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## Heart Failure Patients' Knowledge and Barriers of Low Sodium Diet Adherence in Erbil City

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### ABSTRACT

**Background and objective:** A low sodium diet is a cornerstone of non-pharmacologic therapy for heart failure patients. The objective of the study was to assess knowledge and perceived barriers of low sodium diet adherence of heart failure patients in Erbil City.

**Methods:** A descriptive, cross sectional study design was conducted among a sample of 50 patients diagnosed heart failure in Medical Wards and Cardiac Care Units at both Rizgary and Hawler Teaching Hospitals in Erbil City from Feb 2018 to Oct 2019. Patients who met the inclusion criteria were selected for participation of the study, interviews based on a questionnaire patient's sociodemographic, clinical characteristics and the Dietary Sodium Restriction Questionnaire (DSRQ). Frequency, percentage, and the chi-square test were used for analyzing data.

**Results:** The results show that majority of heart failure patients were low knowledge (80%) and high perceived barriers (66%) to low sodium diet adherence. There were significant associations between knowledge and barrier with age group (p-value=0.01; p-value=0.04), gender, (p-value=0.00; p=0.05), level of education (p-value=0.00; p-value=0.02) and economic status (p-value= < 0.001; p-value= <0.001).

**Conclusion:** Results of the study show that heart failure patients had low knowledge and perceived more barriers to adherence of low sodium diet.

**Key words:** Heart Failure; Knowledge; Perceived barriers; Low sodium diet

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### INTRODUCTION

Heart failure, often referred to as congestive heart failure (CHF), is the inability of the heart to pump sufficient blood to meet the needs of the tissues by providing oxygen and essential nutrients. However, the term CHF is misleading, because it indicates that patients must experience pulmonary or peripheral congestion [1]. Heart failure, an exceedingly common

cardiac condition, is associated with high rates of morbidity and mortality including frequent hospital admissions [2]. Sodium restriction has remained a core therapy for managing sodium and fluid retention in patients with acute and chronic heart failure [3]. Heart failure is a chronic illness that afflicts more than 5,000,000 Americans and contributes to more than 286,700

deaths annually. The prevalence of heart failure increases by approximately 550,000 patients [4]. A low-sodium diet is an accepted treatment of patients with heart failure, although minimal evidence exists on the appropriate amount of sodium intake for this population. Certain heart failure guidelines have liberalized dietary sodium recommendations, which actually exceed guidelines for healthy adults [5]. Although the low-sodium diet is a fundamental non-pharmacologic component of heart failure care, most people with heart failure have considerable difficulty in following such a diet [6]. Fluid overload, usually secondary to dietary sodium indiscretion, was identified as a major reason for heart failure exacerbations that resulted in hospitalization and high prevalence of non-adherence to the low-sodium diet [7]. Moreover, restricting sodium intake, the role of dietary sodium in heart failure management has been fully established in highly effective medical therapy. Recent data highlighted an alternative hypothesis that sodium restriction may be harmful in heart failure patients and low-sodium diet in combination with high-dose diuretics and fluid restriction promoted increases in hospital readmission and death [8]. The purpose of this study is to determine the knowledge of a low-sodium diet in the care of patients with heart failure and substantial barriers to adherence that patients face. There are no prior studies done for assessment of patients' knowledge and barriers toward adherence of low-sodium diet in Erbil City.

## METHODS

A descriptive cross sectional study design was used to assess heart failure patients' knowledge and perceived barriers to low-sodium diet adherence in medical wards and cardiac care units at both Rizgary and Hawler Teaching Hospitals from February

2018 to October 2019 in Erbil City. In order to obtain accurate data and a representative sample, a non-probability (purposive) sample was used to select heart failure patients according to the following criteria: patients who agree to participate in the study, patients with a medical diagnosis of heart failure, age more than 18 years old and have been taking treatment for at least the past one month. Sample size estimation was calculated by following statistical formula:  $\text{sample size} = Z^2 pq/d^2$  {z=confident interval 95% or 1.96, p= prevalence 0.029, q= (1-p) =0.971, d= sampling error 0.05}[9].  $\text{Sample size} = Z^2 pq/d^2 = (1.96)^2 * (0.029) * (0.971) / (0.05)^2 = 43$ , for representative sample of 50 heart failure patients chosen in this study. Data were collected through a standardized questionnaire comprising of sociodemographic and clinical characteristics including age, gender, level of education, marital status, occupation, residential area, economical status, cigarette smoking, hospitalization in last year, and comorbidity in addition to the New York Heart Association Class (NYHA), a clinical tool used to evaluate cardiac symptoms on a patient's daily activities. Class I patients do not have any limitations of physical activity. Class II patients have slight limitations of physical activity, but ordinary physical activity results shortness of breath, or chest pain. Class III patients have limitations of limited physical activity and Class IV patients are unable to carry out any physical activity without discomfort [10]. The Dietary Sodium Restriction Questionnaire (DSRQ), an instrument based on the theory of planned behavior which was cross-culturally adapted [7] and validated for use in Brazilian Portuguese, with the name (Questionário de Restrição de Sódio na Dieta) was used in part two. The DSRQ demonstrated to be a reliable tool for measuring adherence to dietary sodium

restriction in patient’s heart failure and comprises of two subscales: knowledge (6 items) and perceived barriers (8 items). Patients responded to each item by recording one of three options (agree =2, neutral=1, disagree =0) [7,11]. Regarding level of knowledge, if total score is equal to or less than 6, the patient is considered to have low knowledge, while scoring more than 6 is considered high knowledge. Low perceived barriers were indicated if total score is equal to or less than 8, whereas scoring more than 8 indicated high perceived barriers. Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 22, descriptive and inferential statistics were used to finding outcome of the study such as frequency, percentage, mean and standard deviation and statistical tests such as chi-square, p-value of equal or less than 0.05 was considered a statistically significant.

**RESULTS**

Table 1 shows the sociodemographic and clinical characteristics of 50 patients with heart failure (HF) who participated in the study. Regarding age range from 30-69 years, 36% of patients ranged their age group between 50-59 with a mean age of 58.07±12.39, more than half percentage (58%) of them were males and 42% were females; 54% were illiterates while 6% of them graduated from university and majority of the participants (78%) were married. Moreover, 36% were unemployed, more than three quarters (88%) of patients resided in urban areas, 46% of them reported insufficient economic status and 72% of them were non-smokers. Severity of heart failure as measured by New York Heart Association (NYHA) showed that most of patients had symptomatic and functionally compromised set in their classes of II and III (32%, 42% respectively).

More than three quarters (78%) of the heart failure patients were hospitalized in the last year and higher proportion of the patients had hypertension (72%), coronary heart disease (64%) and diabetes (56%).

**Table 1:** Socio-demographical of heart failure patients

Variables n=50		N (%)
<b>Age group (years)</b>	30-39	17 (34)
	40-49	5 (10)
	50-59	18 (36)
	60-69	10 (20)
<b>Gender</b>	Male	29 (58)
	Female	21 (42)
	Illiterate	27 (54)
	Primary school	11 (22)
<b>Level of education</b>	Secondary school	9 (18)
	University graduated	3 (6)
<b>Marital status</b>	Married	39 (78)
	Widowed	7 (14)
	Divorce	4 (8)
	High profession	2 (4)
<b>Occupation</b>	Unskilled worker	15 (30)
	Housewife	15 (30)
	Unemployed	18 (36)
<b>Residential area</b>	Rural	6 (12)
	Urban	44 (88)
	Insufficient	23 (46)
<b>Economic status</b>	Sufficient	17(34)
	Exceed need	10(20)
<b>Cigarette smoking</b>	Yes	14 (28)
	No	36(72)
<b>New york heart association</b>	Class I	9 (18)
	Class II	16 (32)
	Class III	21 (42)
	Class IV	4 (8)
<b>Hospitalized in last year</b>	Yes	39 (78)
	No	11(22)
<b>Comorbidity</b>	Hypertension	36 (72)
	Coronary heart disease	32 (64)
	Diabetes mellitus	28 (56)

Table 2 illustrates items of knowledge and perceived barriers of adherence to a low sodium diet. Heart failure patients had highest percentage (42%) of knowledge in item “eating a low-salt diet will keep swelling down”, while they had lowest percentage (20%) knowledge in item “understand how to follow a low-salt diet”. Also, heart failure patients reported perceived main barrier (62%) in item “family members are not following a low - salt diet”

whereas, lowest percentage (28%) of perceived barrier in item “following a low-salt diet is hard to do because rarely cooked”.Table3 reveals overall patient’s knowledge and perceived barriers of following a low-sodium diet adherence among heart failure patients. The majority (80%) of patients had low knowledge and perceived high barriers (66%) to following a low - sodium diet adherence

**Table 2 :** Patient Knowledge and Perceived barriers about following a low-sodium diet

Knowledge and Perceived Barriers (n=50)	Disagree		Neutral		Agree	
	N	(%)	N	(%)	N	(%)
<b>Items of knowledge</b>						
1-Understand how to follow a low-salt diet.	23	(46)	17	(34)	10	(20)
2- Keep track of the total amount of salt eating in a day.	17	(34)	22	(44)	11	(22)
3- Pick out which foods on the grocery are low in salt.	18	(36)	21	(42)	11	(22)
4- Eating a low-salt diet will keep fluid from building up in body	24	(48)	14	(28)	12	(24)
5- Eating a low-salt diet will keep swelling down.	14	(28)	15	(30)	21	(42)
6- Eating a low-salt diet will breathe easier	18	(36)	17	(34)	15	(30)
<b>Items of barriers</b>						
1- Food does not taste good on a low-salt diet	7	(14)	20	(40)	23	(46)
2-There are enough types of low-salt foods to satisfy my appetite	1	(2)	21	(42)	28	(56)
3-Following a low-salt diet is hard to do because rarely cooked	12	(24)	24	(48)	14	(28)
4-Following a low-salt diet takes too much time.	12	(24)	21	(42)	17	(34)
5-Following a low-salt diet takes too much money.	10	(20)	21	(42)	19	(38)
6-Following a low-salt diet is hard to understand.	18	(36)	16	(32)	16	(32)
7-The families members are not follow a low-salt diet.	10	(20)	9	(18)	31	(62)
8-Following a low-salt diet is hard to do when I go out to eat.	16	(32)	8	(16)	26	(52)

**Table 3:** Overall patient knowledge and perceived barriers about low-sodium diet

Overall of knowledge and perceived barriers (n=50)	N	(%)
<b>-Knowledge</b>		
Low Knowledge (0-6 score).	40	(80)
High Knowledge (7-12 score).	10	(20)
<b>-Barriers</b>		
Perceived low Barriers (0-8 score)	17	(34)
Perceived high Barriers (9-16 score)	33	(66)

Table 4 and 5 illustrates the association between demographic data with knowledge and perceived barriers of low low-sodium diet adherence. The results show that there is a significant association between age group and knowledge (p-value=0.01) and perceived barrier (p-value=0.04). Also, gender is significantly associated with knowledge (p-value=<0.001) and perceived barrier (p-value=0.05).

Concerning educational level, there is a significant association between level of education with knowledge (p-value=<0.001) and perceived barrier (p-value=0.02). There is a significant association between economic status and knowledge (p-value=<0.001) and barrier (p-value=<0.001). In regard to smoking, there is a significant association found with knowledge (p-value=<0.001), while not significant in barrier (p-value =0.06).

**Table 4:** Association between demographic data and Knowledge of low low-sodium diet adherence

Variables (n=50)	Knowledge		df	P-value Chi- square
	Low N (%)	High N (%)		
<b>Age group (years)</b>	30-39	15 (30)	2(4)	3 0.01 9.94
	40-49	3(6)	2(4)	
	50-59	17(34)	1(2)	
	60-69	5(10)	5(10)	
<b>Gender</b>	Male	28(56)	1(2)	1 <0.001 11.82
	Female	12(24)	9(18)	
<b>Educational level</b>	Illiterate	24(48)	3(6)	3 <0.001 17.42
	Primary school	4(8)	7(14)	
	Secondary school	9(18)	0(0)	
	University graduate	3(6)	0(0)	
<b>Economic status</b>	Insufficient	13(26)	10(20)	2 <0.001 14.67
	Sufficient	17(34)	0(0)	
	Exceed need	10(20)	0(0)	
<b>Smoking status</b>	Yes	36(72)	0(0)	1 <0.001 32.14
	No	4(8)	10(20)	

df=degree of freedom, P-value less than 0.05 consider significant

**Table 5:** Association between demographic data and Perceived barriers of low low-sodium diet adherence

Variables (n=50)		Barriers		df	P-value
		Low N (%)	High N (%)		
<b>Age group (years)</b>	30-39	9(18)	8(16)	3	0.04
	40-49	2(4)	3(6)		
	50-59	6(12)	12(24)		
	60-69	0(0)	10(20)		
<b>Gender</b>	Male	13(26)	16(32)	1	0.05
	Female	4(8)	17(34)		
<b>Educational level</b>	Illiterate	13(26)	14(28)	3	0.02
	Primary school	2(4)	9(18)		
	Secondary school	0(0)	9(18)		
	University graduate	2(4)	1(2)		
<b>Economic status</b>	Insufficient	2(4)	21(42)	2	<0.001
	Sufficient	11(22)	6(12)		
	Exceed need	4(8)	6(12)		
<b>Smoking status</b>	Yes	15(30)	21(42)	1	0.06
	No	2(4)	12(24)		

df=degree of freedom, P. value less than 0.05 consider significant

## DISCUSSION

Heart failure is an eminent problem, and patient awareness of the disease and subsequent adherence to the treatment may decrease the burden of this serious problem. In this study, the minority of heart failure patients (20%) reported that they understand how to follow a low-salt diet. This result is comparable with the observation study that shows that 40% of the patients were following a low sodium diet [12]. While this result is contrast with study reported the majority of patients reported that they received a recommendation to follow a low-sodium diet and that they understood how to follow the diet. One explanation for this result may be that patients recalled only limited information about how to follow a low-sodium diet despite reporting that they know how to follow the diet. When asked about what they were told regarding how to follow the diet, most patients recalled that they were simply told to watch the amount of salt

they ate or to avoid adding salt to foods. It is not possible in this study to determine whether the limited information recalled was due to reduced memory, poor concentration or inadequate teaching by health care providers or patients' illiteracy. The present study displayed that major barriers faced by heart failure patients was within the item "the family members are not following low-salt diet". It is supported by previous research which demonstrated that having an involved spouse increases dietary adherence. Unfortunately, the most common barriers reported by patients were related to friends and family. Majority of family members did not eat the same diet and most friends and relatives did not serve appropriate foods when patients visited. It is not possible to determine whether this was due to lack of awareness or lack of consideration. Regardless, working with patients to help them determine the best strategies

to inform friends and families of their dietary needs may help. Close friends and family members should be included in all teaching about following a low-sodium diet. Alternatively, clinicians, whenever possible should speak directly with friends and family members to increase their awareness of the important role they play in the ability of patients to adhere to recommendations [13]. A study stated that adherence of low-sodium diet is influenced by the opinions of significant others/spouses, family members, nurse, physicians, and other health care professionals. Including family members in heart failure treatment particularly regarding adherence to non-pharmacological measures appears to be crucial and has been gaining ground as a self-care strategy [14]. Moreover, a recent US study found that patients with heart failure whose family members also followed a low-sodium diet were 1.6 times more likely to be adherent [15]. One of major contributing factor in continuing poor adherence to a low-sodium diet is lack of knowledge, because majority of patients not received a recommendation and information of sodium restricted diets (SRD) from health care providers. This indicates that health care providers simple recommendation may not be enough to motivate patient's adherence behavior. Researchers suggested that lack of knowledge is a key barrier in diet adherence [16]. In this study, the highest proportion (80%) of patients had low knowledge and high barriers (66%) to adherence low-sodium diet which is supported by the study showing the overall adherence to sodium diet was poor [17]. Also another study found that 86% of heart failure patients were not aware of a SRD guideline, 42% could not determine sodium content from a nutrition label, and 56% could not distinguish high and low sodium foods [6]. The result in this study

reveals that poor adherence in SRD in HF patients is still problematic and health care providers need to attend to dietary sodium adherence to improve health outcome of HF patients. Diet education should be included strategies of how to follow a SRD guideline in daily life and strategies of how to overcome barriers of adherence to SRD. Patient education should be focused on understating how SRD adherence contributes their HF management. Many studies simply do not report associations between demographic variables and adherence; thus, it is important to continue to explore whether and how these variables are related to adherence. In the present study there is a significant association found between age group and knowledge ( $p$ -value=0.01) and perceived barrier ( $p$ -value=0.04) to low sodium diet adherence which is supported by study that found that age is positively related to adherence [18]. While study have reported no association between age and adherence to low sodium diet [19]. Gender is significantly associated with knowledge ( $p$ -value= <0.001) and perceived barrier to low sodium diet adherence ( $p$ -value=0.05). Another study revealed that women are less adherent than men [20] possibly due to lifestyle alterations that involve shopping for and preparing meals might be harder for men to make and traditional domestic roles that call for the wife to prepare meals. Moreover, concerning educational level there was a significant association between level of education with knowledge and perceived barrier to low sodium diet adherence,  $p$ -value= <0.001 and  $p$ -value=0.02 respectively, reported that number of years of education and adherence were significantly positively related [21]. The findings of present study shows there was is significant association between economic status and knowledge

(p-value= <0.001) and barrier (p-value=0.001). A study reported that income was negatively related to low-salt diet adherence is surprising, as one might expect that those who are more affluent are more likely to seek out and afford healthier foods, and thus would be more adherent to a low-salt diet [22].

## CONCLUSION

The study showed that higher proportion of heart failure patients were older age, male, had low levels of education, were having insufficient economic status, most of them hospitalized in last year, majority of patients had symptomatic and functionally compromised (New York Heart Association NYHA classes II and III) and high proportion of the patients had co-morbidity (hypertension, coronary artery disease and diabetes mellitus). In general, most of patients had poor knowledge and more barriers to adherence to low-sodium diet. There was a significant association between heart failure knowledge and barrier with age group, gender, level of education, economical status.

## CONFLICT OF INTEREST

I declare that there is no conflict of interest in this study

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