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Risk Factors as Predictors of Sexual Activity in Heart Failure

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Patients with heart failure (HF) often have concerns about sexual activity while living with HF. Little is known about factors that contribute to sexual activity and sexual dysfunction in HF. This study examined selected risk factors and demographic variables as predictors of sexual activity in HF patients. The sample (N = 97) was mostly male and white and had some college education. Four risk factors, tobacco use, alcohol use, having diabetes, and number of medications, were statistically significant in showing decreased odds of being sexually active, when controlling for age, sex, education, and body mass index. Nonexercisers and hypertension were not significant predictors of sexual activity. Among cardiac medication classes, there were no statistically significant differences between those HF patients who were and were not sexually active. Health professionals need to be mindful of these predictive factors as they provide sexual counseling to patients with HF.

Keywords: Heart failure, Sexual activity, Sexual dysfunction

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Sexual activity, as an area of physical activity, is often of concern to heart failure (HF) patients. Existing evidence suggests that sexual activity, which includes all aspects of intimate contact, may be adversely affected in HF, although factors that influence these changes are not well understood. Much of the research has generally focused on myocardial infarction and erectile dysfunction (ED) in cardiac disease. Knowledge of sexual concerns and sexual activity in HF is limited.

Sexuality remains an important aspect of the lives of many cardiac patients, including those with HF. The discussion of sexual concerns with patients and partners seems to be limited, however. An online survey of members (N = 290) of the Heart Failure Society of America were asked if they brought up the topic and provided advice related to sexual activity in HF. Findings revealed that 23% discussed sexual activity with patients, 48% sometimes discussed the topic, and 24.5% discussed sexual activity only when asked by the patient.[1] In contrast, a study of HF patients (N = 100) showed that 60% of men and 75% of women reported that physicians did not discuss potential sexual problems with them.[2] Issues such as older age of the patient, risk of increasing cardiac symptoms, fear of sudden cardiac death, and raising patient's anxiety levels, are cited as reasons that health professionals do not discuss sexual issues with patients.[3]

Sexuality and sexual activity remain an important aspect of quality of life throughout the life span and into older age. Increasing life expectancies make discussion of sexual concerns more important as cardiac patients and their partners seek active, fulfilling lives. Heart failure patients may maintain sexual interest, but sexual performance may be adversely affected by HF or its treatment.[4] Sexual function in those with advanced HF may be negatively affected by medications that cause sexual dysfunction, decreased exercise capacity, fatigue, shortness of breath, fear of death, anxiety, depression, and changes in self-esteem and mood.[5-7]

SEXUAL ACTIVITY IN HEART FAILURE

Changes in sexual activity commonly occur in those living with HF. A study of 62 men and 11 women with advanced HF revealed that 76% (n = 47) had a marked decline in the frequency of sexual activity, and 32% (n = 20) had ceased sexual activity.[5] Difficulty with sexual performance was reported by 44% (n = 27) of the sample, and 37% (n = 23) stated they were unable to perform sexually. Similarly, Westlake and colleagues[7] studied 63 couples in an outpatient cardiac rehabilitation program, finding that 62% (n = 39) of HF patients had slight or marked decrease in the frequency of sexual activities, and 30% (n = 19) had ceased all sexual activity. Partners also reported a slight or marked decrease in sexual activity (48%, n = 29), and 30% (n = 18) noted that sexual activity had ceased.

Jaarsma[4] studied sexual problems in HF patients (n = 73) over time, at baseline and 3 and 9 months after a hospitalization for HF. Patients reporting a lack of sexual activity over time improved slightly, with 33% at baseline, 26% at 3 months, and 27% at 9 months. Change was also noted for those reporting marked decline in sexual activity with 15% (n = 35) at baseline, 8% at 3 months, and 7% at 8 months. Patterns for those reporting a slight change in sexual activity were similar, 11% at baseline, 7% at 3 months, and 8% at 9 months.[4]

The available research reveals that sexual activity is often adversely affected in HF, and sexual dysfunction is a common complaint. The risks for ED in men include lower education level, heart disease, hypertension (HTN), diabetes, cigarette smoking, and obesity.[8] In addition, depression, anxiety, and medication side effects may play a role.[9] Prevalence of ED in large population-based studies is estimated at 39% in 40-year-olds and up to 68% in men aged 69 years.[8] Prevalence of sexual dysfunction in women is thought to be similar to men, but with women exhibiting problems such as vaginal dryness, decreased libido, pain with intercourse, or difficulty achieving orgasm. Decline in sexual activity for women is also influenced by partner availability and concurrent medical conditions. Level of education, a history of sexual abuse or sexually transmitted diseases, physical health, and state of well-being have been associated with female sexual dysfunction.[8]

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Few studies have explored sexual dysfunction in HF. Schwarz and colleagues[2] examined the prevalence of sexual dysfunction in 100 patients with stable New York Heart Association (NYHA) class I to III HF. Sexual dysfunction was prevalent among both sexes, with 87% of women diagnosed with sexual dysfunction and 84% of men with ED. In women, 80% cited decreased lubrication as a contributor to frequent unsuccessful intercourse (76%). Maintaining sexual activity was an important component for men (52%), and many (61%) were interested in treatments to improve sexual function.[2]

Given the limited understanding of sexual function in HF, the purpose of this study was to examine selected variables as predictors of sexual activity in HF. Strategies for sexual counseling in HF are suggested based on the available research.

METHODS

Design and Sample

This study used a cross-sectional, comparative approach to study HF patients in a cardiology service at a major academic medical center. Participants were eligible for the study if they met the following inclusion criteria: (1) diagnosis of chronic HF etiology, confirmed by a cardiologist in this service; (2) had undergone evaluation for HF and on stable doses of medications for at least 1 month; (3) had not been referred for heart transplantation or ventricular assist device implantation. Those excluded from the study were those with (1) valvular heart disease, peripartum HF, or cardiomyopathy due to myocarditis; (2) history of stroke in the last 3 months or with major sequelae; (3) myocardial infarction in the last 3 months; (4) coexisting terminal illness; and (5) major psychiatric disorders. The sample for this analysis included 97 HF patients.

Procedure

The institutional review board at the study site approved the study. Before data collection, all participants gave informed, written consent. Patients were referred to this project by nurse practitioners and cardiologists

on the service. A trained research assistant confirmed patient eligibility, explained the study to the patient, and obtained informed consent. Trained research assistants collected sociodemographic and clinical characteristics by medical record review and patient interview.

Measurement

Sociodemographic Variables: Participants were asked to respond to questions related to the following demographic factors: (1) sex, (2) ethnicity, (3) education level, (4) marital status, (5) living condition (with someone or alone), (6) employment status (employment outside home, unemployed by choice, sick leave/disability, retired because of HF, retired unrelated to HF), (7) financial/how well lives on income (comfortable, enough to make ends meet, not enough to make ends meet), and (8) medical insurance (yes/no).

Clinical Variables: Clinical factors were chosen, based on the literature, for those variables that were more likely to influence sexual function. The following clinical characteristics were obtained from the medical record and patient report: (1) smoking/tobacco history, (2) alcohol/drinking history, (3) medical risk factors (HTN, treated for HF, diabetes), (4) participates in exercise (yes/no), (5) body mass index (BMI), (6) left ventricular ejection fraction, (7) NYHA classification, (8) medications by class, and (9) number of medications. Participants were asked the extent to which they had been sexually active in the last 2 months.

Statistical Analyses

Sociodemographic and clinical variables were first analyzed using descriptive statistics (frequencies and means). The majority of HF patients were married or cohabitating; therefore, logistic regression was used to examine potential predictors of sexual activity among married or cohabitating HF patients. The logistic regression model used 6 risk factors (tobacco use, alcohol use, diabetes, exercise, number of medications, HTN) and 4 control variables (age, sex, education, BMI) to predict whether the respondent was sexually active. $P < .05$ was considered to be statistically significant.

RESULTS

Sociodemographic characteristics of this sample of 97 participants with HF are displayed in Table 1. Participants were predominantly male, married, white, and well educated. The mean age of participants was 62 ± 10.74 years. Most respondents were unemployed or retired, with 25% of retirements related to HF. Most had medical insurance and reported that their income level was comfortable or able to make ends meet. Table 2 contains the clinical characteristics of the sample. Risk factors and comorbidities represent those more likely to influence the ability to be sexually active. Most patients had an ischemic HF etiology or NYHA class II or III HF and had a mean ejection fraction of 34%. Most participants reported sexual activity in the last 2 months (65%, n = 63), although the frequency of sexual activity varied (Table 3).

Logistic regression was used to analyze variables that contributed to sexual activity among HF patients. Age,

TABLE 1 Sociodemographic Characteristics of the Sample (N = 97)

Characteristic	n	%
Male sex	75	77
Ethnicity		
White	91	94
Black	5	5
Mixed	1	1
Marital status		
Married	93	96
Cohabitating	4	4
Living condition		
Lives with someone	91	94
Lives alone	6	6
Education level		
Less than high school	17	17
High school diploma	26	27
Some college	26	27
College/bachelor's degree	12	12
Graduate/professional degree	16	17
Employment status		
Employed outside home (full time or parttime)	16	17
Unemployed by choice	1	1
Sick leave or disability	22	23
Retired due to heart failure	24	25
Retired not due to heart failure	30	31
Other	3	3
Financial/how well lives on income		
Comfortable	34	35
Enough to make ends meet	43	45
Not enough to make ends meet	19	20
Has medical insurance	91	94

TABLE 2 Clinical Characteristics of the Sample (N = 97)

Characteristic	n	%
Current or recent tobacco smoker	20	21
Alcohol/drinking history	32	33
Medical risk factors		
Hypertension	74	76
Treated for heart failure	95	98
Diabetes	43	44
Atrial fibrillation	50	52
Implantable cardioverter defibrillator	48	51
Stroke/TIA	20	21
Asthma/COPD	25	26
CABG	37	38
Participates in exercise	85	88
BMI		
<30 kg/m	41	42
≥30 kg/m	56	58
Heart failure etiology		
Ischemic heart disease	57	60
Idiopathic	12	13
Hypertension	8	8
Alcoholic	2	2
Other	16	17
NYHA class		
I	7	7
II	34	36
III	47	50
IV	7	7
Medications		
ACE inhibitors	77	79
ARB	10	10
Antiarrhythmic	10	10
Antidepressant	21	22
β-Adrenergic blocker	83	86
Calcium-channel blocker	16	16
Digoxin	32	33
Diuretics	75	77
No. medications		
None	1	1
2	2	2
3	37	38
4	30	31
5	11	11
6	1	1
Left ventricular ejection fraction	91	Mean, 34.19 (SD, 13)

Abbreviations: ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blockers; BMI, body mass index; CABG, coronary artery bypass grafting; COPD, chronic obstructive pulmonary disease; NYHA, New York Heart Association; TIA, transient ischemic attack.

sex, education, and BMI were used as covariates to control for these factors in the analysis (Table 4). Four of the 6 risk factors related to HF, tobacco use (P = .001), alcohol use (P = .016), having diabetes (P = .023), and number of medications (P = .012) were statistically significant in showing decreased odds of being sexually active, when controlling for age, sex, education, and BMI. These variables contributed to 33% (R^2 = 0.325) of the variance in sexual activity. Nonexercisers and HTN were not significant predictors of sexual activity. Among control variables, only age (P < .001) had a statistically significant impact on sexual activity. Further analyses were conducted to evaluate medication classes and any impact on sexual activity. Among medication classes, there were no significant differences between those HF patients who were and were not sexually active.

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DISCUSSION

Selected variables that have the potential to impact sexual activity were tested in a group of HF patients. Tobacco and alcohol use, diabetes, and number of medications

TABLE 3 Sexual Activity in Heart Failure (N = 97)

Sexual Activity in the Past 2 Months	n	%
Not at all	34	35
Once a month	25	26
Once a week	23	24
Twice a week	10	10
More than twice a week	5	5

were significant predictors of decreased or absence of sexual activity in HF. It is well known that tobacco, alcohol, and diabetes can affect sexual function. In a study predicting risk factors for ED, those men with only a single risk factor and ED included those with, in order of greatest incidence, high cholesterol, current smoking, HTN, obesity, diabetes, and high triglycerides.[10] More surprising in the present study, however, was that the specific class of medication was not as influential on sexual activity as the number of prescribed medications. This finding is contrary to what was anticipated, because certain classes of medications such as β-blockers, calcium-channel blockers, vasodilators, diuretics, and lipid-lowering agents can affect sexual function.[11] The majority of participants in the study were prescribed medications commonly used in HF, with 86% taking a β-adrenergic blocker, 79% an angiotensin-converting enzyme inhibitor, 77% diuretics, and 33% digoxin. Given that HF patients are often on multiple medications, it was anticipated that both the class of medication and number of medications would adversely affect sexual function, although not demonstrated in this study. The number of medications was a significant contributor to the decrease in sexual activity. Most participants were prescribed 3 or more medications, with most taking 3 (38%) or 4 (31%) medications. Of interest is that HF patients often take multiple medications, and it seems that the cumulative effect of 3 or 4 cardiac medications significantly affected sexual function.

TABLE 4 Logistic Regression Analysis for Predictors of Sexual Activity

Variables	Beta	Standard Error	Odds	P
Dependent variable = sexually active (N = 97)				
Risk Factors				
Smoking/tobacco use	−3.041	.903	.048	.001
Alcohol use	−1.555	.647	.211	.016
Diabetes	−1.336	.589	.263	.023
Hypertension	.256	.685	1.292	.708
No Exercise	−.677	.813	.508	.405
Number of medications	−.714	.285	.490	.012
Controls				
Age	−1.77	.044	.838	.000
Gender (female)	.297	.698	1.345	.671
Education (degree)	.713	.695	2.041	.305
BMI	−.031	.040	.970	.445
R-square=	.325			

Abbreviation: BMI, body mass index.

In addition, a diagnosis of HTN did not predict adverse effects on sexual activity, perhaps indicating that these HF patients were well controlled on their medications. A lack of exercise was also not predictive of sexual activity. It was thought that those who were more "fit" would have improved exercise endurance, which might carry over to improved sexual activity. Although this still might be true, a lack of exercise did not have an adverse effect on sexual activity in this sample. In contrast, a study of 59 stable, male HF patients demonstrated that exercise training with cycle ergometry improved sexual activity.[12] Further research is needed to validate factors contributing to impaired sexual function.

The number of HF patients who were not sexually active (35%) was similar to prior reports, ranging from 30% to 33%.[4,5,7] Jaarsma[4] noted some improvement in sexual activity over time after an HF diagnosis and at 9 months after hospitalization, with a 6% improvement in those reporting lack of sexual activity at baseline. Those with HF are often assumed to be less interested in sexual activity, perhaps because many fall into the older age group. In the present study, most HF patients (65%) reported being sexually active, with a mean age of 62 years. Thus, directing patient education and supportive measures to successfully resume sexual activity is an important aspect of quality of life for this population.

The extent of sexual dysfunction in those not sexually active was not specifically examined in this study but warrants further investigation. However, recent literature does provide insight into sexual problems experienced by HF patients. Problems of sexual desire seem to be common for both men and women with HF, 76% and 87%, respectively, in 1 study, and ED in men and orgasmic problems in both sexes were prevalent.[2] Less is known about sexual dysfunction of women, particularly in those with coronary disease. A study of 2,626 women revealed that history of psychological problems ($P = .04$), being married ($P = .03$), low physical activity ($P = .012$), chronic disease ($P < .01$), multiparity ($P < .05$), menopause status ($P \leq .01$), and partner ED ($P = .01$) were significantly associated with female sexual dysfunction.[13] For both sexes, sexual satisfaction can be adversely affected by HF, impacting 80% of men and 83% of women in 1 study.[2]

Study Limitations

This study used a nonexperimental design to explore predictors of sexual activity in HF. The design was appropriate as little is known about what influences sexual activity in HF. Further research is needed to validate these findings. Limitations include a relatively small sample size, although larger than some prior reports.[4,5,7] The sample was drawn from 1 clinical site, thus limiting

generalizability. In addition, other predictors of sexual activity may exist that were not accounted for in this study.

PRACTICE CONSIDERATIONS

A number of factors contribute to sexual activity and sexual dysfunction in HF. Acute care nurses have an important role in assessment of sexual issues and working with the healthcare team to ensure that patient concerns are addressed. A number of strategies can be used at the bedside and as part of patient education and management.

Acute care nurses have an important role in assessment of sexual issues and working with the healthcare team to ensure that patient concerns are addressed.

- Assess sexual concerns and do not rely on the patient to bring up the topic. Often, discussing exercise recommendations first and then discussing return to sexual activity make an easier transition for both the nurse and the patient. A general statement such as the following may be useful: "Many individuals with heart failure have questions and concerns about resuming sexual activity. What concerns do you have?"[6] Patients often are relieved to have you discuss the topic and give them the opportunity to discuss concerns and treatment options.
- Patients may be concerned about the risk of sexual activity with HF. The nurse may initiate this discussion with the physician, and risks are evaluated in light of the patient's history, current HF status, medications, and other factors. In general, NYHA class I HF patients are at low risk, with appropriate medical management; NYHA class III or IV patients may be at high risk because sexual activity has the possibility of triggering cardiac decompensation in some patients; and NYHA class II patients may be at moderate risk for exacerbation of HF symptoms.[14]
- Other suggestions for resuming sexual activity when living with HF include (1) a semireclining or on-bottom position may decrease physical exertion; (2) engaging in sexual activity when well rested and avoiding heavy meals or alcohol before sexual activity; (3) stopping and resting if shortness of breath occurs; and (4) using sexual foreplay to "ease back into" sexual activity and to determine tolerance for sexual activity. In addition, patients can be encouraged to remain intimate through hugging and kissing. Sexual intercourse, oral sex, or mutual masturbation may not be possible for those with compromised exercise capacity.[6,11]
- As illustrated in this study, medications can adversely affect sexual function. For those patients who wish to be sexually active, the nurse and physician might discuss if it is clinically feasible to discontinue or replace medications with known sexual side effects. For example, propranolol might be changed to carvedilol, and a thiazide diuretic might be replaced with a loop diuretic.[9]
- Given that ED occurs commonly in HF, men may be interested in the phosphodiesterase 5 (PDE-5) inhibitors as part of their treatment plan. These medications are generally well tolerated in HF and have improved some aspects of sexual function[15,16] and improved exercise capacity.[16] If a patient taking a short-acting PDE-5 inhibitor (sildenafil, vardenafil) experiences chest pain, they are advised not to take nitroglycerin for 24 hours afterward. This is extended to 48 hours for the longer acting tadalafil.[15]
- The role of the psychological status of the HF patient should not be underestimated. Assessment of depression and anxiety in the acute care setting is of great importance. Not only have anxiety and depression been linked to negative outcomes in cardiovascular disease, but they also impact sexual activity. Patients may benefit from antidepressant medications, although caution is needed as the commonly used selective serotonin reuptake inhibitors can contribute to a decrease in libido and may worsen ED. One approach is to treat depression in men with these medications and counteract side effects with a PDE-5 inhibitor.[9]

In summary, multiple factors likely play a role in influencing sexual activity in HF. Further research is needed to address sexual concerns of HF patients, examine correlates and predictors of sexual activity, and evaluate strategies for resuming sexual activity in intervention studies. Patients with HF and their partners often have unanswered questions, and acute care nurses are in key positions to be able to address this quality-of-life issue.

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