. The number of study participants was small. The HIV-specific quality of life scale was not employed to ascertain the quality of life. Additionally, the investigation did not address organic conditions, including anemia, hypothyroidism, and vitamin B12 deficiency, which may contribute to psychiatric symptoms, particularly depression.

## Conclusion

Improving HRQoL in PLWH is one of the primary therapeutic endpoints. To achieve this goal, detecting factors influencing HRQoL and improving the negative factors should be among the principal objectives.

### Ethics

**Ethics Committee Approval:** The study was approved by the Mersin University of Clinical Research Ethics Committee (protocol number: 2020/168, date: 20.02.2020).

**Informed Consent:** Consent form was filled out by all participants.

**Presented in:** This manuscript represents the research thesis of the corresponding author and was presented as a poster abstract at the 5th HIV/AIDS Congress held in Turkey.

### Footnotes

#### Authorship Contributions

Surgical and Medical Practices: M.S.Ş., Concept: M.S.Ş., F.Ö.K., G.E., Design: M.S.Ş., F.Ö.K., S.A., G.E., M.T-Ş., Data Collection or Processing: M.S.Ş., M.T-Ş., Analysis or Interpretation: M.S.Ş., F.Ö.K., S.A., G.E., M.T-Ş., Literature Search: M.S.Ş., S.A., G.E., Writing: M.S.Ş., F.Ö.K., S.A., M.T-Ş.

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## References

1. UNAIDS. Fact Sheet 2022. Last Accessed Date: 2022 Jan 13. Available from: [https://www.unaids.org/sites/default/files/media\\_asset/UNAIDS\\_FactSheet\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/UNAIDS_FactSheet_en.pdf)
2. Republic of Turkey, Ministry of Health. HIV-AIDS İstatistikleri. Last Accessed Date: 2022 Sep 13. Available from: <https://hsgm.saglik.gov.tr/depo/birimler/bulasici-hastaliklar-ve-erken-uyari-db/Dokumanlar/Istatistikler/hiv-aids-2023.pdf>
3. Carballo E. UNAIDS Global HIV Statistics. Last Accessed Date: 2022 Jan 13. Available from: <https://www.unaids.org/en/resources/fact-sheet>
4. Cooper V, Clatworthy J, Harding R, Whetham J. Emerge Consortium. Measuring quality of life among people living with HIV: a systematic review of reviews. *Health Qual Life Outcomes*. 2017;15:220.
5. Pedersen KK, Eiersted MR, Gaardbo JC, Pedersen M, Gerstoft J, Troseid M, Nielsen SD. Lower Self-Reported Quality of Life in HIV-Infected Patients on cART and With Low Comorbidity Compared with Healthy Controls. *J Acquir Immune Defic Syndr*. 2015;70:16-22.
6. Miners A, Phillips A, Kreif N, Rodger A, Speakman A, Fisher M, Anderson J, Collins S, Hart G, Sherr L, Lampe FC. ASTRA (Antiretrovirals, Sexual Transmission and Attitudes) Study: Health-related quality-of-life of people with HIV in the era of combination antiretroviral treatment: a cross-sectional comparison with the general population. *Lancet HIV*. 2014;1:32-40.
7. Lazarus JV, Safreed-Harmon K, Barton SE, Costagliola D, Dedes N, Del Amo Valero J, Gatell JM, Baptista-Leite R, Mendão L, Porter K, Vella S, Rockstroh JK. Beyond viral suppression of HIV-the new quality of life frontier. *BMC Med*. 2016;14:1-5.
8. World Health Organization. Measuring quality of life: the development of the World Health Organization Quality of Life Instrument (WHOQOL). Geneva. 1993.
9. Leidy NK, Revicki DA, Geneste B. Recommendations for evaluating the validity of quality-of-life claims for labeling and promotion. *Value Health*. 1999;2:113-27.
10. Bowling A. Measuring disease: A review of disease-specific quality of life measurement scales. 2<sup>nd</sup> ed. Berkshire: Open University Press; 2001.
11. Popping S, Kall M, Nichols BE, Stempher E, Versteegh L, van de Vijver DAMC, van Sighem A, Versteegh M, Boucher C, Delpech V, Verbon A. Quality of life among people living with HIV in England and the Netherlands: a population-based study. *Lancet Reg Health Eur*. 2021;8:100177.
12. Kall M, Fresán U, Guy D, Brown G, Burgui C, Castilla J, Grecu VI, Dumitrescu F, Delpech V, Lazarus JV. Quality of life in people living with HIV in Romania and Spain. *BMC Infect Dis*. 2021;21(Suppl 2):898.
13. Erdinc FS, Dokuzoguz B, Unal S, Komur S, Inkaya AC, Inan D, Karaoglan I, Deveci A, Celen MK, Kose S, Erben N, Senturk GC, Heper Y, Kutlu SS, Hatipoglu CA, Sumer S, Kandemir B, Sirmatel F, Bayindir Y, Yilmaz E, Ersoy Y, Kazak E, Yildirmak MT, Kayaaslan B, Ozden K, Sener A, Kara A, Gunal O, Birengel S, Akbulut A, Yetkin F, Cuvalci NO, Sargin F, Pullukcu H, Gokengin D, Multicentric Hiv Study Group. Temporal Trends in the Epidemiology of HIV in Turkey. *Curr HIV Res*. 2020;18:258-66.
14. Gokengin D, Tabak F, Korten V, Lazarus JV, Unal S. The HIV Treatment Cascade in Turkey. HepHIV 2019 Bucharest Conference: Challenges of Timely and Integrated Testing and Care. 2019;P04/09. Available from: [https://eurotest.org/media/usumqenv/po4\\_09.pdf](https://eurotest.org/media/usumqenv/po4_09.pdf)
15. Gokengin D, Cimen C, Cagatay A, Gencer S, Akalin H, Ceran N, Deveci A, Ozdemir H, Erdinc S, Dogan G, Korten V. HIV cascade of care in Turkey: Data from the HIV-TR cohort. *HIV Med*. 2019;20:112-3.
16. Kuman Tunçel Ö, Pullukçu H, Erdem HA, Kurtaran B, Taşbakan SE, Taşbakan M. COVID-19-related anxiety in people living with HIV: an online cross-sectional study. *Turk J Med Sci*. 2020;50:1792-800.
17. Karacaer Z, Altındiş S, Gencer S, Gümüşer F, Erol S, Özkan H, Öztürk S, Birengel S, Parlak E, Yalçı A, Ağalar C, Tosun S, Altındiş M. Quality of life in people living with human immunodeficiency virus: A cross-sectional study. *Klimik Derg*. 2019;32:154-60.
18. Atalay S, Ucak HA, Ascibasi K, Sonmez U. Quality of Life of People Living with HIV Compared with that of The General Population in Turkey: A Cross Sectional Study. *PBS*. 2022;12:32-40.
19. Demirel OF, Mayda PY, Yıldız N, Sağlam H, Koçak BT, Habip Z, Kadak MT, Balcıoğlu İ, Kocazeybek B. Self-stigma, depression, and anxiety levels of people living with HIV in Turkey. *Eur J Psychiatr*. 2018;32:182-6.
20. Ergen P, Görmez A, Ankaralı H, Aydın Ö, Baysal NB, Çağ Y. Anxiety and Depression among People Living with HIV During the COVID-19 Pandemic: A Face-to-Face Survey from Turkey. *Psychiatr Danub*. 2023;35:103-11.
21. Aşçıbaşı K, Albayrak Uçak H, Atalay S, Sönmez U. Depressive and Anxiety Symptoms Among People Living with HIV in Turkey: A Cross-sectional Study. *J Tepecik Educ Res Hosp*. 2022;32:63-72.
22. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Med Care*. 1992;30:473-83.
23. Coons SJ, Rao S, Keininger DL, Hays RD. A comparative review of generic quality-of-life instruments. *Pharmacoeconomics*. 2000;17:13-35.
24. Farivar SS, Cunningham WE, Hays RD. Correlated physical and mental health summary scores for the SF-36 and SF-12 Health Survey, V.1. *Health Qual Life Outcomes*. 2007;5:54.
25. Gandek B, Ware JE, Aaronson NK, Apolone G, Bjorner JB, Brazier JE, Bullinger M, Kaasa S, Lepage A, Prieto L, Sullivan M. Cross-validation of item selection and scoring for the SF-12 Health Survey in nine countries: results from the IQOLA Project. *International Quality of Life Assessment*. *J Clin Epidemiol*. 1998;51:1171-8.
26. Hikasa S, Shimabukuro S, Hideta K, Kuroda N, Higasa S, Sawada A, Tokugawa T, Ikegami A, Kotani A, Kimura T. Quality of life of people living with HIV compared with that of the general population in Japan. *J Infect Chemother*. 2017;23:698-702.
27. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry*. 1961;4:561-71.
28. Hisli N. Beck Depresyon Envanterinin üniversite öğrencileri için geçerliği, güvenilirliği. *Psikoloji Dergisi*. 1989;7:3-13.
29. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol*. 1988;56:893-7.
30. Ulusoy M, Sahin NH, Erkmen H. (1998). Turkish version of the beck anxiety inventory: Psychometric properties. *Journal of Cognitive Psychotherapy*. 12;2:163-172. Retrieved from: <https://www.proquest.com/scholarly-journals/turkish-version-beck-anxiety-inventory/docview/205853806/se-2>
31. Beck AT, Steer RA. Beck Anxiety Inventory Manual. San Antonio, TX: Psychological Corp. 1993.
32. Bekele T, Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, Monette L, Rueda S, Bacon J, Watson J, Hwang SW, Dunn J, Guenter D. Positive Spaces Healthy Places Team. Direct and indirect effects of perceived social support on health-related quality of life in persons living with HIV/AIDS. *AIDS Care*. 2013;25:337-46.
33. Mengistu N, Hareru HE, Shumye S, Yimer S, Sisay D, Kaso AW, Muche T, Kassaw C, Soboksa NE, Molla W, Molla A, Duko B. Health related quality of life and its association with social support among people living with HIV/AIDS receiving antiretroviral therapy in Ethiopia: a systematic review and meta-analysis. *Health Qual Life Outcomes*. 2022;20:77.
34. Barger D, Hessamfar M, Neau D, Farbos S, Leleux O, Cazanave C, Rouanes N, Duffau P, Lazaro E, Rispal P, Dabis F, Wittkop L, Bonnet F. Factors associated

- with poorer quality of life in people living with HIV in southwestern France in 2018–2020 (ANRS CO3 AQUIVIH-NA cohort: QuAliv study). *Sci Rep.* 2023;13:16535.
35. Nobre N, Pereira M, Roine RP, Sintonen H, Sutinen J. Factors associated with the quality of life of people living with HIV in Finland. *AIDS Care.* 2017;29:1074–8.
  36. Briongos Figuero LS, Luque PB, Martin TP, Sagrado MG, Bouza JME. Assessment of factors influencing health-related quality of life in HIV-infected patients. *HIV Med.* 2011;12:22–30.
  37. Brown GR, Rundell JR, McManis SE, Kendall SN, Zachary R, Temoshok L. Prevalence of psychiatric disorders in early stages of HIV infection. *Psychosom Med.* 1992;54:588–601.
  38. Rezaei S, Ahmadi S, Rahmati J, Hosseini H, Dehnad A, Aryankhesal A, Shabaninejad H, Ghasemyani S, Alihosseini S, Bragazzi NL, Raoofi S, Kiaee ZM, Ghashghaee A. Global prevalence of depression in HIV/AIDS: a systematic review and meta-analysis. *BMJ Support Palliat Care.* 2019;9:404–12.
  39. Fumaz CR, Larrañaga-Eguilegor M, Mayordomo-López S, Gómez-Martínez S, González-García M, Ornellas A, Fuster Ruiz de Apodaca MJ, Remor E, Ballester-Arnal R. Spanish Group for the Quality of Life Improvement in HIV or AIDS. Health-related quality of life of people living with HIV infection in Spain: a gender perspective. *AIDS Care.* 2019;31:1509–17.
  40. Belak Kovacević S, Vurusić T, Duvancić K, Macek M. Quality of life of HIV-infected persons in Croatia. *Coll Antropol.* 2006;(30 Suppl 2):79–84.
  41. Perez IR, Lima AODL, del Castillo LS, Bano JR, Ruz MAL, Jimenez AD. No differences in quality of life between men and women undergoing HIV antiretroviral treatment: Impact of demographic, clinical and psychosocial factors. *Aids Care.* 2009;21:943–52.
  42. Rodriguez-Penney AT, Iudicello JE, Riggs PK, Doyle K, Ellis RJ, Letendre SL, Grant I, Woods SP; HIV Neurobehavioral Research Program HNRP Group. Co-morbidities in persons infected with HIV: increased burden with older age and negative effects on health-related quality of life. *AIDS Patient Care STDS.* 2013;27:5–16.
  43. Hays RD, Cunningham WE, Sherbourne CD, Wilson IB, Wu AW, Cleary PD, McCaffrey DF, Fleishman JA, Crystal S, Collins R, Eggen F, Shapiro MF, Bozzette SA. Health-related quality of life in patients with human immunodeficiency virus infection in the United States: result from the HIV cost and services utilization study. *Am J Med.* 2000;108:714–22.
  44. Liu H, Zhao M, Ren J, Qi X, Sun H, Qu L, Yan C, Zheng T, Wu Q, Cui Y. Identifying factors associated with depression among men living with HIV/AIDS and undergoing antiretroviral therapy: a cross-sectional study in Heilongjiang, China. *Health Qual Life Outcomes.* 2018;16:190.
  45. Beyene Gebrezgiabher B, Huluf Abraha T, Hailu E, Siyum H, Mebrahtu G, Gidey B, Abay M, Hintsu S, Angsom T. Depression among adult HIV/AIDS patients attending ART clinics at Aksum Town, Aksum, Ethiopia: a cross-sectional study. *Depression Res Treat.* 2019;2019:3250431.
  46. Crothers K, Griffith TA, McGinnis KA, Rodriguez-Barradas MC, Leaf DA, Weissman S, Gibert CL, Butt AA, Justice AC. The impact of cigarette smoking on mortality, quality of life, and comorbid illness among HIV-positive veterans. *J Gen Intern Med.* 2005;20:1142–5.