

## The Impact of Gender and Marital Status on Therapeutic Outcomes of Maintenance Hemodialysis Patients

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### Abstract

**Background and Aims:** The hemodialysis regimen required to treat end stage renal disease (ESRD) can be extremely strict, requiring individuals to deal with multiple acute and chronic stressors. The aim of this study was to assess relationships between compliance and therapeutic goals with marital status separately by sex in uremic patients receiving hemodialysis in Tehran province.

**Methods:** In December 2005, an observational study was performed that included the whole HD population (2630 patients; 1505 males and 1125 females) from 56 different units in the province of Tehran, an area encompassing 13.5 million inhabitants.

**Results:** The mean age of patients in this study was 53.4±16.5 years. They were 1505 men (57.2%) and 1125 women (42.8%). Regarding marital status, it was shown that 1855 (72.5%) were married, 59 (2.3%) were divorced and 329 (12.9%) were widowed. A relationship between marital status and sex was found (80.2% of males were married versus 62.1% of females) (P=0.001). Mean hemoglobin level was not significantly different in two sexes (P=0.15) but was different significantly between married and singles (P=0.002). Even if there was no significant difference in achieving the numbers of K/DOQI guideline targets among different sex and marital status, the control was better in those with family support (P<0.05). The numbers of dialysis sessions and vaccination or preference for transplantation did not differ among the groups. As the marital status has a great impact on therapeutic goals achievements and that 38% of females versus 19.8% of males are single they may need more supervision. Higher rate of illiteracy mandates educational facilities to be appropriate to their capabilities.

**Conclusions:** The bottom line is that although patients with less support can get dialysis in adequate dose, they need more concentration regarding calcium and phosphorus metabolism and anemia management.

**Keywords:** Hemodialysis, Marital status, Compliance, Gender

### Introduction

The hemodialysis regimen required to treat end stage renal disease (ESRD) can be extremely strict, requiring individuals to deal with multiple acute and chronic stressors. Stressors for individuals on hemodialysis can be treatment-related such as dietary

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and fluid restrictions and taking different medications, or psychosocial in nature such as alterations in sexual function, changes in self-confidence, and panic of death (1-3). Most patients showed non-adherence with diet, fluid restrictions and medications. Family members were important providers of social support for patients (4). Adaptation and support can result in advantageous outcomes, and successful relationship within the family has a great impact on this matter (1). On the other hand, marital and family connection can be the victim of maladaptation such as depression, anxiety, sexual dysfunction. Alternatively, factors associated with marital status seem to differ by sex. Women reported higher stress in response to physical and vessel (AV fistula, graft) problems and higher scores in using emotion-oriented and support-seeking coping strategies, while the men reported higher stress in reproductive system functioning and higher score in using avoidance as a coping strategy (5). Others reported that women appeared to be more vulnerable than men (3). The aim of this study was to assess relationships between compliance and therapeutic goals with marital status separately by sex in uremic patients receiving hemodialysis in Tehran province.

## Materials and Methods

In December 2005, an observational study was performed that included the whole HD population (2630 patients; 1505 males and 1125 females) from 56 different units in the province of Tehran, an area encompassing 13.5 million inhabitants. The study variables included demographic data (sex, age, marital status, education, and nationality), condition for transplantation, how they had been diagnosed as ESRD patients and vaccination status. Statistics were mainly descriptive and were according to the study objectives. Results are expressed as arithmetic means  $\pm$  SD.

## Results

The mean age of patients in this study was  $53.4 \pm 16.5$  years. They were 1505 men (57.2%) and 1125 women (42.8%). 5.6% of patients were less than 25 years old. About 4% (97) of whom on maintenance dialysis were non-Iranian (mainly from Afghanistan). The blood group of hemodialysis patients was O (38%), A (33%), B (22%) and AB (8%) respectively, which is compatible with normal society. Patients were on maintenance HD for  $49.0 \pm 17.9$  months. 2376 patients (90.3%) received three dialysis sessions per week. The number of sessions which each patient received did not show any relation to sex or marital status. The assessment on marital status showed, 1855 (72.5%) were married, 59 (2.3%) were divorced and 329 (12.9%) were widowed. A relationship between marital status and sex was found (80.2% of males versus 62.1% of females were married) ( $P=0.001$ ) (table1). In this population, eligibility for transplantation based on physician notes showed that 924 (36%) patients fulfilled criteria which showed positive statistical relationship with education level ( $P<0.05$ ) and not marital status ( $P=0.18$ ). 744 (29%) of these patients (male to female was 301 to 443) were illiterate and 580 (22.5%) got diploma and more. We found higher education level in male and more illiteracy in female as we expected ( $P<0.05$ ). Sixty-three percent of patients were vaccinated for hepatitis B with no impact from sex or marital status. 2.5, 8.6 and 0.1% were HBs Ag, HCV Ab & HIV Ab positive, respectively. The mean values for serum calcium, phosphorus and PTH, as well as the recommended ranges by the National Kidney Foundation Dialysis Outcomes Quality Initiative (K/DOQI) guidelines in relation to sex and marital status are presented in Table 1. Dialysate calcium concentration was 2.5 mEq/L. Albumin level had not shown difference between groups of sex and marital status.

Regarding anemia management mean hemoglobin level was not significantly different in two sexes ( $P=0.55$ ) but was different significantly between

**Table 1.** Treatment objectives regarding sex and marital status

K/DOQI ranges	Male (%)	Female	P Value	Married (%)	Single (%)	P Value
<b>Phosphorus, mg/dl</b>	5.4 ± 1.5	5.4 ± 1.5	0.7	5.4 ± 1.5	5.7 ± 1.6	0.008
<3.5	643 (51.4)	498 (53.3)		975 (53.7)	155 (45.1)	
3.5-5.5	521 (41.6)	87 (40.1)		717 (39.5)	166 (48.3)	
>5.5	87 (7)	62 (6.6)		125 (6.9)	23(6.7)	
<b>Calcium, mg/dl</b>	8,9±1.2	9.1±1.3	0.0001	9 ± 1.2	8.8 ± 1.3	0.01
<8.5	458 (36.4)	273 (29)		592 (32.4)	134 (38.5)	
≥8.5	800 (63.8)	669 (71)		1236 (67.6)	214 (61.5)	
<b>Intact PTH, pg/ml</b>	211.3 ± 190	198.3 ± 190.7	0.8	205.8 ± 194.4	193.4 ±169.5	0.4
<150	122 (44)	118 (53.2)		204 (49.3)	35 (46.1)	
150-300	79 (28.5)	59 (26.6)		109 (26.3)	25 (32.9)	
>300	76 (27.4)	45 (20.3)		101 (24.4)	16 (21.1)	
<b>Calcium Phosphorus product, mg<sup>2</sup>/dl<sup>2</sup></b>			0.7			0.006
<55	895 (72.8)	653(71.1)		1303 (73)	231 (67.9)	
55-72	242 (19.7)	191 (20.8)		359 (20.1)	69 (20.3)	
>72	93 (7.6)	74 (8.1)		122 (6.8)	40 (11.8)	
<b>Hemoglobin</b>	10.1 ± 2.1	10.2 ± 1.9	0.1	10.2±2	9.9 ± 2.2	0.002
<8	154 (16.1)	95 (13)		188 (13.5)	60 (21.9)	
8-11	461 (48.3)	378 (51.9)		707 (50.6)	126 (46)	
≥11	340 (35.6)	256 (35.1)		502 (35.9)	88 (32.1)	
<b>Ferritin</b>	527.3 ± 453	642.8± 522.2	0.001	589.9 ± 489.7	498.5 ±460.8	0.001
<100	84 (12.8)	32 (6.6)		83 (8.9)	32 (17)	
≥100	573 (87.2)	453 (93.4)		852 (91.1)	156 (83)	

mg, milligram; dl, deciliter; pg, picogram.

**Table 2.** Demographic data of patients by gender

Variables	Males (1505)	Females (1125)
Age (yrs)	53.13±17.6	53.78±15.80
Dialysis duration (Mon)	49.17±57.60	53.75±60.06
Hemoglobin (gr/dl)	10.12±2.07	10.17±1.91
Epo dose (IU/Kg/W)	97.20±27.41	109.75±29.81
Cholestrol (mg/dl)	154.0±41.9	171.1±45.1
Triglyceride (mg/dl)	158.6±100.9	184.7±97.6
Marital status		
Non married	203 (13.8)	113 (10.4)
Married	1180 (80.2)	675 (62.1)
Divorced	28 (1.9)	31 (2.9)
Widowed	61 (4.1)	268 (24.7)

**Yrs**, Years; **Mon**, Months; **gr**, grams; **dl**, deciliter; **IU**, International Unit; **Kg**, Kilogram; **W**, Week; **mg**, milligram.

married and singles males (10.2±2.0 vs 9.8±2.2, P=0.048). Iron store expectedly was considerably lower in females. Mean dose of Epo was not significantly different between two genders (Table 2). But it was shown that the mean dose of Epo in married males was 113.2±45.0 vs. 93.2±19.0 IU/Kg/W in singles (P<0.001) and similarly in married females in comparison with singles (116.4±37.9 vs. 105.6±22.3, P<0.001).

## Discussion

This article presents information about hemodialysis patients in 2005, in Tehran, Iran. Our results on family structure reflect a social change in family types; 38% of females versus 19.8% of

males are single due to death of spouse, divorce or no marriage. Lack of family support may increase life pressures in women's lives. According to Kimmel (2003) and Quinan (2007) studies women are more vulnerable to psychosocial disorders with chronic disease than men and we can conclude, because of loneliness and life pressure in a hemodialysis woman, psychological problems such as depression and anxiety will increase in this group and this can affect on ESRD therapy and outcome (6, 7). As we see in this study, marital status has a great impact on patients' therapeutic goals achievements.

After reviewing the data of this group, 66% were illiterate or had only primary education. The general census conducted in 2006 showed that 16% of Iran population over 6 years was illiterate. The ratio of male to female was 11.3% to 19.7% ([http://www.sci.org.ir/portal/faces/public/sci\\_en/sci\\_en.Glance/sci\\_en.educate](http://www.sci.org.ir/portal/faces/public/sci_en/sci_en.Glance/sci_en.educate)). Comparable to general population there were more women in this group. Due to the impact of education level on patient's compliance, efforts should be made to increase patients' knowledge about their disease and treatment (for example; making films, pictured brochures). Undoubtedly, education level has a positive impact on provision of suitable conditions for transplantation ( $P<0.05$ ), indicating that we may achieve higher level of patients' health care by implementation of educational strategies for these group of patients.

The difficulty in the management of calcium and phosphorus metabolism has been demonstrated in different studies. Apparently treatment with phosphorus binders and vitamin D analogues is independently associated with improved survival among the incident hemodialysis patients. Meanwhile, the strict maintenance of serum calcium and phosphorus levels within the ranges recommended by the K/DOQI guidelines is difficult to achieve due to multi factorial reasons. One of the two main barriers is the patient's noncompliance (8-10). In this study also less than 2% and 35% of

the population achieved 4 and 3 K/DOQI guideline targets for the laboratory tests, respectively (9). Even if there was not significant differences in achieving the numbers of K/DOQI guideline targets among different sex and marital status, the control was better in those with family support ( $P<0.05$ ). It seems that medical team should have more concern regarding this point.

The other important issue for hemodialysis patients is anemia management. In Iran the protocol to consists of recombinant  $\alpha$ -erythropoietin and iron sucrose for intravascular iron. Ferritin is the most commonly performed measure of iron status (76.7%) compared with serum iron and total iron binding capacity (TIBC) (11). The higher dose of Epo in married group; although may not be significant clinically, may help them to get better outcome.

On the subject of prevalence of hepatitis B and C, the rates of HCV Ab positive patients in Tehran (8.4%) were higher than in the rest of the country (4.5%), whereas percentages of HBs Ag positive patients were not significantly different (12). As vaccination is free and accessible to all, expectedly the rate of vaccination did not show significant differences among different sexes or marital statuses. Since prophylaxis is important in these patients, had we checked the percentage of vaccinated patients when they start dialysis the difference would have become apparent.

According to this study, only 13% of hemodialysis patients in Tehran agree with cadaveric transplantation. There was no relationship with educating level or marital status. In fact there is a general unspoken vision regarding transplantation from deceased donors in hemodialysis patients. The law of transplantations from deceased donors was passed in 2000, which should compete with a well-established living unrelated donor renal transplantation program since 1988 (11). We strongly suggest campaigns directed at the general population and medical professionals may help to reverse this trend.

## Conclusions

The bottom line is although patients with lower support can get dialysis in adequate dose; it seems that they need more attention regarding other therapeutic options such as calcium phosphorus metabolism and anemia management which needs patient's compliance or support.

## Conflict of interest

None declared.

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