

*Research Article***Outcome assessment of Chronic Hemodialysis in El-Minia University****El Minshawy O., Sharawy M., Kamal A, Fathy B. and Ragab M.**

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**Abstract**

**Aim:** outcome assessment is the measuring instrument that provides a rating or score (categorical or continuous) that is intended to represent some aspect of the patient's health status and are used to define efficacy endpoints when developing a therapy for a disease or condition<sup>(4)</sup>. The study aimed at assessment of clinical outcomes of patients on hemodialysis in Minia unit. **Methods:** A prospective cohort of ESRD patients receiving HD (n=136) in Minia university unit were followed up for 12 months. **Subjects:** were assessed clinical outcomes of dialysis adequacy (Kt/V), hemoglobin, Uf%, pre dialysis SBP, catheter used, albumin level, bone minerals, hospitalization rate and mortality. **Results:** The mean pre dialysis systolic blood pressure, KT/V, URR, s. Ca, s. phos, s. albumin levels and hospitalization rate of HD patient. And Mortality rate were assessed in our unit. **Conclusion:** we assessed the clinical outcome in our hemodialysis unit & recommend unified local electronic data registry for each governorate in Egypt to constitute the national registry.

**Key Words:** haemodialysis, prospective cohort, systolic blood pressure

**Introduction**

Hemodialysis was one of the most common procedures performed in U.S. hospitals in 2011. As renal replacement therapy becomes more widespread and more affordable, the measurement of patient outcomes and comparison with national and international benchmarks will be a valuable tool in planning health services and demonstrating effective use of resources<sup>(3)</sup>. Measuring quality has become a central theme in United States health care. Clinical practice guidelines (CPGs), other basis of best published clinical evidence and expert opinion, and clinical performance measures (CPMs) on the basis of those guidelines, are used as yardsticks to measure quality of care<sup>(5)</sup>. The current set of kidney disease CPMs that aggregate patient data include outcome measures (mortality, hospital readmission, and patient experience of care), intermediate outcome measures (dialysis adequacy and vascular access), process measure (blood transfusion), and safety measure (blood stream infections and hypercalcemia) Holloway and Quill discuss mortality as a measure of quality and They conclude that mortality is a good quality measure for individuals with acute illness who are not supposed to die, but a poor

quality measure for most patients who suffer multiple chronic diseases and are near the end of their life<sup>(6)</sup>. Another Performance measurements are embodied through setting up targets of several key performance indicators (KPIs) in every perspective, which allow easy monitoring and evaluation be done and proper responses be prompted to reach the targets in a more efficient way. In the most important patient perspective, 10 clinical KPIs are defined. These indicators involve the most important objectives in dialysis field. Physicians are responsible for setting the KPI targets, which are determined mainly according to the most recent scientific guidelines or publications, such as K/DOQI with some modifications based on local situation after a thorough panel discussion. These targets will be modified periodically if new global consensus was created or difficult clinical situations were encountered<sup>(7)</sup>. In Hong Kong, Clinical outcome measures were adopted two criteria used as part of the evaluation of quality of care as the clinical outcome measures for study. The target standard for dialysis adequacy measured by equilibrated, single pool or on-line Kt/V was  $\geq 1.2$  if patients were receiving three HD sessions

per week,  $\geq 1.8$  if receiving twice weekly HD. The target standard for blood hemoglobin was set as  $\geq 9$  g/dL. These criteria and standards were determined based on international best practice and expert opinion.<sup>(8)</sup> Numerous studies have documented that an increased risk for death and hospitalization was associated with lower levels of dialysis adequacy, increased anemia, lower serum albumin values, and the use of a vascular access other than an arteriovenous fistula (AVF) for hemodialysis. Consequently, clinical practice guidelines such as the Kidney Disease Outcomes Quality Initiative (KDOQI) or the European Best Practice Guidelines (EBPG) were developed in order to improve the quality of care and outcomes of hemodialysis patients<sup>(9)</sup>.

### Subjects and sampling

This prospective study was carried out on all chronic regular HD patients of Minia University HD unit in the period between February 2015 and February 2016 which included 136 chronic HD patients. all

Patients on HD > 3 months in Minia University HD unit were included. Patients of acute kidney injury (AKI) or AKI on top of chronic renal failure were excluded.

All HD Patients were offered to participate in the study. Blood Urea, Serum Creatinine, Iron, Ferritin, Albumin, Calcium, Phosphorus, Parathormone hormone which were calculated and Hemoglobin level which was calculated every 3 months. URR & Kt/v were calculated every 6 months.

**Clinical outcome measures** We thought that measures of outcome of HD in Taiwan at year 2012 were most likely of other country measures to be applied in Minia unit, so we applied these measures in our research. Items of clinical key performance indicator (cKPI) as outcome of HD are 10 measures which are Volume control, pre dialysis systolic blood pressure, dialysis adequacy, nutritional state, bone minerals, anemia, annual hospitalization rate and annual Hospital stay-day rate adding to these items the mortality rate as it can't be ignored when assessing the outcome.

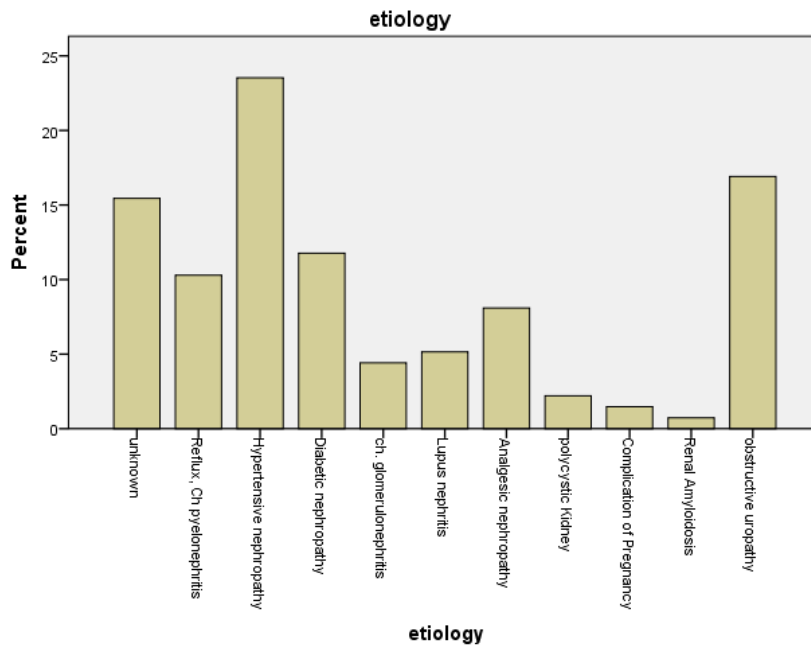
### Results

**Table 1. The socio-demographic and clinical characteristics of HD patients at are displayed**

<b>Sex</b>			
Male	72(53%)	<b>Dry weight (Mean <math>\pm</math> SD)</b>	65.5 $\pm$ 15.4
Female	64(47%)		
<b>Age(Mean <math>\pm</math> SD)</b>	48.3 $\pm$ 15.4	<b>BMI(Mean <math>\pm</math> SD)</b>	21.8 $\pm$ 4.4
<b>Occupation</b>		<b>Residence</b>	
Unemployed	111(81.6%)	Rural	78(57%)
employed	25(18.4%)	Urban	58(43%)
<b>2<sup>nd</sup> vascular access</b>		<b>1<sup>st</sup> vascular access</b>	
Fistula	133(97.1%)	Catheter	127(93%)
A-V graft	1(0.7%)	Fistula	8(6.3%)
Catheter	3 (2.2%)	A-V graft	1(0.7%)
<b>HTN</b>	72(53%)	<b>DM</b>	26(19%)
<b>Start of HD(years)</b>		<b>Duration of session(hours)</b>	
Mean $\pm$ SD	5.5 $\pm$ 4.5	Mean $\pm$ SD	4 $\pm$ 0.3

**Table 2: showing the different etiology of ESRD**

<b>Etiology</b>	<b>Total (n = 136)</b>
<b>Unknown</b>	21(15.4%)
<b>Chronic pyelonephritis</b>	14(10.3%)
<b>Hypertensive Nephrosclerosis</b>	32(23.5%)
<b>Diabetic nephropathy</b>	16(11.8%)
<b>Chronic glomerulonephritis</b>	6(4.4%)
<b>Lupus nephritis</b>	7(5.1%)
<b>Analgesic nephropathy</b>	11(8.1%)
<b>Polycystic Kidney</b>	3(2.2%)
<b>Toxemia of Pregnancy</b>	2(1.5%)
<b>Renal Amyloidosis</b>	1(0.7%)
<b>Obstructive uropathy</b>	23(17%)



**Table (3): URR, KT/V, Hb, s.albumin, Ca, phosphorus, PTH, IDWG, UF%, pre systolic B.P, hospitalization & hospital stayday rate:**

<b>KT/V(N=1.2)</b> Mean ± SD	0.8±0.1	<b>Calcium (mg/dL)</b> Mean ± SD	8.2±0.2
<b>URR(N=0.65)</b> Mean ± SD	44.9±14.2	<b>Phosphorous (mg/dL)</b> Mean ± SD	6.37±0.6
<b>Hb(10 -12mg/dl)</b> Mean ± SD	10.8±2	<b>PTH (pg/ml)</b> Mean ± SD	718.6±529.6
<b>IDWG</b>	2.08±0.6	<b>Serum albumin</b> Mean ± SD	4.1±0.3
<b>UF%</b>	3.3±1.3	<b>Hospitalization per yaer</b>	1.08 ± 0.3
<b>Pre-SBP</b> (Mean ± SD)	120.9±21.2	<b>hospital stay days per year</b>	0.9± 0.2

The mean URR was  $44.9(\pm 14.2)$ , KT/V was  $0.8(\pm 0.1)$  in our research, the mean hemoglobin value was  $10.3(\pm 1.6)$  at the study, the proportion of patients with hemoglobin level  $\geq 100$  g/L was 70% at the study. The mean body weight change (predialysis weight – postdialysis weight), as a surrogate for interdialysis weight gain (IDWG), was  $2.08\pm 0.6$ , (UF%) was  $3.3\pm 1.3$ . The mean pre dialysis systolic blood pressure was  $120.9\pm 21$ . Further, the proportion of patients with pre dialysis systolic blood pressure (pre-SBP)  $\leq 150$  mmHg) was 91.1% at the study. The mean s. Ca level was  $8.2(\pm 0.3)$ , the mean values of phosphate decreased as the mean s.phos. Level of the patients was  $6.4(\pm 0.6)$ . The proportion of patients with phosphate level  $< 5.5$  mg/dL was 31%. Parathyroid hormone levels was  $718.6(\pm 529.6)$ , The mean s. albumin level of the patients was  $4.1(\pm 0.3)$ . The hospitalization rate was  $1.08 \pm 0.3$  hospital events per patient year for the year 2014. Further, 47.7% of patients underwent at least one admission during the year 2014. Hospital stay-day rate of at year of study was  $0.9\pm 0.2$

A total of 136 of the patients 17.6%<sup>(24)</sup> died during the twelve months follow up period

## Discussion

Incidence of ESRD requiring renal replacement therapy is increasing steadily and places a tremendous burden on the healthcare budget even in developed countries<sup>(12)</sup>. HD still represents the main mode for renal RRT for ESRD in Minia Governorate<sup>(2)</sup>. In the current study, the first cause of ESRD was hypertension (23.5%), This was followed by diabetes (11.8%) , Diabetic nephropathy as a cause of ESRD in El-Minia Governorate is increasing as it constituted 5% causes of ESRD in year 2004 and year 2005 and becomes 8% in year 2006 eventually becomes responsible about 13% of causes of ESRD according to the results of the study in 2007.<sup>(15)</sup> The current study showed that chronic glomerulonephritis GN was the cause of ESRD in 4.4% of patients in Minia university wherese it was 10% in 2007.<sup>(13)</sup> Obstructive uropathy as a cause of ESRD in our study was found in 16.9% of patients, while it was 11% in Minia governerate in 2007<sup>(13)</sup>.

Chronic pyelo-nephritis was the cause of ESRD in 7.4% of patients of our research but was 5% of patients in Minia governorate 2007<sup>(13)</sup>. The use of analgesics was the cause of ESRD in 8.1% of patients in our research but while it was 6% in similar study in 2007<sup>(13)</sup>, in the United States the etiology of ESRD is analgesic Nephropathy in only 0.2% which reflects awareness of the people themselves in the United States about the risk of analgesics abuse.<sup>(16)</sup>, this high incidence may be because of abuse of drugs without prescriptions from a physician. In our study, polycystic kidney diseases were the cause of ESRD in 2.2% of patients, Systemic lupus erythematosus was the cause of ESRD in 2.2% of patients in our study. The mean age of the patients was  $(48 \pm 15)$ . Mean age was  $47 \pm 13$  years in study in Minia governorate in 2007, while mean age was  $46 \pm 13$  years, in year 2006. In 2005 the mean age of the patients was  $44.6\pm 13.7$  years, this increase in mean age of the patients may reflect better care of HD patients in El-Minia Governorate.<sup>(13)</sup> The increasing mean age of ESRD patients reflects an improvement in healthcare; but in UK, where the median age of ESRD patients is 65.9 years.<sup>(17)</sup> In this study, 52.9% of the dialysis patients were men and 47.1% were women whereas, 65.7% of the dialysis patients were men and 34.3% were women. We found that only 6.3% of patients were prepared with a permanent vascular access when initiating dialysis which was 20% in a similar study in Assuit in 2014.<sup>(18)</sup> The Death rate in our study was 24/163(17.6%) because of infection or cardiovascular complications while the death rate in study was (18.2%) in 2007, while it was (19%) in 2006.<sup>(13)</sup> while in 2005 it was and (21%)<sup>(14)</sup> as considered one of the clinical outcome measures in some papers as the target was the percentage  $\leq 18\%$  yearly which agree with our research.<sup>(19)</sup>

**Clinical outcomes:** We thought that measures of outcome of HD in Taiwan at year 2012 were most likely of other country measures to be applied in Minia unit , so we applied these measures in our research .Items of clinical key performance indicator (cKPI) as outcome of HD are:<sup>(7)</sup>

**Volume control:** IDWG, was  $2.6 \pm 1.04$  kg at the study. The relative IDWG, (UF%) was  $3.3 \pm 1.3$  which is less than the target of (cKPI) (the target was  $\leq 5\%$ ) IDWG, was  $2.28 \pm 1.01$  kg, (UF %) was  $3.98 \pm 1.65\%$  in Taiwan; 2012.<sup>(7)</sup>

**Hypertension:** The mean pre dialysis systolic blood pressure was  $120.9 \pm 21.2$  at the study further, the proportion of patients with pre dialysis SBP  $\leq 150$  mmHg was 91.1% which is equal to the target of (KPI) (the target was  $\geq 80\%$  of the patients had pre-SBP  $\leq 150$  mmHg)

**Vascular access:** The second vascular access used was AV fistula by 97.1%, so the central venous catheter used was 2.2% which is less than the target of (cKPI) in 2012 (the target was  $\leq 8\%$ ), Whether up to 73.9% of patients still use native AVF as their vascular access and those with CVC composed only 5.8% of the total dialysis patients in 2012.<sup>(7)</sup>

**Dialysis adequacy:** URR was  $44.9 (\pm 14.2)$ , Kt/V levels in this study as it was of range of  $0.8 (\pm 0.1)$  whether it less than the target of (cKPI) (the target was  $\geq 1.5$ )<sup>(7)</sup>

**Nutrition:** The mean s. albumin level of the patients was  $4.1 (\pm 0.3)$  which is more than the target of (cKPI) (the target was  $\geq 38$  g/L)<sup>(7)</sup>, and above the target In another paper as it was  $\geq 3.8$  g/dl in 60% of the patients.<sup>(19)</sup>

**Bone minerals:** the mean s.phos. Level of the patients was  $6.4 (\pm 0.6)$ . But the proportion of patients with phosphate level  $< 5.5$  mg/dL was 31% which less than the target of (cKPI) (Serum phosphate (P)  $\leq 5.5$  mg/dL in  $\geq 60\%$  of the patients).<sup>(7)</sup> The mean s. Ca level of the patients was  $8.2 (\pm 0.3)$  at the study. The mean PTH level of the patients was  $718.6 (\pm 529.6)$  at the study.

**Anemia:** \*The mean hemoglobin level was  $10.3 (\pm 2)$ , the proportion of patients with hemoglobin level  $\geq 100$  g/L was 70% at the study which equal to the threshold of (cKPI) (the threshold of hemoglobin level  $\geq 100$  g/L in  $\geq 70\%$  of the patients)<sup>(7)</sup>

\*The mean transferrin saturation (TSAT) of all patients was  $40.58 (\pm 27.19)$ . 90% of the

patients with TSAT  $\geq 20\%$  at the end of the study which is more than the target of (cKPI). (the target: More than 80% of patients have adequate TSAT  $\geq 20\%$ ).<sup>(7)</sup>

**Hospitalization rate** was  $1.6 \pm 0.7$  hospital events per patient year of study but still less than h mydr4scospitalization rate in Taiwan in 2011& 2012 which were 0.611, and 0.581, respectively. Among the causes of hospital admission were infection, vascular access complications, uncontrolled HTN or cardiovascular complications. Further, 47.7% of patients underwent at least one admission during the year of study, The target in another papers was  $\leq 10$  days/patient year<sup>(20)</sup>. Hospital stay-day rate of at year of study was  $2.04 \pm 2.9$  which is less than the Day rates for the years 2011, and 2012 which were 3.49 and 2.12 respectively in Taiwan.<sup>(7)</sup>

**Conclusions:** According to the above described data of the cKPI criteria, we could assess the clinical outcome of our unit..

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