



CODEN (USA): IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.439371>Available online at: <http://www.iajps.com>**Research Article****FREQUENCY AND PROGNOSIS OF CONGESTIVE  
HEART FAILURE IN DIALYSIS PATIENTS ATTENDING  
PUBLIC HOSPITALS IN PAKISTAN****Fazal ur Rehman Khilji<sup>1</sup>, Marvi Baloch<sup>1</sup>, Qaiser Iqbal<sup>1</sup>, Fahad Saleem\*<sup>1</sup>, Nisar A.  
Shahwani<sup>1</sup>, Shehla Iftikhar<sup>2</sup>**<sup>1</sup>Faculty of Pharmacy & Health Sciences, University of Balochistan, Quetta, Pakistan<sup>2</sup>Senior Medical Officer, CENAR, Quetta, Pakistan**Received:** 02 March 2017**Accepted:** 10 March 2017**Published:** 28 March 2017**Abstract:****Objective**

The current research was conducted to evaluate episodes of Congestive Heart Failure (CHF) among dialysis patients; its frequency and prognosis in patients attending public healthcare institutes of Quetta city, Pakistan.

**Methods**

This is a multicenter cohort study conducted at two public healthcare institutes of Quetta city, Pakistan. Data of 117 patients for one year was screened from the official records and evaluated retrospectively to identify variables of interest. Data was collected through a validated information sheet. SPSS v.20 was used for data analysis and data was described descriptively.

**Results**

All patients had End-Stage Renal Disease (ESRD) and were on regular maintenance hemodialysis therapy. Out of all selected patients, 7.7 % patients had Non-Insulin Dependent Diabetes Mellitus, 4.3% patients had Ischemic Heart Disease, 78.6% had Left Ventricular Hypertrophy and 80.34% had Cardiomyopathy. Forty five patients (38.46%) were confirmed with CHF. Thirty seven (31.6%) of those had systolic dysfunction, 8 (6.8%) had diastolic dysfunction and 4 (3.4%) had both systolic and diastolic dysfunction. Additionally, 13 (28.9%) patients developed de novo CHF. Recurrence of CHF was observed in 26 patients (57.7%) whereas among the CHF group, eleven patients died during the study period presenting a mortality rate of 24% in CHF group (Table 5).

**Conclusion**

The incidence of CHF was relatively high in our study population of ESRD. Frequent recurrence of the disease, re-hospitalization and enhanced mortality in our study population is evident of adverse prognosis of CHF in ESRD population.

**Corresponding author:****Fahad Saleem,**

Faculty of Pharmacy &amp; Health Sciences

University of Balochistan, Quetta

Pakistan.

Email: [fahaduob@gmail.com](mailto:fahaduob@gmail.com); Ph: 00923458326545

QR code



Please cite this article in press as Fahad Saleem *et al*, *Frequency and Prognosis of Congestive Heart Failure in Dialysis Patients Attending Public Hospitals in Pakistan*, *Indo Am. J. Pharm. Sci*, 2017; 4(03).

**INTRODUCTION:**

Heart Failure (HF) is defined as a complex clinical syndrome that can result from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill or eject blood [1]. The diagnosis of HF relies on clinical examination and can be challenging. Heart failure has been rated as an epidemic condition and is a staggering clinical and public health problem that is associated with significant mortality, morbidity, and healthcare expenditures [1]. In addition to heart failure, congestive heart failure (CHF) is cardiovascular complication in which heart becomes unable to supply sufficient amount of blood to meet the metabolic requirements and fulfill oxygen demand of the body [2] (Malik, Tuka, Mokrejsova, Holaj, & Tesar, 2009). It is increasingly seen as a major public health problem that needs to be adequately addressed [3]. Within this context, there is increasing evidence that chronic kidney disease (CKD) itself is a key contributor to severe cardiac damage and equally CHF is a key cause of advancement of CKD [4,5]. In addition, multiple mechanisms can exacerbate CHF symptoms in patients with end stage renal disease (ESRD). Several factors and circumstances more specific to dialysis patients may contribute to the risk of sudden cardiac death ([6]. In line with what is reported, Harnett et al in their study identified older age, anemia, hypoalbuminemia, high diastolic blood pressure, and systolic dysfunction as variables resulting in CHF [7]. Other factors which play an important role in worsening of CHF may result from hypertension (HTN), acute renal failure (ARF), chronic renal disease (CKD) and end stage renal disease (ESRD) in dialysis recipients [8]. Additionally, CHF itself contributes to the development of ESRD [9]. Congestive heart failure is an independent risk factor for early mortality in ESRD patients [10]. In the ESRD population, hemodialysis (HD) also contributes by itself to the development of CHF [11]. Overall, the incidence of CHF is growing in both the general and ESRD populations [2,12,13] but is extremely prevalent among established patients on renal replacement therapy (dialysis) and is a significant predictor of death [14] (Stack & Bloembergen, 2001). The development of CHF at the initiation of ESRD is an adverse and independent prognostic indicator of mortality [7], whereby numerous patients having CHF often fail to respond to CHF treatment and advance to end stage CHF with numerous hospitalizations, reduced quality of life, progressive CKD which may lead to other cardiovascular diseases within a short period of time [15].

The situation is not different in Pakistan and CKD is also rapidly growing in the country due to increased

prevalence of Diabetes Mellitus, HTN and nephrolithiasis [16]. However, there is scarcity of information on patients with CHF and ESRD from Pakistan. Consequently, the current research was conducted to evaluate CHF in dialysis patients, its prevalence, incidence and prognosis among patients attending public healthcare institutes in Quetta city, Pakistan. Subsequently, use this information to suggest ways of improving the care of these patients, which could be monitored in future studies.

**METHODS:****Study settings**

One year multicenter cohort study carried out in two public healthcare centers in Quetta city, Pakistan, namely Sandeman Provincial Hospital Quetta (SPHQ) and Balochistan Institute of Nephro-Urology Quetta (BINUQ).

**Study design and sampling**

The study was undertaken from October 2015 to September 2016. All patients that were registered during this time period were evaluated. Overall 174 patients, 117 patients of both genders [57 males (48.7%) and 60 females (51.3%)] were included in the study. All patients had End-Stage Renal Disease (ESRD) and were on regular maintenance hemodialysis therapy. Fifty seven patients were enrolled from SPHQ and sixty patients from BINUQ based on the inclusion criteria.

**Inclusion criteria**

Patients who were clinically established for ESRD, recipients of regular maintenance hemodialysis for at least for six months, and receiving hemodialysis therapy at the same center, were included in the study. Patients not established for ESRD, recipients of maintenance hemodialysis less than six months, those who left for other centers, cities or discontinued therapy during the study period were excluded. Additionally, patients with severe mental disorder and who died within three months of initiation of study were also excluded.

**Data collection process**

A data collection form was designed and approved by the research team. This included two physicians practicing at BINUQ and their expertise were taken into consideration. The data collection form was piloted with 10 record files that were taken from SPHQ. The data collection form was then discussed with the nephrologist for appropriateness and validity related issues. Little modifications were needed and the amended data collection form was used for data collection.

The research tool contained relevant information regarding the demographics and disease characteristics of the patients, such as age, gender,

hypertension; dialysis access, frequency and duration of HD, congestive heart failure (CHF), LV dysfunction (LVD), ischemic heart disease (IHD), left ventricular hypertrophy (LVH), diabetes of the patients.

#### Statistical analysis

SPSS version v 20 was used for statistical analysis. Descriptive statistics were used to describe demographic and disease characteristics of the patients. Percentages and frequencies were used for the categorical variables, while means and standard deviations were calculated for the continuous variables. The characteristics of the whole sample were presented.

#### Ethical approval

Institutional Review Board, Faculty of Pharmacy & Health Sciences, University of Balochistan, Pakistan approved the study. Additionally, permission to conduct the study was taken from the medical superintendent of the respective institutes.

#### RESULTS:

##### Demographic characteristics of the study respondents

**Table 1 shows the demographic characteristics of the patients.**

**Table 1: Demographic characteristics of the patients (N = 117)**

Characteristics	Frequency	Percent
<b><i>Institute</i></b>		
SPHQ	57	48.7%
BINUQ	60	51.3
<b><i>Age group</i></b>		
10-20 year	09	7.7%
21-31 year	19	16.2%
32-42 year	24	20.5%
43-53 year	39	33.3%
>53 year	26	22.2%
<b><i>Gender</i></b>		
Male	57	48.7%
Female	60	51.3%

**Disease related characteristics of the respondents**  
Table 2 describes that all the patients enrolled, with all patients having hypertension. 7.7 % patients had NIDDM and 1.7% patients IDDM. 4.3% patients had

IHD, 78.6% LVH and 80.34% CMP. 31.6% of patients were suffering from Systolic dysfunction and 6.8% from Diastolic Dysfunction (Table 2).

**Table 2: Disease related characteristics of the study respondents**

Characteristics	Frequency	Percentage
<b><i>End-stage Renal Disease (ESRD)</i></b>		
Yes	117	100%
No	0	0%
<b><i>Hypertension (HTN)</i></b>		
Yes	117	100%
No	0	0%
<b><i>Non-Insulin Dependent Diabetes Myelitis (NIDDM)</i></b>		
Yes	9	7.7%
No	108	92.3%
<b><i>Insulin Dependent Diabetes Myelitis (IDDM)</i></b>		
Yes	2	1.7%
No	115	98.3%
<b><i>Ischemic Heart Disease (IHD)</i></b>		
Yes	5	4.3%
No	112	95.7%
<b><i>Left Ventricular Hypertrophy (LVH)</i></b>		
Yes	92	78.6%
No	25	21.4%
<b><i>Left Ventricular Dysfunction (LVD)</i></b>		
Systolic Dysfunction	37	31.6%
Diastolic Dysfunction	8	6.8%
Normal L.V Function	72	61.5%
<b><i>Cardio-myopathy (CMP)</i></b>		
Yes	94	80.3%
No	23	19.7%

**Vascular access duration and frequency of HD**

94% patients were accessed through arterio venous fistula for hemodialysis and 6% through central venous catheterization (Table 3). The vast majority of

the patients (97.4%) were recipients of hemodialysis twice a week, 56% of the patients were on dialysis for 1-3 years or longer (Table 3).

**Table 3: Vascular access duration and frequency of HD**

Characteristics	Frequency	Percentage
<b><i>Duration Of Hemodialysis</i></b>		
6 Months	5	4.3%
1 Year	46	39.3%
1-3 Years	56	47.9%
4-6 Years	9	7.7%
More than 6 Years	1	0.9%
<b><i>Hemodialysis (Frequency per week)</i></b>		
2/ week	114	97.4%
3/ week	03	2.6%
<b><i>Arterio-Venous Fistula (AVF)</i></b>		
Yes	110	94%
No	7	6%
<b><i>Central venous Catheterization (CVC)</i></b>		
Yes	7	6%
No	110	94%

**Signs and symptoms of the study respondents**

57.3% of the patients had shortness of breath (table 4). Out of all patients, 35.0% had pedal edema, 4.3%

had asities, 36.8% had palpitation and 20.5% had pericardial effusion (Table 4).

**Table 4: Signs and symptoms of the study respondents**

Characteristics	Frequency	Percentage
<b><i>Shortness Of Breath (SOB)</i></b>		
Yes	67	57.3%
No	50	42.7%
<b><i>Pedal Edema</i></b>		
Yes	41	35.0%
No	76	65.0%
<b><i>Asities</i></b>		
Yes	5	4.3%
No	112	95.7%
<b><i>Palpitation</i></b>		
Yes	43	36.8%
No	74	63.2%
<b><i>Pericardial Effusion (PE)</i></b>		
Yes	24	20.5%
No	93	79.5%

The prognosis and de-novo CHF is presented in Table 6. From 117 patients, 45 (38.4%) developed CHF whereby only 4 (3.4%) developed both systolic and diastolic dysfunction. Out of the reported 45

CHF patients, de-novo CHF was reported in 13 (28.8%) while recurrence of CHF was observed among 26 (57.7%). Death was reported in eleven patients throughout the study period (Table 5).

**Table 5: Prognosis and de-novo congestive heart failure**

Characteristics	Frequency	Percent
<b><i>Congestive Heart Failure</i></b>		
Yes	45	38.46%
No	72	61.5%
<b><i>Systolic plus Diastolic Dysfunction</i></b>		
Yes	4	3.4%
No	113	96.6%
<b><i>New (de-novo) Congestive Heart Failure</i></b>		
Yes	13	28.8%
No	32	71.2%
<b><i>Recurrence of Congestive Heart Failure</i></b>		
Yes	26	57.7%
No	19	42.3%
<b><i>Deaths</i></b>		
Yes	11	24.4%
No	34	75.6%

**DISCUSSION:****Frequency of CHF**

45 ESRD patients out of 117 had established CHF, which were confirmed clinically based by echocardiography (Table 5). This percentage is high compared to other reported studies. The prevalence of congestive heart failure in hemodialysis recipients was 9% in the study by Parfrey et al [17] and higher than 31% reported by Harnett et al [7] (Harnett et al., 1995). Clinical manifestations of congestive heart failure are already present in approximately a third of new dialysis patients [18]. Compared with the general population, dialysis patients have a 10 to 20 times greater incidence of cardiovascular death [19]. The reported incidence of heart failure is substantially higher than that of acute coronary syndrome (29 events/1,000 patient-years) in long-term dialysis patients [20]. The incidence of heart failure in prevalent dialysis patients is estimated at 71 events/1,000 patient years, substantially higher than the incidence of acute coronary syndrome (29 events/1,000 patient-years) [21]. There may be a number of reasons for the high incidence of CHF in the ESRD population in our study. Firstly, Quetta being the capital city of the province, patients come from rural areas to get healthcare facilities. Secondly, a large number of patients from across the border of Afghanistan also come for the treatment. Patients in rural areas typically have a poor health care system and have very low economic conditions; consequently, they rely on home remedies for the treatment of severe disease conditions. In such rural areas, mythical and spiritual beliefs are negative aspect of treatment leading to a worsening of disease before presenting to specialist centres in urban settings. Herbal treatment is one of the most notorious ailments in such areas, which may be the main reason of worsening the disease specially affecting the deterioration of the cardiovascular and renal systems before presentation. Another important fact is the existences of non-qualified practitioners that also contribute to the deterioration of health conditions in such areas. Furthermore, the lack of awareness and late referral of patients from general practitioners and physicians to the nephrologists in deprived health care systems may also lead to a higher incidence of ESRD and CHF in our study population.

Typically when the patients are referred to nephrologists, they already have progression of kidney disease and most of the time patients come to nephrologists with advanced stage renal disease or even with renal insufficiency. In such circumstances, nephrologists have limited choice of

treatment, with patient advised that renal replacement therapy may be the only option. The suitable choice of renal replacement therapy for nephrologists is to initiate the patient on hemodialysis. Initiation of hemodialysis requires vascular access, with central venous catheterization (CVC) adopted for prompt hemodialysis execution. Meanwhile, an arterio-venous fistula (AVF) is performed surgically, which takes almost three to four weeks in maturation. After this, continuous hemodialysis is executed by means of AVF. AVF is more appropriate for hemodialysis compared to CVC. This is true in our study whereby 94% of the patients had vascular access to AVF as compared to CVC (Table 3).

**Prognosis**

CHF is associated with poor outcome in patients who are on maintenance hemodialysis [22]. Left ventricular systolic dysfunction, per se, is an independent cardiovascular risk factor for poor prognosis, even in patients with normal renal function, in the elderly population and in patients with asymptomatic LV systolic dysfunction. It is likely that decreased LVEF may indicate a similar adverse prognosis in ESRD patients, despite transplantation [23]. This reflects our study outcomes, where recurrence of CHF was 57.7% and 24.4% mortality in CHF group that results in adverse prognosis. A significant proportion of cardiovascular events in long-term dialysis patients are caused by heart failure, and the presence of heart failure are predictive of a poor prognosis. Cardiac hypertrophy and systolic dysfunction are now widely recognized as powerful predictors of adverse prognosis in the long-term dialysis population. In our study population 78.6% patients had LVH, and 31.6% patients had systolic dysfunction, both contribute in poor prognosis. Congestive heart failure is itself a complex cardiovascular complication its management is very challenging.

Four patients were found to have both systolic and diastolic dysfunctions with 13 patients (29%) developing *de novo* CHF (Table 5). Frequently re-hospitalization was required due to worsening of the cardiovascular conditions subsequent of CHF resulting in 26 patients that is 57.7% (Table 5). In CHF group, 11 patients died resulting 24.4% deaths in this specific group during the study period. These circumstances reflect the poor prognosis of CHF in ESRD population of our study.



**CONCLUSION:**

The incidence of CHF was relatively high in our study population of ESRD. Frequent recurrence of the disease, re-hospitalization and enhanced mortality in our study population is evident of adverse prognosis of CHF in ESRD population. Cardiovascular diseases must not be considered separately in ESRD patients, appropriate management and correction of comorbid conditions improves the disease conditions to some extent.

**Limitations**

The limited sample size is an issue while discussing about the generalizability of the results.

**Disclosure**

The authors have no conflict of interest to declare. No funding was received for this study.

**REFERENCES:**

1. Roger, V. L. Secondary Prevention: The Ongoing Challenge. *Revista espanola de cardiologia (English ed.)*, 2011;64(1), 8.
2. Malik, J., Tuka, V., Mokrejsova, M., Holaj, R., & Tesar, V. Mechanisms of chronic heart failure development in end-stage renal disease patients on chronic hemodialysis. *Physiological Research*, 2009;58(5), 613.
3. Roger, V. L. Epidemiology of heart failure. *Circulation Research*, 2013; 113(6), 646-659. doi:10.1161/circresaha.113.300268
4. Segall, L., Nistor, I., & Covic, A. (2014). Heart failure in patients with chronic kidney disease: a systematic integrative review. *BioMed Research International*, 2014, 937398. doi:10.1155/2014/937398.
5. Silverberg, D., Wexler, D., Blum, M., Schwartz, D., & Iaina, A. The association between congestive heart failure and chronic renal disease. *Current Opinion in Nephrology & Hypertension*, 2004; 13(2), 163-170.
6. Dellsperger, C. Cardiovascular mortality in dialysis patients. *Advances in Peritoneal Dialysis*, 2012; 28, 56-59.
7. Harnett, J. D., Foley, R. N., Kent, G. M., Barre, P. E., Murray, D., & Parfrey, P. S. Congestive heart failure in dialysis patients: prevalence, incidence, prognosis and risk factors. *Kidney International*, 1995;47(3), 884-890.
8. Vasan, R. S., & Levy, D. Defining diastolic heart failure a call for standardized diagnostic criteria. *Circulation*, 2000;101(17), 2118-2121.
9. Silverberg, D., Wexler, D., Blum, M., Schwartz, D., & Iaina, A. The association between congestive heart failure and chronic renal disease. *Current*

*Opinion in Nephrology and Hypertension*, 2004; 13(2), 163-170.

10. Chan, C., Floras, J. S., Miller, J. A., & Pierratos, A. Improvement in ejection fraction by nocturnal haemodialysis in end-stage renal failure patients with coexisting heart failure. *Nephrology Dialysis Transplantation*, 2002;17(8), 1518-1521.
11. Hsu, C. Y., Vittinghoff, E., Lin, F., & Shlipak, M. G. The incidence of end-stage renal disease is increasing faster than the prevalence of chronic renal insufficiency. *Annals of Internal Medicine*, 2004; 141(2), 95-101.
12. Christ, M., Stork, S., Dorr, M., Heppner, H. J., Muller, C., Wachter, R., & Riemer, U. Heart failure epidemiology 2000-2013: insights from the German Federal Health Monitoring System. *European Journal of Heart Failure*, 2016;18(8), 1009-1018. doi:10.1002/ejhf.567.
13. Mazurek, J. A., & Jessup, M. (2017). Understanding Heart Failure. *Heart Failure Clinics*, 13(1), 1-19. doi:10.1016/j.hfc.2016.07.001
14. Stack, A. G., & Bloembergen, W. E. A cross-sectional study of the prevalence and clinical correlates of congestive heart failure among incident US dialysis patients. *American Journal of Kidney Diseases*, 2001;38(5), 992-1000.
15. Silverberg, D. S., Wexler, D., Iaina, A., Steinbruch, S., Wollman, Y., & Schwartz, D. Anemia, chronic renal disease and congestive heart failure—the cardio renal anemia syndrome: the need for cooperation between cardiologists and nephrologists. *International Urology and Nephrology*, 2006;38(2), 295-310.
16. Khan, A., Khan, A. H., Adnan, A. S., Syed Sulaiman, S. A., Gan, S. H., & Khan, I. (2016). Management of patient care in hemodialysis while focusing on cardiovascular disease events and the atypical role of hyper-and/or hypotension: a systematic review. *BioMed Research International*, 2016. DOI: 10.1155/2016/9710965
17. Parfrey, P. S., Harnett, J. D., Griffiths, S. M., Gault, M. H., & Barré, P. E. Congestive heart failure in dialysis patients. *Archives of Internal Medicine*, 1988;148(7), 1519-1525.
18. Baigent, C., Burbury, K., & Wheeler, D. Premature cardiovascular disease in chronic renal failure. *The Lancet*, 2000;356(9224), 147-152.
19. Cheung, A. K., Sarnak, M. J., Yan, G., Berkoben, M., Heyka, R., Kaufman, A., . . . Windus, D. Cardiac diseases in maintenance hemodialysis patients: results of the HEMO Study. *Kidney International*, 2004;65(6), 2380-2389.
20. Wang, A. Y.-M., & Sanderson, J. E. (2011a). Current perspectives on diagnosis of heart failure in long-term dialysis patients. *American Journal of Kidney Diseases*, 2011;57(2), 308-319.

21.Wang, A. Y.-M., & Sanderson, J. E. (2011b). Treatment of heart failure in long-term dialysis patients: a reappraisal. *American Journal of Kidney Diseases*, 201;57(5), 760-772.

22.Banerjee, D., Ma, J. Z., Collins, A. J., & Herzog, C. A. Long-term survival of incident hemodialysis patients who are hospitalized for congestive heart failure, pulmonary edema, or fluid overload. *Clinical*

*Journal of the American Society of Nephrology*, 2(6), 2007;1186-1190.

23.Wali, R. K., Wang, G. S., Gottlieb, S. S., Bellumkonda, L., Hansalia, R., Ramos, E., . . . Blahut, S.Effect of kidney transplantation on left ventricular systolic dysfunction and congestive heart failure in patients with end-stage renal disease. *Journal of the American College of Cardiology*, 2005;45(7), 1051-1060.