

Comparison of Psychosocial and Economic Problems and Quality of Life in Patients Following Heart Transplantation or Left Ventricular Assist Device Implantation

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Abstract

Background: The use of left ventricular assist devices (LVADs) has become increasingly common as a treatment to extend lifespan and improve the quality of life (QOL) for patients awaiting heart transplantation (HT) or those ineligible for HT. However, patients with an LVAD often experience various challenges.

Aim: This study aimed to compare the QOL of patients following LVAD implantation and HT, and to identify the problems experienced by LVAD patients.

Methods: This descriptive study was conducted through face-to-face interviews with 66 patients (LVAD = 21; HT = 45) having had undergone surgery in the adult cardiovascular surgery clinic of a university hospital and later visited the cardiology outpatient clinic for a follow-up. Data were collected using a "Determination Form for Sociodemographic Characteristics and Problems Associated with LVAD and HT" and the "Short Form-36 (SF-36) Quality of Life Scale". Data analysis included t-tests, analysis of variance (ANOVA), and multiple regression analysis.

Results: The mean age of the participants was 39.3 ± 15.7 years. The majority of patients in both groups were male and single. The survival time of patients who underwent HT was longer than that of patients who received a LVAD implantation. Among heart transplant patients, issues such as depression, anger, personality and attitude changes, and anxiety were identified. Patients with LVAD implants primarily experienced depression, fear, and anxiety about the future. Complications such as infection, thrombosis, and bleeding were more common in LVAD patients, while heart transplant patients experienced complications including tremors, diabetes mellitus, osteoporosis, hypertension, and infections. Most patients in both groups reported being unemployed and facing economic difficulties.

Conclusion: Although the clinical QOL improves following LVAD implantation, better outcomes are generally achieved after HT. Social, psychological, and sexual challenges significantly impact patients' overall well-being. It is believed that preparing patients for the postoperative period may help identify potential problems early and support their adaptation to the recovery process.

Keywords: Heart transplantation, heart-assist devices, nursing, quality of life

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Introduction

Heart failure is a major public health concern. As of 2017, an estimated 6.5 million adults in the United States (U.S.) were living with heart failure. Although advances in heart failure treatment can reverse myocardial damage and improve survival rates, many patients continue to experience persistent symptoms, contributing to increased morbidity and mortality. Heart transplantation (HT) is one of the most effective treatments for patients with severe heart failure symptoms.¹ However, when a suitable donor organ is unavailable, ventricular assist devices (VADs) offer a promising alternative by providing mechanical support to the ventricles. These devices have emerged as a promising alternative treatment to HT for patients with advanced-stage heart failure, serving as an effective mechanical circulatory support strategy to improve survival. As a result, left ventricular assist devices (LVADs) have become both an alternative to HT and a form of "permanent treatment" for patients who are not eligible for HT.^{2,3} LVADs are highly effective in improving cardiac output and maintaining adequate hemodynamics over the long term.³ The average one-year survival rate with an LVAD is approximately 80%.⁴ Nevertheless, after implantation, patients must adapt to various lifestyle changes, and they often face physical, psychological, and social challenges.⁵ These challenges may include limitations in daily activities such as bathing and swimming, travel difficulties, disruptions in interpersonal relationships, the need to modify their home environment and manage family dynamics. Additionally, patients are at risk for serious medical complications such as thrombosis, bleeding, infection, right heart failure, and device malfunction, some of which can be fatal.⁶

Some physical, psychological, and social problems emerge in the early period after HT and often persist over time.⁷ Side effects of immunosuppressive drugs and metabolic changes introduce new stressors and contribute to increased mortality, morbidity, and various psychosocial and psychological challenges for patients.⁸ Although there are a limited number of studies⁹ in the literature focusing on the problems experienced by patients following HT, no comprehensive study has been found that addresses the problems experienced by patients with an LVAD. This study aims to identify the psychosocial and financial challenges faced by pa-

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tients who have undergone LVAD implantation or HT and to compare the two groups in terms of their quality of life (QOL). Understanding the problems experienced by these patients can support the delivery of effective and holistic nursing care. Additionally, this information can help both patients and caregivers adapt to life with an LVAD or after HT, while also supporting the nurses in managing complications and facilitating lifestyle adjustments associated with these treatments.

Study Questions

- What are the postoperative problems experienced by LVAD patients?
- What are the postoperative problems experienced by patients after undergoing HT?
- How does LVAD implantation affect patients' QOL in the postoperative period?
- How does HT affect patients' QOL in the postoperative period?

Materials and Methods

Study Design and Samples

This descriptive study aimed to compare the psychosocial and economic problems, as well as the QOL, experienced by patients who underwent LVAD implantation or HT. The study aimed to include the entire population without performing a sample size calculation. Based on hospital records, a total of 60 patients had undergone LVAD implantation and 120 had undergone HT between 2000 and 2017. Since many of these patients had passed away, the study sample was limited to those who were alive and visited the hospital for follow-up between January and May 2018, when the study was conducted. As a result, 22 patients with LVAD implantation and 49 patients with HT were included in the study. One LVAD patient was excluded due to deterioration in health status, and four HT patients declined to participate. Therefore, the study was completed with a total of 66 patients (21 with LVAD implantation and 45 with HT). Pediatric patients, those with cognitive impairments, orientation or confusion issues, or hemodynamic instability were excluded from the study.

Data Collection Tools

Sociodemographic and Psychosocial Measurements

A data collection form, prepared based on a literature review, was used to identify the sociodemographic characteristics of the patients and the problems associated with LVAD implantation and HT.¹⁰⁻¹⁵ The form consisted of two sections. The first section included seven questions aimed at identifying patients' sociodemographic characteristics, such as age, gender, marital status, income level, and place of residence. The second section contained 21 questions focused on identifying complications experienced after LVAD implantation and HT, as well as psychosocial and financial problems.

Short Form-36 (SF-36) Quality of Life Scale (QOL Measures)

The SF-36 Quality of Life Scale was developed by Ware and Sherbourne¹⁶ in 1992. It was translated into Turkish by Koçyiğit et al.¹⁷ in 1999, and its validity and reliability were also established. The Cronbach's alpha value for the scale ranged between 0.7324 and 0.7612. The SF-36 Quality of Life Scale consists of 36 items and includes eight health domains: physical functioning (10 items), role limitations due to physical problems (four items), pain (two items), general health perception (five items), vitality/energy (four items), social functioning (two items), role limitations due to emotional problems (three items), and mental health (five items). High scores on the scale indicate better health status, while lower scores reflect poorer health.¹¹ In our study, the Cronbach's alpha values for the scale ranged from 0.784 to 0.986.

Data Collection

Data were collected through face-to-face interviews conducted in the cardiovascular surgery department and cardiology outpatient clinic with patients who consented to participate in the study and had undergone either LVAD implantation or HT. Each interview took approximately 20 minutes to complete the data collection forms.

Ethical Approval

This study was approved by the Non-interventional Research Ethics Committee of Başkent University (Approval Number: KA17/299), and the necessary institutional permissions were obtained [Decision dated 12/20/2017, No: 888225990-044/45767]. All participants were informed about the study, and written consent was obtained from each patient. Permission to use the scale was also secured. All procedures were carried out in accordance with the principles outlined in the Declaration of Helsinki.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences version 25.0 (SPSS, IBM Corporation, NY, USA). Descriptive statistics were expressed as numbers and percentages, and as mean \pm standard deviation for numerical data. The chi-square test was used for comparing rates between groups, while the t-test and analysis of variance (ANOVA) were used to analyze quantitative variables in independent groups. Additionally, multiple regression analysis was conducted using the backward elimination method. The data analyses were performed at a 0.05 significance level with a 95% confidence interval. A p value of <0.05 was considered statistically significant.

Results

Characteristics of the Patients

The mean age of the patients was 39.3 ± 15.7 years (LVAD: 48.9 ± 14.1 years; HT: 34.8 ± 14.4 years). The majority of patients in both groups were male (LVAD: 90.5%; HT: 60.0%) and single (LVAD: 81.0%; HT: 57.8%). Among those with LVAD implantation, 47.6% were primary school graduates, while 48.9% of the HT group were high school graduates. Most patients in both groups were unemployed (LVAD: 61.9%; HT: 51.1%) and reported that their income was equal to their expenses (LVAD: 42.2%; HT: 38.1%). Diabetes mellitus was more common among patients with LVAD implantation (23.8%), whereas hypertension (31.1%) was more frequently observed in patients who underwent HT (Table 1).

Mean QOL Scale Scores Based on Sociodemographic Characteristics in Patients with LVAD Implantation and HT

An examination of the SF-36 QOL scale mean scores revealed that patients who underwent HT had higher mean scores in the subdimensions of physical functioning ($\bar{X} = 87.44 \pm 14.60$) and energy/vitality ($\bar{X} = 74.22 \pm 19.51$). In comparison, patients with LVAD implantation also had relatively high mean scores in the same subdimensions: physical functioning ($\bar{X} = 67.14 \pm 28.92$) and energy/vitality ($\bar{X} = 59.52 \pm 25.34$) ($p < 0.05$) (Table 1).

When comparing marital status, married patients had higher mean scores in the physical functioning subdimension ($\bar{X} = 88.69 \pm 14.63$) compared to single patients ($\bar{X} = 76.86 \pm 24.49$) ($p < 0.05$). Regarding employment status, working patients had higher mean scores in several subdimensions: physical functioning ($\bar{X} = 88.16 \pm 14.35$), emotional role difficulty ($\bar{X} = 92.22 \pm 24.26$), pain ($\bar{X} = 90.00 \pm 15.32$), and general health perception ($\bar{X} = 69.00 \pm 22.33$) compared to non-working patients ($p < 0.05$). Patients aged 54–74 years had lower mean scores in the physical functioning subdimension ($\bar{X} = 65.31 \pm 30.41$) compared to other age groups ($p < 0.05$) (Table 1).

Patient Features Based on Disease Type and Treatment Pathway

An examination of the reason for hospital visits in the postoperative period revealed that eight LVAD patients visited the hospital for routine checkups, while 13 visited due to complications. Among HT patients, 31 out of 45 visited the hospital for checkups, and 14 visited due to complications ($p < 0.05$). It was found that 19 LVAD patients were within five years post-operation, and only two had survived for more than five years. In contrast, 24 HT patients were within five years post-operation, while 21 had survived for more than five years ($p < 0.05$) (Table 2).

HT patients most frequently experienced tremors (52.8%), diabetes mellitus (hyperglycemia) (48.9%), osteoporosis (40.0%), hypertension (31.1%), rounded face (22.2%), and infections (15.6%). In contrast, LVAD patients predominantly experienced complications such as infections (52.4%), thrombosis (33.3%), bleeding (33.3%), and lifestyle changes associated with these complications (33.3%).

Factors Affecting the QOL Scale Subdimensions of Patients with LVAD Implantation and HT

The overall mean QOL score for LVAD patients was 68.67 ± 24.33 , while the mean score for HT patients was 79.09 ± 17.61 . Based on the regression analysis of factors affecting QOL in both patient groups, those who visited the hospital due to complications within the first year had lower scores in several sub-dimensions compared to those who visited for routine checkups: general health perception (15.24 points lower), pain (16.27 points lower), physical role difficulty (24 points lower), and physical functioning (10.53 points lower) ($p < 0.05$).

Table 1. Mean scores of the short form-36 (SF-36) quality of life scale by sociodemographic characteristics in patients with left ventricular assist device (LVAD) implantation and heart transplantation (HT) (n=66)

		SF-36 quality of life subscale							
Sociodemographic characteristics	n	Physical functioning X̄±SD	Role limitations due to physical health X̄±SD	Role limitations due to emotional problems X̄±SD	Energy/vitality X̄±SD	Mental health X̄±SD	Social functioning X̄±SD	Pain X̄±SD	General health perception X̄±SD
Group									
LVAD implantation	21	67.14±28.92	65.48±46.42	77.78±41.28	59.52±25.34	76.38±21.20	70.83±30.96	77.50±29.68	54.76±27.91
HT	45	87.44±14.60	86.67±34.38	85.19±35.22	74.22±19.51	75.20±18.56	74.72±30.68	84.00±23.16	65.33±21.54
Statistical evaluation ^a		t=-3.041 p=0.005	t=-1.867 p=0.072	t=-0.753 p=0.454	t=-2.586 p=0.012	t=0.230 p=0.819	t=-0.478 p=0.634	t=-0.969 p=0.336	t=-1.536 p=0.135
Marital status									
Single	43	76.86±24.49	76.16±41.88	80.62±38.64	68.83±23.92	77.48±20.00	71.51±30.65	80.87±26.80	59.06±24.40
Married	23	88.69±14.63	86.95±34.43	86.95±34.43	70.86±19.75	72.00±17.72	77.17±30.76	83.91±22.84	67.39±22.90
Statistical evaluation ^a		t=-2.454 p=0.017	t=-1.123 p=0.266	t=-0.658 p=0.513	t=-0.348 p=0.729	t=1.104 p=0.274	t=-0.714 p=0.478	t=-0.446 p=0.646	t=-1.348 p=0.182
Employment status									
Employed	30	88.16±14.35	90.00±30.51	92.22±24.26	74.66±22.81	77.60±18.89	81.25±27.99	90.00±15.320	69.00±22.33
Unemployed	36	75.00±25.74	71.52±44.38	75.00±43.91	65.27±21.47	73.88±19.70	67.01±31.50	75.20±29.96	56.11±24.14
Statistical Evaluation ^a		t=2.619 p=0.011	t=1.995 p=0.050	t=2.013 p=0.049	t=1.719 p=0.090	t=0.776 p=0.440	t=1.922 p=0.059	t=2.584 p=0.012	t=2.233 p=0.029
Age group (years)									
11-22	14	92.14±9.138	92.85±26.72	85.71±36.31	67.50±18.88	69.71±17.45	77.67±30.68	86.96±20.19	64.28±22.68
23-41	17	83.82±21.25	76.47±43.72	94.11±24.25	78.23±23.58	82.82±15.85	81.61±28.33	81.17±24.15	70.58±22.97
42-53	19	83.42±14.72	85.52±34.67	87.71±29.83	70.52±21.07	74.73±19.46	73.02±27.40	86.18±21.94	60.78±21.42
54-74	16	65.31±30.41	65.62±47.32	62.50±50.00	60.93±23.95	74.00±23.00	61.71±35.19	73.28±33.26	52.18±27.44
Statistical evaluation ^b		F=4.692 p=0.005	F=1.393 p=0.253	F=2.413 p=0.075	F=1.746 p=0.167	F=1.297 p=0.283	F=1.297 p=0.283	F=0.987 p=0.405	F=1.1724 p=0.171

^a t-Test; ^b Analysis of variance (ANOVA) Test. X±SD: Mean±standard deviation, t: t-value (used to test if the coefficient is significantly different from zero), t: independent samples t test, F: F-statistic (used to test whether the overall regression model is significant), F: Analysis of variance

Table 2. Patient characteristics based on disease type and treatment process

Disease and treatment variables	LVAD implantation (n=21)		HT (n=45)		Statistical analysis
	n	%	n	%	
Frequency of hospital admission					0.297
1–4 times	9	43.0	28	62.0	X ² =2.427
5–8 times	6	29.0	7	16.0	
9 or more times	6	29.0	10	22.0	
Reason for hospital admission					0.018
Routine control	8	38.0	31	69.0	X ² =5.617
Complication	13	62.0	14	31.0	
Postoperative survival duration					0.003
≤5 years	19	90.0	24	53.0	X ² =8.700
>5 years	2	10.0	21	47.0	

*: Pearson's chi-square X² test. LVAD: Left ventricular assist device, HT: Heart transplantation.

Table 3. Factors influencing short form-36 (SF-36) quality of life subscale scores in patients with left ventricular assist device (LVAD) implantation and heart transplantation

Factors affecting subdimensions of the SF-36 quality of life scale	B	SD	Beta	t	p	Statistical analysis
Factors affecting the general health perception subscale						
Constant	83.45	8.60	0.00	9.706	0.001	R ² =0.099 F=7.000 p=0.010
Reason for hospital admission within one year	-15.24	5.76	-0.31	-2.646	0.010	
Factors affecting the pain subscale						
Constant	104.86	9.05		11.582	0.001	R ² =0.101 F=7.196 p=0.009
Reason for hospital admission within one year	-16.27	6.07	-0.32	-2.683	0.009	
Factors affecting the energy/vitality subscale						
Constant	29.30	13.08		2.241	0.029	R ² =0.138 F=5.046 p=0.009
Patient group (LVAD implantation vs. HT)	10.97	5.97	0.23	1.838	0.071	
Postoperative survival time	9.40	5.28	0.22	1.782	0.080	
Factors affecting the role limitations due to physical health subscale						
Constant	113.75	14.19		8.015	0.000	R ² =0.091 F=6.371 p=0.014
Reason for hospital admission within one year	-24.00	9.51	-0.30	-2.524	0.014	
Factors affecting the physical functioning subscale						
Constant	50.68	15.56		3.256	0.002	R ² =0.290 F=8.453 p<0.001
Patient group (LVAD Implantation vs. HT)	13.10	5.59	0.28	2.344	0.022	
Postoperative survival time	9.97	4.78	0.24	2.084	0.041	
Reason for hospital admission within one year	-10.53	5.02	-0.24	-2.098	0.040	

*: Regression analysis. B: Unstandardized regression coefficient (shows how much the outcome changes when the predictor increases by one unit), SD: Standard deviation, t: t-value (used to test if the coefficient is significantly different from zero), t: independent samples t test, R²: Coefficient of determination (shows how much of the outcome is explained by the predictors), F: F-statistic (used to test whether the overall regression model is significant), F: Analysis of variance.

Patients who had undergone surgery more than five years ago had significantly higher scores in some sub-dimensions: physical functioning scores were 9.97 points higher, and the energy/vitality scores were 9.40 points higher, compared to those who had surgery within the past five years. Additionally, HT patients had higher mean scores than LVAD patients in the energy/vitality sub-dimension (10.97 points higher) and in physical functioning (13.10 points higher) (Table 3).

Problems Experienced by LVAD and HT Patients

Most patients (LVAD: 71.4%; HT: 84.1%) reported no problems in their social relationships. However, among those who did report issues, 28.5% of LVAD patients and 13.6% of HT patients stated that their communication with friends deteriorated during the postoperative period. Psychological problems reported by LVAD patients included depression (42.9%), fear (particularly fear of death) (42.9%), anxiety (28.6%),

Table 4. Problems experienced by patients undergoing left ventricular assist device (lvad) implantation and heart transplantation

Problems experienced by patients undergoing LVAD implantation and heart transplantation	LVAD implantation (n=21)		Heart transplantation (n=44)	
	n*	%**	n*	%**
Social relationship challenges				
Impaired communication with friends	6	28.5	6	13.6
Impaired communication with colleagues	3	14.3	2	4.6
Impaired family relationships	2	9.5	5	11.4
No issues reported	15	71.4	37	84.1
Psychological problems				
Depression	9	42.9	15	34.1
Fear (including fear of death)	9	42.9	8	18.2
Anxiety	6	28.6	10	22.7
Uncertainty about the future	5	23.8	7	15.9
Anger	3	14.3	13	29.5
Difficulty adapting	2	9.5	4	9.1
Social isolation	2	9.5	6	13.6
Personality and behavioral changes	1	4.8	12	27.3
No issues reported	8	38.1	18	40.9
Economic difficulties				
High transportation costs	9	42.9	29	67.4
Examination and treatment expenses	6	28.6	20	46.5
Early retirement due to health	6	28.6	9	20.9
Job loss	4	19.0	4	9.3
Inability to obtain a work permit	2	9.5	1	2.3
Reduced physical activity	2	9.5	5	11.6
Decreased productivity	0	0	6	14.0
Difficulty finding employment related to health condition	0	0	3	7.0
No issues reported	7	33.3	9	20.9
Sexual health problems				
Decreased sexual desire	7	36.8	6	14.0
Erectile dysfunction	7	36.8	3	7.0
Reduced frequency of sexual intercourse	4	21.1	5	11.6
Fear of engaging in sexual activity	4	21.1	1	2.3
Position-related difficulties during intercourse	3	15.8	0	0
Lack of pleasure during sexual activity	1	5.3	3	7.0
Partner-related concerns	1	5.3	2	4.7
Menstrual irregularities	0	0	6	14.0
No issues reported	6	31.6	30	69.8
Additional problems reported by LVAD patients only				
Inability to bathe or swim (e.g., in sea/pool)	15	71.4	–	–
Weight of the LVAD bag	13	61.9	–	–
Being subject to curious or intrusive questions	13	61.9	–	–
Difficulty carrying the device bag	12	57.1	–	–
Fear of bag theft (snatching)	12	57.1	–	–
Feelings of embarrassment due to visible equipment	9	42.9	–	–
Need to plan for batteries and electrical components on long trips	5	23.8	–	–
Obligation to carry spare batteries	5	23.8	–	–
Sleep disturbances	5	23.8	–	–
Problems using public transportation	2	9.5	–	–
Total		21.00		–

*: Patients could select more than one response, **: Results are presented as n (%). LVAD: Left ventricular assist device, HT: Heart transplantation

and worry about the future [23.8%]. In contrast, HT patients reported depression [34.1%], anger [29.5%], changes in personality and behavior [27.3%], and anxiety [22.7%]. Additionally, economic difficulties were experienced by 66.7% of LVAD patients and 79.1% of HT patients (Table 4).

These problems primarily included transportation costs (LVAD: 42.9%; HT: 67.4%), examination and treatment expenses (LVAD: 28.6%; HT: 46.5%), and financial difficulties related to early retirement (LVAD: 28.6%; HT: 20.9%). Additionally, 61.9% of LVAD patients and 60% of HT patients reported that they stopped working after the operation (Table 4).

Postoperative sexual problems among LVAD patients included a decrease in sexual desire [36.8%], erectile dysfunction [36.8%], a reduction in the frequency of sexual intercourse [21.1%], and fear of engaging in sexual activity [21.1%]. HT patients reported fewer sexual issues than LVAD patients, with the most common being a decrease in the frequency of sexual intercourse [11.6%] and reduced sexual desire [14.0%]. Among female HT patients, the most frequently reported sexual issue was menstrual irregularity [14.0%] (Table 4).

Although not shown in the table, 66.7% of HT patients reported making lifestyle changes, 73.3% stated that they did not experience changes in their roles and responsibilities, and 60% stopped working. In comparison, 71.4% of LVAD patients indicated making lifestyle changes, 76.2% experienced changes in roles and responsibilities, and 61.9% stopped working (Table 4).

Furthermore, most LVAD patients (71.4%) reported difficulties with bathing and stated they were unable to go to the sea or pool (61.9%). Many also experienced being subjected to curious questions (61.9%), felt the battery bag was heavy and difficult to carry (57.1%), and expressed fear of the LVAD bag being stolen or snatched (57.1%) (Table 4).

Discussion

According to the International Society for Heart and Lung Transplantation (ISHLT) guidelines, HT is generally recommended for patients under 70 years of age due to the increased risk of comorbidities and complications related to immunosuppression in older individuals. Data from the United Network for Organ Sharing (UNOS) show that the median age of HT recipients is 56 years [interquartile range (IQR): 46–63 years].¹⁸ In our study, most HT patients were in the 42–53 age group, while the majority of LVAD patients were in the 54–74 age group, supporting the finding that HT is typically preferred for younger patients. It was also observed that nearly all LVAD patients were single. This may be attributed to the frequent hospitalizations, the high caregiving burden associated with the condition, and the lack of an active sexual life following the operation.

Our study observed that the sociodemographic characteristics of patients in both groups influenced different subdimensions of the QOL scale. The mean scores in the physical functioning subdimension were higher among married patients compared to single patients. This finding may be attributed to the emotional and practical support provided by spouses. In a study conducted by Vader et al.¹⁹ involving LVAD patients, it was reported that married patients had lower mortality rates. Similarly, Kelly et al.² found that the five-year survival rate was higher among married HT patients.

In our study, working patients had higher mean scores in the physical functioning, emotional role difficulty, pain, and general health perception subdimensions compared to non-working patients. Another study on LVAD patients found that being unemployed was associated with removal from the transplant waiting list, increased mortality,¹⁹ and poorer overall QOL outcomes within the first two years after implantation.²⁰ In our study, it was found that the mean physical functioning scores in the 54–74 age group were lower than those of the younger age group. Some studies, however, have reported contrary findings, showing that older HT patients had lower anxiety levels, fewer psychological problems, and better quality of life compared to younger HT patients.²¹ This difference may be attributed to variations in countries' levels of development, with more developed countries experiencing fewer psychosocial issues and older individuals possibly having better coping mechanisms due to greater life experience.

It was also observed in our study that the mean scores in the physical functioning and energy/vitality subdimensions were significantly higher in HT patients compared to LVAD patients. This finding is consistent with previous research.³ It is likely due to the fact that LVAD patients must carry a device weighing approximately 2 kg in their daily lives, which imposes physical limitations and reduces their overall vitality and physical fitness.

Similar to the findings of the present study, it has been observed that the survival rates of both LVAD and HT patients tend to decrease over time following the operation. Complications are among the key factors affecting the survival rates of patients with an LVAD.²² In our study, a range of complications was observed following LVAD implantation, including driveline infection, surgical site infection, pump thrombosis, gastrointestinal bleeding, cerebrovascular accidents, arrhythmia, renal failure, and device failure.^{23,24} For HT patients, neurological and dermatological issues such as tremors, fatigue, and forgetfulness have been reported more frequently.²⁵

The most common causes of death in this group are cardiac allograft vasculopathy, acute rejection, infection, and malignancy.²⁶ The results of our study are consistent with these findings.^{25,26} In the present study, LVAD patients visited the hospital more frequently than HT patients, primarily due to complications. This result is also supported by the findings of Jakovljevic et al.³

For both patient groups, the mean scores in the physical role difficulty and physical functioning subdimensions were lower among those who visited the hospital due to complications compared to those who visited for routine checkup. In the postoperative period, patients were prescribed multiple medications with various side effects. These treatments, combined with complications, difficulties in daily activities, and increased dependency on others, contribute to a decline in patients' quality of life. As the frequency of hospital visits due to complications increased, both overall health perception and pain sub-dimension mean scores showed a noticeable decrease. In a study by Dew et al.,²⁷ it was found that LVAD patients (n=42) experienced fear of infection (52.0%), fear of device malfunction (40.0%), sleep disturbances due to driveline position (40.0%), and discomfort caused by device noise (32.0%). The study emphasized that anxiety levels increased alongside physical limitations and psychological distress, ultimately leading to a decline in QOL.

Social support is one of the key factors associated with QOL for both LVAD and HT patients.^{28,29} Patients often experience changes in their relationships with family, friends, and neighbors in the postoperative period and must cope with these adjustments.³⁰ In our study, we found that both LVAD and HT patients experienced deteriorated communication with friends, strained family relationships, and difficulties with colleagues after surgery. Additionally, LVAD patients often faced social isolation after implantation (due to efforts to protect themselves from infection), relocated their homes, adjusted their roles and responsibilities, and were unable to continue working due to decreased independence, ultimately leading to early retirement.

Regarding psychological issues, LVAD patients most commonly reported depression, fear (particularly fear of death), anxiety, and concerns about the future. HT patients, on the other hand, described experiencing depression, anger, changes in personality and attitude, and anxiety. Studies have indicated that both LVAD and HT patients experience symptoms of depression and anxiety, although these symptoms tend to decrease over time during the postoperative period.^{3–9,14} In another study, patients with an LVAD were reported to have lower QOL and reduced psychological functioning compared to HT patients.³¹ Furthermore, LVAD patients have been shown to face issues requiring psychiatric intervention, including family stress, major depression, organic mental syndromes, and severe adjustment disorder.³² Based on our observations, it became evident that both patient groups needed to establish new balances within the family after the operation. Among LVAD patients in particular, the adaptation and acceptance process regarding the device had a negative impact on both the patient and their family.

In a study by Weerahandi et al.,³³ LVAD patients were also reported to experience financial difficulties. Similarly, a study by Sadala et al.³⁴ found that HT patients faced increased familial and financial problems following transplantation. Consistent with these findings, our study also revealed that most patients in both groups experienced financial problems.

LVAD patients experienced specific issues related to sexual function, including erectile dysfunction or vaginal dryness, problems related to cables or batteries, difficulties achieving orgasm, fear of injury, partner-related problems, negative self-image, pain, and depression.^{35,36} On the other hand, some studies have shown that sexual function in certain LVAD patients improved or was maintained after implantation. In these cases, patient-partner harmony was achieved despite the presence of the device, and some couples experienced increased non-sexual intimacy.³⁶ These findings regarding sexual issues in LVAD patients are consistent with the results of our study.

In terms of social life, LVAD patients also reported challenges such as the inability to bathe or swim in the sea/pool, being subjected to curious or intrusive questions, the heaviness of the device bag, and difficulty carrying the bag. In some studies, the problems experienced after LVAD implantation included changes in body image, challenges with battery and device management, bathing and swimming limitations, driving restrictions, deterioration in interpersonal relationships, and resulting stress.^{35,37} Patients reported that while they were able to overcome physical, psychological, and environmental concerns through early adaptation, they often took longer to accept the LVAD as an integral part of their body.³⁷

Limitations

The limitations of this study include its single-center design, the smaller sample size of patients with LVAD implantation compared to those who underwent HT, and the predominance of male patients in the LVAD group.

Conclusion

LVAD implantation is expected to continue playing an increasingly important role in the treatment of heart failure. Therefore, it is essential to identify the psychosocial problems experienced by LVAD patients, assess changes in their quality of life, and understand the factors that influence these changes. While HT patients generally report better QOL compared to those with LVADs, demographic characteristics and post-treatment complications can lead to both positive or negative variations in QOL. Patients in both groups faced financial problems of varying degrees. In general, the economic problems experienced by these patients were primarily related to transportation costs, examination and treatment expenses, and early retirement. For LVAD patients, additional financial support is often required due to ongoing care needs, follow-up and treatment processes, and maintenance of the device. For HT patients, difficulty finding employment and reduced productivity after transplantation contribute to their economic burdens. Therefore, future studies should aim to identify risk factors and track changes in the psychosocial, financial, and quality of life outcomes of these patients using larger sample sizes.

Ethics Committee Approval: The study was approved by the Başkent University Non-inventional Research Ethics Committee (Approval Number: KA17/299, Date: 20.12.2017).

Informed Consent: All participants were informed about the study, and written consent was obtained from each patient.

Conflict of Interests: The authors have no conflicts of interest to declare.

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