



# TRENDS IN RENAL REPLACEMENT THERAPY IN BOSNIA AND HERZEGOVINA 2002-2008

HALIMA RESIĆ\*<sup>1</sup>, ENISA MEŠIĆ<sup>2</sup>

<sup>1</sup> Clinic for Hemodialysis, University of Sarajevo Clinics Centre, Bolnička 25, 71000 Sarajevo, Bosnia and Herzegovina

<sup>2</sup> Clinic for Nephrology, University Clinical Center Tuzla, Trnovac bb, 75 000 Tuzla, Bosnia and Herzegovina

\* Corresponding author

## ABSTRACT

Renal Registry (RR) of Bosnia and Herzegovina was established in 2002, with aim to follow up the trends of Renal Replacement Therapy in Bosnia and Herzegovina. The prevalence of Renal Replacement Therapy (RRT) in Bosnia and Herzegovina is rising steadily. One reason for this is an increasing number of patients starting RRT. The aim is to present the epidemiology and treatment of all aspects of RRT in Bosnia and Herzegovina in period 2002-2008. Centre-related and patient-related questionnaires were sent to all 25 dialysis centres in Bosnia and Herzegovina. The demographic data, prevalence and incidence, type of renal replacement therapy, cause of ESRD, erythropoietin administration, cause of death, and type of vascular access were obtained from the questionnaires. Collected data were analysed using SPSS statistics. The number of patients treated by Renal Replacement Therapy (RRT) increased steadily from 1,531 patients in 2002 to the 2,206 at the 2008 (43%). The prevalence has increased from 399 pmp in 2002 to 696 pmp. in 2008. Incidence (new patients) in 2002 was 110 pmp and incidence rate in 2008 was 163, and there were 249 new patients (day 1). The mean age for new patients increased from 60 years in 2002 to 63.5 years in 2008 and the population over 75 years rate from 8.79% to 11.3%. Most ESRD patients in Bosnia and Herzegovina are undergoing intermittent hemodialysis (92%), while some patients (8%) are treated by peritoneal dialysis and transplantation. The most significant cause of ESRD in 2008 was chronic glomerulonephritis (421 patients, 19.2%), followed by pyelonephritis (414 patients, 18.9%), BEN (14.7%) and Diabetes mellitus (12.2%). Hepatitis B and C virus infections had 397 (16.3%) patients, out of them 22 had both type of infections and 98 patients had B type infection. Only 10.5% of patients were tested on MRSA and 3 patients were positive on MRSA. There were no HIV-positive patients on RRT. The most common type of vascular access was AV fistula in 85% patients, AV graft 2% and catheters in 13%. Out of hemodialysis patients, 85.7% received ESA almost s.c. The median weekly dose was 4,000 UI. Cardiovascular diseases were the leading cause of death, gross mortality rate of dialysis patients being 13.01% in 2008. The need for RRT in Bosnia and Herzegovina is increasing and the number of patients increased by 43% since 2002. Hemodialysis is still the most common modality of treatment (92%), while proportion of PD and transplantation is slowly increasing. The preventive measures are necessary to prevent ESRD and also to decrease the number of patients on dialysis.

KEY WORDS: RRT, epidemiology, ESRD, hemodialysis.

## INTRODUCTION

The number of patients starting Renal Replacement Therapy (RRT) for (ESRD) continues to increase annually. There is evidence that this is largely due to the increased access to RRT for older patients which might not have been available to them earlier. Renal Association of the United Kingdom (UKRA) published consensus document for recommended treatment of adult patients with ESRD in 1995 (1) and expanded it with the second edition which was published in 1997. The purpose of the document was to provide recommended standards for optimal clinical practices, guiding nephrologists and thereby improving patients' outcomes. Similarly, in the US, the National Kidney Foundation established the Dialysis Outcome Initiative (DOQI) in 1995 (2). The frequency of co-morbidity amongst the incident RRT population is rising (3). The presence of illnesses such as diabetes mellitus, atherosclerotic cardiac and cerebral disease, or malignancy has long been recognized to increase mortality risk in ESRD population (4, 5).

## MATERIALS AND METHODS

Centre and patient questionnaires were sent to all 25 dialysis centres in Bosnia and Herzegovina. Data requested included number of patients, age, sex, prevalence, incidence, cause of ESRD, modality of treatment, HbsAg data, Hepatitis C virus (HCV) and HIV status, erythropoietin administration, cause of death, renal transplantation and vascular access data. Collected data were analyzed using SPSS.

## RESULTS

Out of 25 dialysis centres in Bosnia and Herzegovina all centres responded fully in 2008

(100%), while in 2002 only 18 centres responded. The Renal Registry of Bosnia and Herzegovina joined the ERA-EDTA Registry in 2003 (European Renal Association-European Dialysis and Transplant Association), (section B, aggregated data) and it is one of the 30 countries that participate in the Registry. The majority of dialysis centres are placed in hospitals, while 6 Centres in Republic of Srpska are private (Euromedic and Fresenius Medical Care). Most ESRD patients in Bosnia and Herzegovina are undergoing intermittent hemodialysis (92%), while a minority of patients (8%) is treated by peritoneal dialysis and transplantation (Figure 1.).

There were 572 incident patients (day 1) in Bosnia and Herzegovina, with an incident rate of 163,1 pmp (per million of population) in 2008, compared to the incident rate of 109,7 pmp in 2002 (Table 1.). Out of the total number of 572 patients, 323 were men (187.9 pmp) and 249 were women (139.2 pmp) in 2008 (Table 2.). Men represented 56.5% of the incident patients (Table 2.).

On level	Incident patients at day 1			
	2002.		2008.	
	N	pmp	N	pmp
FBiH/FB&H	-°	-°	353	-°
RS	-°	-°	202	-°
DC Brčko	-°	-°	17	-°
<b>BiH/B&amp;H</b>	420	109.7	<b>572</b>	<b>163.1</b>

TABLE 1. Incident patients at day 1 in Bosnia and Herzegovina 2002-2008.

	Males	Females	353
Patients	323	249	202
pmp	187.9	139.2	17
%	56.5%	43.5%	
Mean age (total) in years	63.0		

TABLE 2. Patients number, percentage, incident rate p.pmp. and mean age in Bosnia and Herzegovina in 2008.

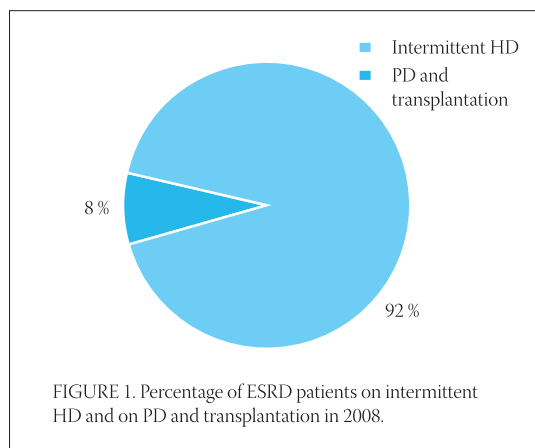


FIGURE 1. Percentage of ESRD patients on intermittent HD and on PD and transplantation in 2008.

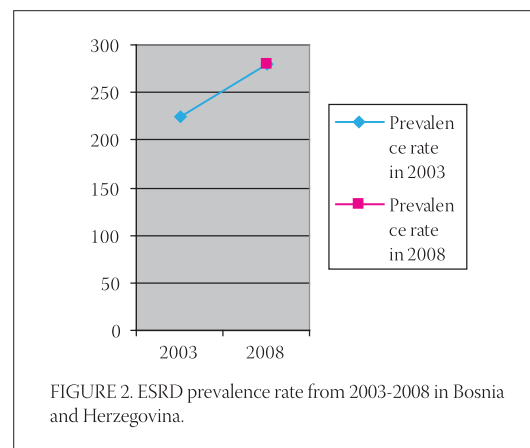


FIGURE 2. ESRD prevalence rate from 2003-2008 in Bosnia and Herzegovina.

359 incident patients (day 91) in 2008 with an incident rate of 102,3 pmp.  
Primary renal disease in incident patients at day 91

Glomerulonephritis	Pyelonephritis	Diabetes mellitus	Hypertension	Polycystic Kidney Disease	Miscellaneous
12.4%	14.5%	20%	9.8%	4.2%	25.7%

TABLE 3. Percentage of primary renal diseases in incident patients at day 91 in Bosnia and Herzegovina in 2008.

	No of patients (% of all RRT)	% Males	Mean age (range) - years	Diabetes mellitus - both (%)	Crude death rate in 2008**
Hemodialysis	2156 (89%)	55%	58 (10-86)	12%	15.2%
Peritoneal dialysis	110 (4.5%)	49%	52 (1-80)	1.5%	0.85%
Transplantation*	151 (6,5%)	66%	44 (12-78)	--	0.15%
All*	2417 (100%)	55%	58 (1-86)		16.2%

\*Residents only \*\*Incident day 1 included

TABLE 4. Patients treated with different forms of renal replacement therapy (RRT) in Bosnia and Herzegovina on December 31, 2008.

The mean age of patients was 63,0 years in 2008. There were 359 incident patients (day 91) in 2008 with an incidence rate of 102,3 pmp. Primary renal diseases in incident patients at day 91 were as follows: Glomerulonephritis (12,4%), Pyelonephritis (14,5%), Diabetes mellitus (20%), Hypertension (9,8%), Polycystic kidney disease (4,2%), miscellaneous (25,7%) (Table 3).

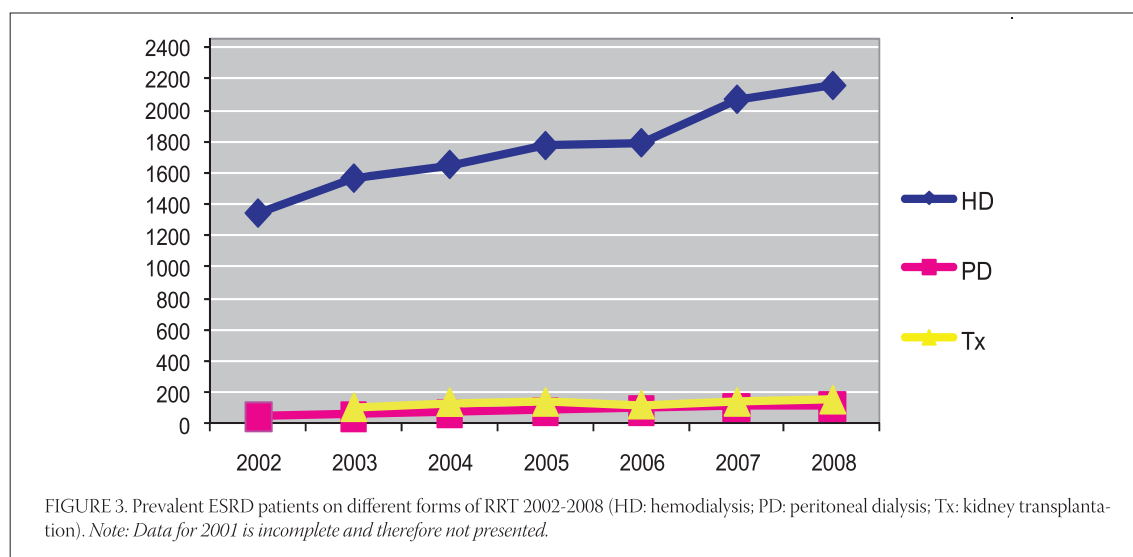
The ESRD prevalence rate increased from 224 pmp in 2003 to 279 pmp in 2008 (Figure 2).

The growth rate of prevalent patients on RRT over the last eight years averaged from 4-16 per year. On December 31, 2008, there were 2442 prevalent RRT patients in Bosnia and Herzegovina with a prevalent rate of 696,1 pmp. The mean age of prevalent patients was 57±14,9 years. The three commonest causes of ESRD were Glomerulonephritis (19%), Pyelonephritis (19%), and Diabetes mellitus (15%). Distribution of RRT modalities is

presented in Table 4. The majority of prevalent RRT patients were treated with chronic hemodialysis (Figure 3). These patients are older and consist of a higher percentage of diabetics than patients treated with peritoneal dialysis or kidney transplantation. There were 17 prevalent patients aged 20 years or younger in Bosnia and Herzegovina.

The vascular accesses were: native arterio-venous fistula (AVF) in 85%- patients (n-1784), PTFE graft in 2% (n-41) and HD catheter in 13% (n-282) (Figure 4). Hemodialysis catheters (n-282) were temporary (non-cuffed) in 60,3% (170) and permanent silastic in 59,7% (n-112) of patients (Figure 5).

Balkan Endemic Nephropathy (BEN) is specific for North-East Bosnia and prevalence in 2002 was 50 pmp according to 2008 has been 87 pmp (306 patients) (Table 5).



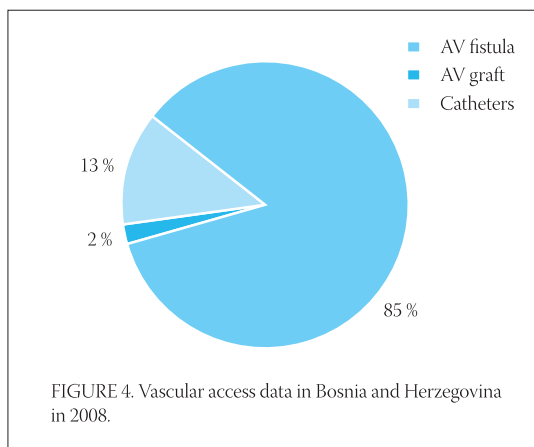


FIGURE 4. Vascular access data in Bosnia and Herzegovina in 2008.

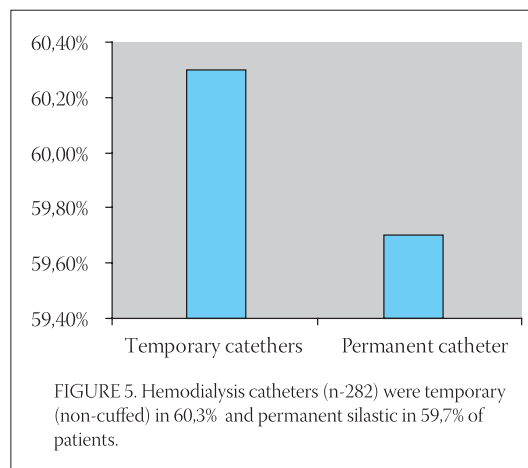


FIGURE 5. Hemodialysis catheters (n=282) were temporary (non-cuffed) in 60.3% and permanent silastic in 59.7% of patients.

31.12 / December 31	2002	2008
Number/ pmp	180/50	306 / 87

TABLE 5. Balkan Endemic Nephropathy (BEN) prevalence in 2002 was 50 pmp (180) according to 2008 has been 87 pmp (306 patients)

On December 31, 2008 there were 2156 prevalent chronic hemodialysis patients (55% men, mean age 58 years, range 10-86).

In patients with AV fistula and graft, the location of fistula/anastomosis was on the forearm in 93,8% (n-1674) of patients on the elbow/arm in 6,2% (n-120). The percentage of patients treated with convective techniques (hemodiafiltration) is increasing: 0.6 in 2006 to 3.6% in 2008. In 2008 398 RRT patients died. Of these 395 were dialysis patients (376 hemodialysis and 19 peritoneal dialysis, and 3 were kidney graft recipients). The crude death rate for dialysis patients in 2008 was 13.7% (12.9% for hemodialysis patients and 0.7% for peritoneal dialysis patients). The most common cause of death in dialysis patients was cardiovascular disease (70%) followed by malignoma (14%).

## DISCUSSION

There has been major increase in the number of patients accepted for RRT in the Bosnia and Herzegovina largely due to rising acceptance rates in the elderly, and to lesion extend in patients with comorbidity, as indicated by the rising acceptance of patients with diabetes and endemic nephropathy. Similar trends in the most European Countries have been recorded recently. Despite the fact that diabetes was one of the most common causes of renal failure in new patients in most European countries and US, in Bosnia and Herzegovina 45% of incident patients start RRT with diagnosis of Glomerulonephritis and Pyelonephritis. Hypertension is responsible for 9.8% of cases of ESRD, and is lower

that reported in the USA, Japan, Germany (6.7, 10). The mean age of patients in our study was 63.5 and the increasing mean age of ESRD patients in Bosnia and Herzegovina reflects the universal trend of dialysis patients living longer due to improving health care systems. The mean age of ESRD patients in Bosnia and Herzegovina is similar as in European countries (7.8). Better health care can decrease the morbidity rate of diabetes and hypertension, but stops start of preventing ESRD from these diseases. Balkan nephropathy is endemic in South-East Bosnia. There were 306 patients or 65% older then 65 years of age who have had Balkan nephropathy at the end of 2008. These patients account for 14.2% of the total dialysis population. Until 2001, as the treatment for anemia 90% of patients received blood transfusion, while in 2008, 83,6% received erythropoietin. HbsAg and antiHCV positive patients in 2008 were 16.3% (397 patients). The high percentage of HCV positive patients in relation to the low percentage of HbsAg positive patients is due to rigid screening of blood donors for HbsAg for many years where HCV screening of blood donors has done from 1997 in Bosnia and Hezegovina, and mostly positive patients has been in period till 1997. Preferred vascular access is AV fistula (85% or 1,784 patients) as in elsewhere in Europe (8). The rate of renal transplantation is low, and most transplantations are from living related kidney donors. Only 10 cadaveric kidney transplantations were made since 2006. Low transplantation rate is due to the lack of cadaveric organ transplantation. The crude death rate for dialysis patients in 2008 was 13.7% (12.9% for HD patients and 0.7% for PD patients), similar as in Eastern Europe, but higher than in US and Northern Europe (9). Cardiovascular disease were the leading cause of death (70%) followed by cerebrovascular accidents.

## CONCLUSION

Glomerulonephritis, pyelonephritis and diabetes mellitus are the commonest causes of ESRD in Bosnia and Herzegovina. However, it is sometimes difficult to elucidate the cause of CKD especially in patients with both hypertension and diabetes mellitus. The need for RRT in Bosnia and Herzegovina is increasing and the number patients increased by 43% from 2002. Hemodialysis is still the most common modality of treatment (92%) and proportion of PD and kidney transplantation is slowly increasing. The preventive measures are necessary to prevent ESRD and also to decrease the number of patients on dialysis.

## REFERENCES

- (1) Hallan S.I., Coresh J., Astor B.C., et al. International comparison of the relationship of chronic kidney disease prevalence and ESRD risk. *J. Am. Soc. Nephrol.* 2006; 17: 2275-2284.
- (2) Coresh J., Selvin E., Stevens L.A., et al. Prevalence of chronic kidney disease in the United States. *JAMA* 2007; 298: 2038-2047.
- (3) U.S. Renal Data System. *USRDS 2008 Annual Data Report: Atlas of End-Stage Renal Disease in the United States*. National Institute of Diabetes and Digestive and Kidney Disease, 2008.
- (4) Marcelli D., Stannard D., Conte F., et al. ESRD patient mortality with adjustment for comorbid conditions in Lombardy (Italy) versus the United States. *Kidney Int.* 1996; 50: 1013-1018.
- (5) Youn E.W., Goodkin D.A., Mapes D.L., et al. The Dialysis Outcomes and Practice Patterns Study (DOPPS): an International haemodialysis study. *Kidney Int.* 1999; 57: S74-S81.
- (6) Yoshino M., Kuhlmann M.K., Kotanko P., et al. International differences in dialysis mortality reflect background general population atherosclerotic cardiovascular mortality. *J. Am. Soc. Nephrol.* 2006; 17: 3510-3519.
- (7) NATIONAL KIDNEY FOUNDATION; *Dialysis Outcomes Quality Initiative: Clinical Practice Guidelines*, New York, National Kidney Foundation, 1997
- (8) Collins A.J, Ma J.Z., Xia A & Ebben J. Trends in anemia treatment with erythropoietin usage and patients. *Am. Soc. Nephrol.* 1998; 32 (Suppl 4): S133-S141.
- (9) Lowrie E.G. Chronic dialysis treatment: Clinical outcome and related processes of care. *Am. J. Kidney Dis.* 1994;24:255-266.
- (10) ERA-EDTA Annual Report 2007. Academic Medical Center, Department of Medical Informatics, Amsterdam, The Netherlands.