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Health-Related Quality of Life among Patients with Ventricular Assist Devices in Saudi Arabia

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Abstract

***Background*:** End-stage heart failure patients awaiting heart transplant often require Ventricular Assisted Devices (VAD) to support systemic and pulmonary circulation and to improve ventricular function, symptoms, and Health-Related Quality of Life (HRQoL). This study evaluates the health-related quality of life in patients with VAD and was conducted at the Cardio Ventricular Assisted Devices Clinic at King Faisal Specialist Hospital and Research Centre, Riyadh. ***Methods*:** This retrospective cohort study design included all eligible VAD patients who were still attending the cardio ventricular assisted devices clinic at KFSHRC, Riyadh. Each study participant was assigned a detailed questionnaire to assess and evaluate HRQoL outcomes measured in physical limitations, emotional stress, sexual activity, and social function from the date of device insertion to the time of data collection. Data were analyzed using the Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). ***Results*:** Between February 2016 until June 2020, 26 patients were eligible for the study. The patients' support scores were moderate to high, indicating a positive effect on their HRQoL, with a mean score of 57.69 in emotional activity, a mean score of 34.07 in physical activity, and a mean score of 83.17 in social activity. The study's results show that the level of HRQoL varies among patients with VADs. ***Conclusion*:** Participating patients with VAD reported excellent health-related quality of life in all domains, with moderate to high support scores indicating a positive effect on their HRQoL. There is currently a lack of study on HRQoL in patients with VADs in Saudi Arabia. Therefore, this study may provide a baseline understanding of current challenges in the care of heart failure patients with VAD awaiting a heart transplant.

Keywords: Health-Related Quality of Life (HRQoL), Ventricular Assist Devices, End-stage heart failure, Mechanical circulatory support, End Stage Heart Failure, Quality of Life.

INTRODUCTION

Heart Failure (HF) is a severe cardiovascular disease characterized by ventricular insufficiency and pulmonary congestion (Low Wang *et al*., 2016). In Saudi Arabia, the prevalence of chronic heart failure is 1.61%, with approximately 455,222 patients hospitalized annually due to acute heart failure (AHF). Inpatient mortality accounts for 40% of cardiovascular-related deaths, and the five-year survival rate after diagnosis is around 50% (Al-Shamiri, 2013).

For patients with acute heart failure, conservative medical management is usually recommended. However, in cases of end-stage cardiovascular disease, Mechanical Circulatory Support (MCS), such as the Ventricular Assist Device (VAD), is considered the top-level therapy to bridge patients to heart transplantation. VAD is an implantable mechanical circulation pump that supports ventricular failure in end-stage heart failure (Siméon *et al*., 2017). The VAD's power supply is connected to an external battery and a controller through a transcutaneous transmission system, which carries a risk of pathogen entry (Donahey *et al*., 2015).

Despite advancements, the prognosis for end-stage heart failure remains poor, with low survival rates. Cardiac transplantation and VAD are the primary treatment options for AHF patients, with favorable outcomes and improved survival rates (Adams and Wrightson, 2018). The impact of heart failure on patients' quality of life is significant, prompting the focus on health-related quality of life (HRQoL) in clinical practice

(Ponikowski *et al*., 2014). VAD has shown positive effects on HRQoL, encompassing physical, mental, emotional, social, cognitive, and spiritual aspects (Karimi & Brazier, 2016).

In summary, HF is a severe cardiovascular disease with high hospitalization rates and mortality. MCS, specifically VAD, is an important therapy for end-stage heart failure. However, challenges such as pathogen entry through the power line exist. The prognosis for heart failure patients remains poor, underscoring the importance of improving quality of life. VAD has shown positive outcomes and improved survival rates, making HRQoL an essential consideration in treatment decisions (Guyatt *et al*., 1993).

Influence of VAD on Health-Related Quality of Life

The VAD is essential for saving lives but comes with challenges, such as caregiver support, complications, and negative impact on health-related quality of life. Limited research exists from the patient's perspective, but studies indicate elevated anxiety and despair. Patients often face difficulties managing the VAD and rely on caregivers for support (Wray *et al*., 2007; Modica *et al*., 2015; Allen *et al*., 2010).

The study proposed to measure the effect of implementing VADs on HRQoL in terms of physical limitation, emotional stress, sexual activity, and social function.

I. Emotional Stress:

The majority of data on emotional distress in VAD patients comes from psychosocial research conducted during "pulsatile" assistance (MacIver and Ross, 2012). The immediate postoperative period is associated with an increase in negative emotions due to heart surgery, fear of device failure, and hospitalization. Patients and their families require support and education on device management and troubleshooting alarms during the recovery phase (MacIver and Ross, 2012; McKelvie *et al*., 2013).

II. Physical Ability

The implementation of VADs for end-stage heart failure has been shown to improve physical activity, strength, range of motion, societal performance, and reduce anxiety (Moreno-Suarez *et al*., 2019). Patients with VADs can perform daily living activities independently, such as dressing, bathing, toileting, walking, and eating (Moreno-Suarez *et al*., 2019; Granegger *et al*., 2021). However, VAD patients may experience sleep disturbances, and methods to improve sleep quality during device maintenance are needed (MacIver and Ross, 2012).

III. Sexual Activity

Male VAD patients often report increased sexual concerns, with specific concerns regarding the position of the driveline during intercourse (Samuels *et al*., 2012; MacIver and Ross, 2012). Female patients of childbearing age require counseling and awareness regarding birth control methods (MacIver and Ross, 2012).

IV. Social Life

VADs can impact various aspects of social life, including confidence, self-worth, social engagement, family interaction, recreation, personal well-being, attention, and peer relationships (Bae *et al*., 2010; Hill *et al*., 2013). Adequate support, education, and holistic care can help VAD patients resume their regular lives and engage in social activities (Abshire *et al*., 2016).

It is important to note that there is a limited quantity of studies focusing on the quality of life of VAD patients post-implementation in Saudi Arabia. Therefore, this study aims to assess HRQoL in patients who have undergone VAD implantation at King Faisal Specialist Hospital & Research Center (KFSHRC) in Riyadh.

Aim and Objectives

The aim of this study was to evaluate the HRQoL among patients with post-ventricular assist devices implanted at King Faisal Specialist Hospital & Research Center (KFSHRC) in Saudi Arabia. The specific objectives of the study were as follows:

1. To determine the effect of implementing Ventricular Assist Devices on Health-Related Quality of Life (HRQoL) outcomes, including physical limitation, emotional stress, sexual activity, and social function.
2. To assess the level of emotional stress experienced by patients after VAD implementation.
3. To examine the impact of VADs on the physical limitations and functional abilities of patients.
4. To explore the changes in sexual activity and satisfaction with VAD among patients.
5. To investigate the effect of VADs on social functioning and on the relationships of patients.

MATERIALS AND METHODS

This study is a retrospective cohort study conducted at King Faisal Specialist Hospital and Research Center (KFSHRC) in Riyadh in 2020. Ethical approval was obtained from the ethics committee, and the study adheres to the principles of the Declaration of Helsinki.

Study Population

The study included a total of 26 VAD patients who had their implants for at least six months or longer before the study was conducted at KFSHRC in Riyadh. Initially, the patients' medical records from February 2016 to July 2020 were reviewed. Subsequently, questionnaires were distributed to the patients for completion.

Inclusion Criteria

1. Adult patients identified with a ventricular assist device (VAD) who were implanted and followed up with at the cardiac clinic at KFSHRC-Riyadh.
2. Patients with end-stage heart failure.
3. Patients aged 18 years or older.

Exclusion Criteria

1. Patients who died at the time of VAD insertion.
2. Patients aged less than 18 years.
3. Patients who underwent heart transplantation after VAD implantation.
4. Patients whose VAD was inserted outside the hospital and outside the study period.
5. Patients diagnosed with a mental disorder.

Data Collection

Initially, the medical records of the eligible patients were reviewed to collect relevant information, including demographic data (age, gender, work status, highest education level), medical history (duration of heart failure before VAD, New York Heart Association class, ejection fraction, presence of comorbidities), and surgical history (indications for VAD, operative date, length of stay, discharge date, readmission rate, and emergency room visits).

Following the review of medical records, self-report questionnaires were distributed to the eligible patients. The questionnaire assessed the health-related quality of life following VAD implementation, including emotional stress, satisfaction with VAD, physical limitations, sexual activity, and social functioning. The average completion time for the questionnaire was between 15-30 minutes.

Statistical Considerations

In this study, version 22.0 of the statistical program SPSS was used for all statistical analyses (SPSS 22; IBM Corp., New York, NY, USA). The researcher collected information from the questionnaires and examined the four outcomes of particular interest: sexual function, social function, physical function, and emotional stress. Qualitative non-numerical parameters were coded or given value labels for simple statistical analysis. Continuous variables were expressed as mean ± standard deviation, and categorical variables were expressed as percentages. The t-test and one-way ANOVA were used for analyzing continuous variables. A p-value of less than 0.05 was considered statistically significant. Tabular summaries of the data were presented where applicable, and graphical representations of the data were used for subgroup analysis. Following the overall estimation attempts, post-hoc subgroup and correlational analyses were conducted to explore different degrees of HRQOL for different values of concomitant variables. All analyses were performed using SPSS, and 95% confidence intervals were adopted for relevant estimates and comparisons.

RESULTS

From February 2016 to June 2020, a total of 26 patients met the eligibility criteria for the study, with 24 patients having LVAD support and two patients utilizing BiVAD support. The demographic characteristics of the Ventricular Assist Devices are presented in Table 1, highlighting the relevant details.

Table 1: Demographic Characteristics

Characteristics	Categories	Number (n=26)	%
Age	18-39	7	26.92
	40-59	18	69.23
	60-79	1	3.85
Gender	Male	21	80.77
	Female	5	19.23
Marital Status	Single	3	11.54
	Married	22	84.62
	Widowed	1	3.85
Educational Level	None	7	26.92
	High school	10	38.46
	University	9	34.62
Work Status	Working	10	38.46
	Sick leave, disability, or retired due to VAD	10	38.46
	Not working: reason unrelated to VAD	6	23.08
Height (Mean±SD)		167.81	8.16
Weight (Mean±SD)		78.70	17.70
BMI (Mean±SD)		27.06	4.82

The study revealed that 50% of the patients had dilated cardiomyopathy, while 38.5% had ischemic cardiomyopathy. In terms of age distribution, 26.92% of the patients belonged to the age group of 18-39 years, while 69.23% were in the age group of 40-59 years. Interestingly, no devices were inserted in patients aged 70 years or older. Furthermore, it was observed that 80.77% of the patients who received VADs were male.

Among the implanted devices, left ventricular assist devices with continuous pump flow accounted for 92.3%, while biventricular support accounted for 7.7%.

The device strategy implemented in this study involved the implantation of all devices as a bridge to candidacy for transplantation. None of the devices were used as a bridge to cardiac recovery, and no patients were selected for the destination therapy strategy. Major adverse events following device implantation were observed, including significant cerebrovascular strokes in 3.8% of the patients, mediastinal significant bleeding and exploration in 11.5% of patients, and driveline infection in 15.4% of patients. However, it is worth noting that only 19.5% of the patients exhibited right ventricular dysfunction, as indicated in Table 1, which presents the demographic characteristics of the VAD cohort.

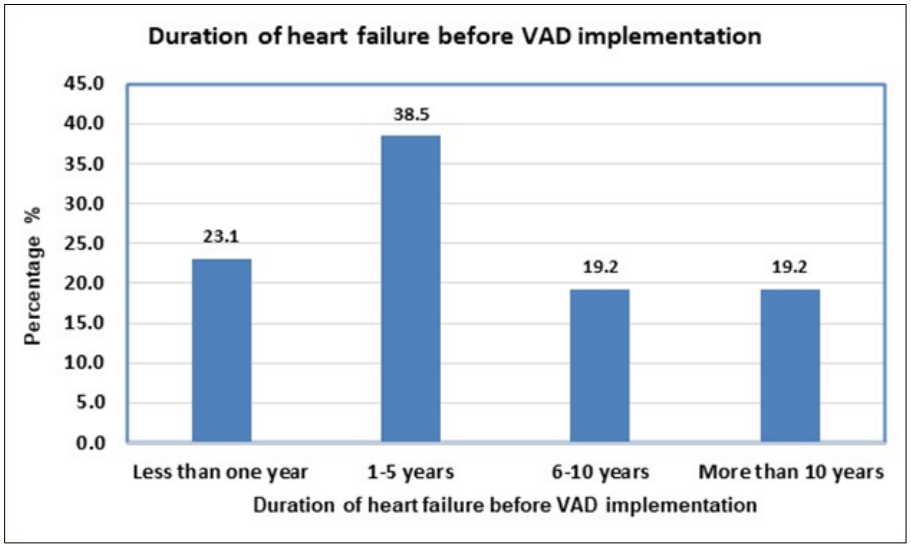

Figure 1: Duration of Heart Failure before VAD implementation

The study also examined the average duration of known heart failure, which ranged from 1 to 5 years, as shown in Figure 1. Table 2 provides detailed information on the medical history and surgical history of the patients with Ventricular Assist Devices. Through the analysis of these categories, it became evident that there was a significant presence of comorbidities among VAD patients, including diabetes, asthma, hypertension, and chronic obstructive pulmonary disease (COPD). These comorbidities are highlighted in Table 2, emphasizing their prevalence and relevance among VAD recipients.

Table 2: Medical History and Surgical History for the Patients with Ventricular Assist Device

Characteristics	Categories	Number (n=26)	%
Duration of Heart Failure Before VAD Implementation	Less than one year	6	23.1
	1-5 years	10	38.5
	6-10 years	5	19.2
	More than 10 years	5	19.2
Diagnosis	Dilated cardiomyopathy	13	50.0
	Restrictive cardiomyopathy	1	3.8
	Postpartum cardiomyopathy	2	7.7
	Ischemic	10	38.5
Present Medical Conditions	Diabetes	6	23.1
	HTN	1	3.8
	Other	2	7.7
	None	12	46.2
	DM & HTN	2	7.7
	DM & HTN & Other	3	11.5
New York Heart Association class	Class I	23	88.5
	Class II	2	7.7
	Class III	1	3.8
Ejection Fraction (EF)	EF<10%-15%	10	38.5
	EF<20 %-35%	16	61.5

Year of Implementation	2020	5	19.2
	2017	3	11.5
	2018	8	30.8
	2019	9	34.6
Type of VAD support	LVAD	24	92.3
	BIVAD	2	7.7
VAD Strategy	Bridge-to-transplant	26	100.0
Have You Had Any Complications After VAD Implementation?	Infection	4	15.4
	Septic shock	1	3.8
	Bleeding	3	11.5
	RV Failure	5	19.2
	None	12	46.2
	RV Failure & Stroke	1	3.8
Are You On the Heart Transplant List?	Yes	26	100.0
Length of Stay in ICU After VAD Implementation:	<1 week	6	23.1
	1-2 weeks	12	46.2
	2-4 weeks	6	23.1
	>4 weeks	2	7.7

The manifestations of VAD disease have a significant impact on the HRQoL of individuals, affecting various domains including physical, emotional, sexual activity, and social aspects. This impact was examined in the current study, and four dimensions emerged from the analysis, as depicted in Table 3.

Table 3: Health-Related Quality of Life among Patients with Ventricular Assist Devices by using SF-36

SF-36 Scales	Mean[#]	SD
Emotional Stress	57.69	21.67
Physical Limitation	34.07	9.54
Sex Life	26.09	44.90
Social Function	83.17	28.49
General Health	87.69	20.36

In the physical domain, participants were questioned about the effects of the disease's clinical condition on their normal functioning and daily activities as well as about the role of therapeutic measures such as physical exercise. The majority of participants reported a positive impact of VAD on their physical ability, with a mean score of 34.07. Most participants were able to perform activities like walking, eating, dressing, and bathing without assistance. However, some participants mentioned limitations in their physical activity due to VAD-related complications, such as because of a stroke.

The emotional domain focused on the feelings associated with coping with VAD and the progression of the disease. Participants expressed an overall satisfaction with VAD on an emotional level, as indicated by a mean score of 57.69. Notably, participants had the highest score in the General Health category, with a mean of 87.69, suggesting a positive perception of their overall well-being.

The sexual activity domain had the lowest mean score among all domains, with a score of 26.09. This highlights the challenges and limitations participants faced regarding their sexual activities while living with VAD.

Lastly, the social domain explored the impact of VAD on participants' social activities. The majority of participants reported a positive effect on their social interactions, with a mean score of 84. They were able to engage in social activities with friends and to spend time with their families. However, some participants mentioned restrictions in their social life due to VAD.

In summary, the study identified and examined these four dimensions—physical, emotional, sexual activity, and social—in relation to age and health-related quality of life. The results provide insights into the specific impacts of VAD disease on these domains, shedding light on the experiences of individuals living with VAD as illustrated in Table 4.

Table 4 revealed that older age group patients had lower quality of life compared to younger age group, particularly in physical health and emotional domains. The study also found a significant decrease in HRQoL scores in patients who experience a longer disease duration in the physical health domain.

Table 4: Health-Related Quality of Life among Patients with Ventricular Assist Devices by Age Using SF-36

	Age < 40 years		Age > 40 years		P Value
SF-36 Scales	**Mean#**	**SD**	**Mean#**	**SD**	
Emotional Stress	63.39	24.05	55.59	21.03	0.427
Physical Limitation	40.82	14.11	31.58	5.98	0.139
Sex Life	16.67	40.82	29.41	46.97	0.562
Social Function	85.71	19.67	82.24	31.54	0.789
General Health	91.43	8.02	86.32	23.38	0.581
# 0 Represents the Lowest Level; 100 Represents the Highest Level					

Table 5 examined the relationship between HRQoL and gender among VAD patients using the SF-36 questionnaire. It aimed to determine if there was a correlation between gender and HRQOL scores, providing insights into potential gender differences in patients' overall quality of life.

Table 5: Health-Related Quality of Life among Patients with Ventricular Assist Devices by Gender Using SF-36

	Male		Female		P Value
SF-36 Scales	**Mean#**	**SD**	**Mean#**	**SD**	
Emotional Stress	60.71	21.66	45	18.43	0.149
Physical Limitation	34.35	10	32.86	8.14	0.76
Sex Life	31.58	47.76	0	0	0.01*
Social Function	81.55	30	90	22.36	0.562
General Health	90	22.36	74	42.04	0.42
# 0 Represents the Lowest Level; 100 Represents the Highest Level *** Significant P Value**					

Table 6 demonstrated a significant decrease in HRQoL scores for the emotional stress and social function domains as the duration of the disease increased. This suggests that individuals with VAD experience challenges in managing emotional well-being and social functioning over time. Additionally, Table 6 visually represents the relationship between the length of VAD support and the variable under study.

Table 6: Health-Related Quality of Life among Patients with Ventricular Assist Devices by Length of VAD Support Using SF-36

	Less than One Year		1-5 Years		P Value
SF-36 Scales	**Mean#**	**SD**	**Mean#**	**SD**	
Emotional Stress	58.93	22.78	57.24	21.88	0.864
Physical limitation	31.63	5.62	34.96	10.62	0.441
Sexuality life	28.57	48.8	25	44.72	0.865
Social furcation	89.29	19.67	80.92	31.28	0.518
General health	90	15	86.84	22.31	0.733
# 0 Represents the Lowest Level; 100 Represents the Highest Level *** Significant P Value**					

Table 7 shows significant differences in General Health (P = 0.040), indicating varying perceptions of health based on education level. Other scales like Emotional Stress, Physical Limitation, Sexuality Life, and Social Function did not show significant differences.

Table 7: Health-related Quality of Life among patients with Ventricular Assist Devices by Educational level using SF-36

	None		High School		University		P Value
SF-36 Scales	**Mean#**	**SD**	**Mean#**	**SD**	**Mean#**	**SD**	
Emotional Stress	51.79	21.86	54.38	19.33	65.97	23.82	0.371
Physical Limitation	32.65	9.09	35	12.35	34.13	6.94	0.891
Sex Life	16.67	40.82	22.22	44.1	37.5	51.75	0.675
Social Function	85.71	24.4	83.75	27.67	80.56	34.86	0.939
General Health	71.43	33.63	94	7.75	93.33	7.91	0.040*
# 0 Represents the Lowest Level; 100 Represents the Highest Level *** Significant P Value**							

DISCUSSION

The findings of the study suggest that patients with VADs experience improvements in their health-related quality of life, which is consistent with the results of the study by Guyatt *et al*., In the study by Guyatt *et al*., it was explained that patients who received LVADs showed improvement in their condition, and their survival rate increased from 75% to 80% (Grady *et al*., 2015). This supports the positive impact of VADs on patients' well-being and overall outcomes.

Furthermore, there is a strong correlation between a higher level of formal education and better HRQoL across various domains, such as the physical, emotional, social, and environmental, as demonstrated in the study by Bruce *et al*., (2014). The study found that individuals with a lower level of education experienced feelings of hopelessness and emotional conflicts, which in turn affected their access to health services. The scarcity of health resources was shown to compromise their HRQoL, as they reported a need for routine medical monitoring. These findings emphasize the importance of education and access to healthcare resources in promoting better HRQoL for individuals.

According to the mentioned logic, when patients report low health-related quality of life, it indicates that their stress levels and disease progression may be compromising their overall well-being and way of life. In such cases, addressing the associated psychological and social conflicts becomes crucial. By promoting acceptance of the illness, fostering a sense of well-being and social belonging, and enhancing patient security, it is possible to improve the quality of life for affected individuals and groups, as suggested by Kugler *et al*., (2011). These factors play a significant role in supporting patients and helping them cope with their illness, ultimately leading to an improved quality of life.

Physical Domain

The presence of Ventricular Assist Devices (VADs) can impact an individual's health-related quality of life, particularly in the physical limitation domain. Gender differences have been observed, with women facing higher risks of poor quality of life in the mental, emotional, and physical domains. Additionally, increasing age can lead to psychological compromise due to the individual's concerns about the possibility of death becoming more pressing over time (Moskowitz *et al*., 1997).

However, overall, VAD patients tend to have a positive perception of their HRQoL, particularly in terms of physical activity. Studies by Moreno-Suarez *et al*., have shown that implementing VADs for end-stage heart failure can improve physical activity levels and enhance strength. Similarly, Granegger *et al*., found that patients receiving LVADs experienced improvements in daily living activities and reduced symptoms compared to heart failure patients without VADs (Moreno-Suarez *et al*., 2019).

Coping with physical pain in various body segments is a common experience among VAD patients, impacting their productivity and compromising their sense of well-being, as highlighted by Hill *et al*., (2013). These manifestations of the disease can significantly affect patients' daily lives and overall quality of life.

Emotional Domain

The disease associated with Ventricular Assist Devices (VADs) is often accompanied by high levels of depression, which can be attributed to the uncertainty surrounding the possibility of sudden death related to cardiac issues and complications associated with VADs. The initial discovery of the disease is often characterized as a shocking event that leads to feelings of apprehension and despair. Limited information and the stigma surrounding the disease further contribute to stress development. Patients may experience ongoing feelings of sadness and a fear of death, with the perception of the disease being solely associated with mortality rather than other clinical aspects. This perception can lead to a sense of condemnation and a significant shift in how patients perceive themselves, their resources, and their capabilities (MacIver and Ross, 2012).

In this context, patients who exhibit symptoms often report higher dissatisfaction with their HRQoL and experience higher levels of stress, even surpassing the impact of physical symptoms (MacIver and Ross, 2012). Studies have shown that the diagnosis itself can trigger negative emotions, regardless of the manifestation of symptoms. The anticipation of suffering plays a significant role in promoting stress, as negative thoughts about their life condition proliferate, further exacerbating the complications associated with the disease.

Overall, the psychological and emotional impact of the disease, combined with the stress related to the uncertainty and stigma, significantly affect patients' well-being and quality of life.

Social Domain

The maintenance of social bonds for individuals affected by VAD disease can vary depending on different social contexts. On one hand, there is a sense of solidarity emanating from family and close friends, which provides support and understanding. However, in the workplace, infected individuals may face marginalization and discrimination, highlighting the social impact and the discrimination associated with the disease. This marginalization can lead to the weakening of work relationships and can further exacerbate the challenges faced by individuals with VAD disease (Abshire *et al*., 2016).

The social representations surrounding the disease can also have negative effects on patients. Myths,

cultural meanings, and negative values associated with the illness can result in psychological damage and in establishing barriers in patients' lives, impacting their dynamics and well-being (Charan & Biswas, 2013).

In terms of employment, a significant portion of participants (38.5%) were able to return to work, while others (15.4%) were unable to do so due to the impact of VAD disease. The decrease in physical vigor often leads to loss of employment, and individuals may find themselves in unfavorable socioeconomic conditions, resorting to informal sector occupations or physically demanding work with long hours, providing only the minimum means of survival. These individuals face obstacles related to societal repercussions and cultural prejudices associated with the disease. The progression of late disease complications, requiring continuous treatment and special care, can also accelerate the retirement process (Donahey *et al*., 2015; Al-Shamiri, 2013).

Retirement can pose additional challenges, as the financial value provided by social security may not cover the expenses for treatment and basic subsistence, which can disturb individuals psychologically and socially. This situation can position them as dependent on society without the opportunity for normal development. The preservation of social relationships is described as a facilitator in accessing healthcare information, disease monitoring, support during crisis times, and participation in social events (Al-Shamiri, 2013).

Overall, the social sphere plays a crucial role in the experience of individuals with VAD disease, both in terms of support and solidarity from intimate social groups and in the challenges and discrimination faced in the workplace and broader society.

Sexual Activity

Some participants in studies have expressed dissatisfaction and a lower enjoyment of life, particularly in relation to sexual activities, compared to seronegative groups. While an average of 31.58% of patients reported being satisfied with their sexual activities, there are concerns and apprehensions raised by VAD patients regarding sexual activity. In one study by Samuels *et al*., nine male patients who received VAD support expressed interest in sexual activities, and five of them became sexually active within a month after returning home. However, many patients were worried about the positioning of the driveline during intercourse (MacIver and Ross, 2012).

The overall results of various studies indicate that the disease significantly compromises the HRQoL across multiple domains with limited coping strategies observed, particularly in the physical dimension. This highlights the need to strengthen individuals in physical, emotional, sexual, and social aspects. Interventions should focus on preserving or restoring functional capacity, promoting acceptance and empowerment in dealing with the disease on a daily basis, providing accessible and useful health services, and facilitating the reintegration of individuals into their family and social environments (Donahey *et al*., 2015).

CONCLUSION

It is essential to assess and to identify the HRQoL for post-ventricular assist devices in improving patient’s quality of life. Limited studies have been conducted on the patient's HRQoL post-VAD implantation worldwide. Also, there is no such study for the population of Saudi Arabia. This research provides insight into the unexplored area of VAD in managing heart failure cases in Saudi Arabia. The study results could highlight the value of using a VAD to treat heart failure to achieve the desired health outcomes and to improve patients' HRQoL. In this study, participating patients with VADs reported excellent health-related quality of life in all domains, with moderate to high support scores indicating a positive effect on their HRQoL.

Future intervention should focus on interventions that develop the HRQoL in patients with VADs at the King Faisal Specialist Hospital and Research center. The outcome of the study is considered to provide support for a multidisciplinary team of healthcare professionals, such as physiotherapists, dietitians, social workers, and psychological counselors, to improve patients’ HRQoL. Further studies are needed to explore the impact of using a VAD to improve heart failure prevention and recovery and to achieve excellent HRQoL for patients. The study's limitations stem from the lack of a universal concept about HRQoL and a standard instrument for its assessment for the individual affected by VAD disease. The search for relevant studies on this topic showed scarce records—privileging aspects that explore the individual's physical domain, the detriment of the psychological and social elements, which help to absorb the dizzying impact of the illness. Therefore, patients require coping strategies that meet their corresponding needs. Also, regarding its stratification, the damage caused to the HRQoL resulting from the VAD disease is not detailed. In most of the findings, individuals are treated only as having VAD disease without specificity except for severe VAD heart disease cases. Also, this study limited the number of patient-participants in the survey.

List of Abbreviations

i. VAD: Ventricular Assisted Devices
ii. LVAD: left Ventricular Assisted Devices
iii. RVAD: right Ventricular Assisted Devices
iv. BIVAD: bi- Ventricular Assisted Devices
v. IRB: Institutional Review Board
vi. KFSHRC: King Faisal Specialist Hospital and Research Centre.
vii. HRQL: Health-Related Quality Life

viii. MCS: Mechanical Circulatory Support
ix. HF: Heart failure
x. AHF: acute heart failure
xi. SF-36: The 36-Item Short Form Survey
xii. WHO: World Health Organization
xiii. MRN: Medical Record Number
xiv. CSICU: Cardiac Surgical Intensive Care
xv. EF: Ejection fraction
xvi. SPSS: Statistical Package for the Social Sciences
xvii. CVD: Cardiovascular Diseases
xviii. FDA: Food and Drug Administration
xix. QoL: Quality of Life
xx. HTx: heart transplantation

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