

Psychosocial aspects of end stage renal disease Cognitive and emotional changes in pre renal and post renal transplants recipients

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Abstract

Recent studies have shown a high prevalence of depression and cognitive changes in patients with end stage renal (ESRD) adrenal transplant recipients. There are few data available on the cognitive and emotional changes in patients undergoing renal transplantation. The aim of this study was to evaluate the changes cognitive profile and depression in renal transplant recipients. Thirty consecutive patients undergoing renal transplantation were evaluated one month before and three months after successful renal transplant with Beck Depression Inventory (BDI), Luria Nebraska Neuropsychological Battery (LNNB), Wechsler Performance Intelligence Scale (WAPIS) and life satisfaction scale. Our study revealed an 86.6 % prevalence of depression in ESRD patients as compared to 56.6% in post renal transplant patients. Analysis of neurocognitive functions on LNNB did not reveal any significant improvement. Furthermore, analysis of life satisfaction scale revealed most of the patients showed high satisfaction levels despite the stress of their disease. Results on WAPIS showed significant improvement in intelligent quotient (IQ) after renal transplantation. Successful renal transplant is associated with improvement in depression and life satisfaction.

Introduction

The incidence of renal failure is about 200 in a million people each year. Most of the illnesses causing renal failure are not in older people, but usually in young adults. Dialysis and kidney transplantation are the two basic treatments for chronic renal failure. Peritoneal dialysis and haemodialysis are the two main forms of dialysis. Haemodialysis is the preferred option used by most centers. Haemodialysis imposed severe restrictions on the patient and family. The patient is placed in a situation that he is totally dependent on a machine and medical personnel two or three times a week. He needs a strict diet and multiple daily medications. Water intake is restricted to a small piece of ice. The cost of the treatment is prohibitive and the loss of working days treatment adds to the financial stress. Depressed mood and

depressive syndromes are common occurrences in these patients. (Barisic et al. 2004). This is understandable since depression commonly follow loss and these patients lose their independence, strength, job and energy. The evaluation of depression is complicated by the fact that the symptoms end renal disease (ESRD) such as diminished appetite, loss of energy, constipation and diminished sexual ability resemble the somatic symptoms of depression. Presence of anhedonia, poor self esteem, crying spells, helplessness, and suicidal ideation are indicators of the disease. Organic brain syndromes such as delirium and dementia are common in these patients. Patients involved in intellectual work noticed progressive impairment in their intellectual abilities as the day of dialysis approaches. (Banies LS,

Jindal RM 2002 and Levy NB Cohen 2001).

A successful transplant dramatically improves the quality of life of the patient. The patient is free from dependence on a machine, dietary restriction and loss of workdays due to dialysis. Cognitive function is said to improve and in children growth and development regains normal levels. (Kramer et al 1996).

Transplantation has its own problems. The patients are on lifelong immunosuppressant such as steroids, which have their own side effects. The fear of rejection looms large and the patient still has to under regular medical supervision. Some workers have not found any difference between transplanted patients and those on dialysis on measures of psychological adjustment and vocational rehabilitation ((Fallon et al., 1997).

In view of the contradictory findings and paucity of kuwaitian studies in this field, the present study was undertaken to find out the prevalence of depressive symptoms, cognitive function and life satisfaction in haemodialysis patients and to assess the changes in these parameters following a successful renal transplant.

Methods

All patients with ESRD admitted to Hamd EL Essa Organ Transplantation Center in Kuwait and being worked –up for renal transplantation were included in the study. The patients (n=30) had been on regular haemodialysis for at least 6 months.

Inclusion criteria

- Patients diagnosed as ESRD who were on regular dialysis and were awaiting surgery.
- Age more than 18 years and less than 60 years.

Exclusion criteria

- Age less than 18 and more than 60 years.
- Coexisting medical illnesses such as ischaemic heart disease (IHD), diabetes, asthma, hepatitis, coexisting infections and head injuries.
- Past or family history of psychiatric disorders.

After selections and before administration of the tests an informed consent was taken from the patients. All patients were evaluated 1 month before undergoing transplantation and 3 months after renal transplantation.

All patients were subjected 1 month before and 3 months after renal transplantation to the followings;

- Beck Depression Inventory (BDI)
- Luria Nebraska Neuropsychological Battery (LNNB)
- Weschler Adult Performance Intelligence Scale (WAPIS).
- Life Satisfaction scale.

The tests were administered in more than one session to avoid exhaustion and boredom in the patients. The tests were scored as per the test booklet .The results were tabulated and analyzed using SPSS software.

Results

Table (1) Sample catachrestic

Sex	No (%)
Male	28 (%)
Female	2 (6.7%)
Mean Age	39.6
Education	
Intermediate	14 (46.7)
Secondary or Higher	16 (53.3%)
Married	26 (86.7)

The mean age of the ESRD was 39.6 years. There were 28 males and 2 female patients.

Table (2)

BDI score	Pre-transplant	Post-transplant
Not depressed (0-9)	4(13.3%)	13(43.3%)
MILDLY DEPRESSED(10-16)	8(26.6%)	17 (56.7%)
Moderately depressed (17-29)	10(33.3%)	0
Severely depressed (more than 29)	8(26.7%)	0
Mean score	22.03	9.83**
Cognitive affective BDI	15.01	4.68
Somatic BDI	7.02	5.15

**p (0.01 highly significant (wilcoxon's rank test))

Shows that 86.7% of the pre-transplant cases were depressed (score ≥ 9 on BDI) and this fell to 56.7 % after transplantation. An important finding was that 69% of the pretransplant cases were moderately to severely depressed while none of patients were moderately to severely depressed after renal transplant. The average BDI score was 22.03 in this population and the score decreased significantly to 9.83 following renal transplantation. We also subdivided the BDI score into cognitive affective components taking the first 13 statements, which is said to be a more accurate measure of depressive symptoms in physically ill patients. The average score on the cognitive scale was 15.01 and this reduced to 4.68 after transplant, while the somatic score reduced from 7.02 to 5.15 underlying the fact that the effect of renal transplant was mainly on the cognitive affective component of BDI.

Table (3)

Description	Pre-transplant N(%)	Post-transplant N(%)
Feelings of punishment	17(56.7)	10(33.03)
2-Self-critical	13(43.3)	8(26.7)
3-Crying spells	13(43.3)	5(16.7)
4-Worthlessness	12(40.0)	2(6.7)
5-Loss of energy	12(40.0)	6(20.0)
6-Indecisiveness	10(33.3)	2(6.7)
7-Sense of failure	10(33.3)	11(37.3)
8-Sadness	8(26.7)	1(3.3)
9-Pessimism	6(26.7)	4(13.3)
10-Sleep disturbance	8(26.7)	4(13.3)
11-Irritability	8(26.7)	7(23.3)
12-Fatiguability	8(26.7)	8(26.7)
13-Loss of pleasure	7(23.3)	3(10)
14-Loss of interest	6(20.0)	5(16.7)
15-Self-hate	5(16.7)	5(16.7)
16-Difficulty in concentration	5(16.7)	3(10.0)
17-Guilty feelings	3(10.0)	1(3.3)
18-Agitation	2(6.7)	2(6.7)
19-Loss of appetite	2(6.7)	1(3.3)
20-Loss of libido	1(3.3)	1(3.3)
21-Suicidal thoughts	0 (0.00)	0(0.00)

Showed that in ESRD patients cognitive affective symptoms such as feelings of punishment, crying, being self critical, indecisiveness, past failure, and worthlessness were common. Among the somatic symptoms, loss of energy was a common symptom. Suicidal ideation was not present in any patient. Post transplant, the sense of failure showed a mild increase, but all the other symptoms either decreased or remained the same.

Table: (4)

WAPIS scoring	Pre-transplant	Post-transplant
Mean IQ	88.5	101*
Bright –normal (110-119)	0(0%)	2(6.7%)
Average (85-109)	22(73.3%)	28(93.3%)
Borderline (70-84)	8(26.7%)	0(0%)

*p less than 0.05 significant (Wilcoxon sign rank test).

On the WAPIS, there was a highly significant increase in mean IQ scores after renal transplant (table 4). Before transplant, 22 patients were in the average range for intelligence and 8 showed borderline retardation. After transplant, 2 moved to the bright normal range while all borderline retardation patients moved to the average range, thus indicating that this disease affects the intelligence.

Table 5

WAPIS subtest	Pre-transplant	Post-transplant
Picture completion	7.40	9.87*
Digit symbol	8.77	11.27*
Block design	7.37	9.43*
Picture arrangement	8.83	9.90*
Object assembly	9.20	10.47*

*p less than 0.05 significant

A significant difference was also observed between pre- and post-renal transplant cases in all the subscales of the WAPIS.

Table 6

BDI scoring		WAPIS subtest				
	Picture completion	Digit symbol	Block design	Picture arrangement	Object assembly	IQ performance
Pre-renal transplant	-0.406 0.026*	-0.202 0.285	-0.242 0.117	-0.061 0.750	0.191 0.311	-0.195 0.302
Post-renal transplant	-0.060 0.753	-0.247 0.189	-0.388 0.034*	-0.005 0.977	0.036 0.849	-0.254 0.175

Pearson Correlation significant (2-tailed indicating significance at 0.05 level)-

The BDI scores of the ESRD patients did not correlate with performance IQ except in the picture completion test. After renal transplant, again the BDI scores did correlate with the performance IQ except the block design test. This indicates that the lower IQ seen in the patients before renal transplant was not due to the effect of the depression as measured by the BDI.

Table 7

Clinical scale	Mean scoring	
	Pre-transplant	Post-transplant
1-Motor function	35.43	31.50**
2-Intellectual functions	30.35	34.23*
3-Expressive speech	40.10	33.77**
4-Receptivel	40.90	35.87**
5-Visuale	38.77	33.33*
6-Tactile	41.83	39.30
7-Reading	49.10	40.37*
8-Writing	42.33	40.93
9-Arithmetic	46.43	45.93
10-Memory	38.57	34.90*

*p less than 0.05 significant

**p less than 0.01 highly significant

On the LNNB, significant differences were seen in motor functions, intellectual functions, receptive speech, expressive speech, visual functions. Reading and memory following renal transplant.

Table 8

LNNB clinical scale	Pre-transplant		Post-transplant	
IQ	BDI scoring	IQ	BDI scoring	IQ
-0.222 0.238	-0.264 0.159	-0.097 0.612	-0.264 0.159	-0.097 0.612
-0.144 0.448	-0.325 0.880	0.088 0.645	-0.325 0.880	0.088 0.645
-0.019 0.922	-0.160 0.397	0.355 0.054	-0.160 0.397	0.355 0.054
-0.108 0.571	0.095 0.615	0.132 0.487	0.095 0.615	0.132 0.487
-0.024 0.897	-0.486 0.006	0.391 0.032	-0.486 0.006	0.391 0.032
-0.222 0.239	0.054 0.778	0.021 0.914	0.054 0.778	0.021 0.914
-0.267 0.154	-0.041 0.832	0.150 0.429	-0.041 0.832	0.150 0.429
-0.198 0.295	-0.163 0.389	-0.024 0.899	-0.163 0.389	-0.024 0.899
-0.028 0.882	-0.116 0.542	0.169 0.372	-0.116 0.542	0.169 0.372
0.061 0.750	-0.070 0.713	-0.117 0.536	-0.070 0.713	-0.117 0.536

Pearson Correlation (2-tailed) between BDI and IQ with LNNB clinical scales .

There was no correlation between BDI and IQ with LNNB clinical subscales in the patients before and after renal transplant.

Table 9

Life Satisfaction scale scoring	Pre renal-transplant	Post renal-transplant
High score	15	30
Average score	15	0
Mean score	133	153*

*p less than 0.05 significant

On the life satisfaction scale, 15 patients scored in the high range and 15 in the average range before renal transplant. All patients in the average group shifted to the high satisfaction group posttransplant. There was also a significant rise in the mean life satisfaction score after renal transplantation.

Discussion

ESRD is a psychologically debilitating disease with considerable emotional morbidity. Depression is the most common symptom in these cases and has been attributed to the loss of many factors; the loss of independence; loss of working ability .loss of healthy self image and loss or diminution of sexual ability. (Barisic et al.2004 and Knight et al. 2003).

In this study, depression was present in as many as 86.7 % of the total population before transplant (table 2), the average score being (22.03) and decreasing to 9.83 after transplantation. Taking a cut-off of 17 to obviate the effects of symptoms due to the illness from impinging on the BDI score, 60 % of the population scored above the cut-off, indicating moderate to severe depression on the BDI before transplant. Similarly, a study of 62 Korean patients (Koo et al .2003) ,on chronic haemodialysis reported a 56.5 % prevalence of depression following a cut-off of above 21. In their study, 34 out of 40 patients scoring more than 18 on BDI met the criteria for major depression. However, in our study none of the patients after renal transplant had a BDI score more than 17. This is unusual as others have reported contrary findings (Baines LS Jindal RM 2002).

Teran-Escandon et al. (Teran –Escandon et al. 2001) reported as 40% prevalence of depression in their sample of post – transplant cases observed after one year. They also observed that patients who had received a kidney from live related donors had a lesser prevalence of depression than those who had received a kidney from cadavers. They hypothesized that patients with kidneys from live related donors might overestimate their prognosis. In our sample, all the patients had received kidney

from a live related. Also, the patients in this study were evaluated three months after transplant, thus excluding cases of graft rejection,. This may have led to a significant improvement in the symptoms of depression in the present study. The BDI proved to be a sensitive indicator for revealing depression and detecting the symptoms in a majority of cases. Out of the total population of 30 cases, only 2 cases had been suspected of having depression by the treating nephrologists and sent for psychiatric evaluation.

The reason for this could be that are reluctant to reveal psychological symptoms to the treating doctor unless these are specifically asked for. Depression has been thought to influence the nutritional status as indicated by albumin levels, Thus, poor nutritional status may mediate the relation between depression and mortality in ESRD (Friend et al .1997). Depression in our study was not linked to diet of the patient but was significantly linked to the educational level.

An analysis of the BDI subscales reveals that punishment feelings, guilty feelings, loss of energy, worthlessness, and indecisiveness were the most common symptoms in ESRD patients. This substantiates the commonly held cultural belief that disease is a response to punishment for wrongs committed earlier. Except for the loss of energy, which may be a symptom of the disease, other symptoms are psychological thus substantiating the validity of the BDI in these cases. Sexual difficulties have been reported to be common in these cases; however, in our study only 3.7% of the cases reported sexual problems in our setting. The common symptoms in the post –renal

transplant group as reflected in the BDI were past failure, punishment feelings, crying and being self critical. These symptoms also substantially validate the effectiveness of the BDI as a tool for assessing depression in these cases. The high prevalence of depression in the pre – as well as the post –renal transplant cases may indicate the need for starting a prophylactic antidepressant in these cases. (Kramer et al.1997).

Also found a 44% prevalence of depression in patients with ESRD, which is in agreement with our findings. Their study also linked depression to increased mortality which was not able to verify. Depression is also reported to be higher men sub and linked to depression in the spouse. We unable to verify this in our study .OF the patients 26.7% had a borderline IQ before renal transplant, while after transplant none of the patients had a borderline .AIQ .To negate the influence of culture and education measured only the performance IQ using WAIPS.In a study of adults with ESRD since childhood (Groothoff et al. 2002) the performance was found to be 9.2 points lower than a comparative group of adults without renal disease. The lowest scores were observed in tasks that required concentration, memory, and general knowledge. On analyzing the subscales of WAPIS, in this study we found that the lowest scores were obtained in picture completion and block design. Picture completion is a measure of visual concentration and a non-verbal test of general information. A low score on this test may indicate difficulty in concentration and inadequate visual organization. Block design, on the other hand is said to be a relatively non-verbal culture free test of intelligence which correlates highly with general intelligence. It is also said to be an

excellent indicator of brain damage especially of the right hemisphere (Lezak 1996).Low scores were obtained on other subtests as well which improved significantly after transplantation .In a similar study of 9 medically stable children and adolescent, improvement in intellectual functions was found after successful renal transplant (Mendley SR AND Zelko FA 1999).In another study involving 20 children and adolescent with ESRD before and after transplantation, patients exhibited significantly greater improvement from initial testing to one month after transplantation on the performance IQ and full-scale IQ (reed 18). The significant difference was not maintained , however , at 1 year after transplantation .The later the onset of renal failure or the fewer the years in ESRD the less the impairment in cognitive performance. Blood urea nitrogen, serum creatinine levels and blood pressure did not correlate with any of the cognitive or academic achievement measures. In our study too we did not find any such correlation (Ryan et al, 1980) compared patients on dialysis with a group of medical –psychiatric patients. They reported that renal cases showed greater deficit on object assembly and block design subtest relative to neurological cases or medical .Psychiatric patients. Thus, it appears that block design is a sensitive indicator of dysfunction in renal disease. Analysis of the clinical scales of LNNB revealed significant differences between the patients before and after renal transplantation (table7) in motor functions, intellectual ability, expressive and receptive speech , reading , memory and visual functions.

It appears that the language functions are impaired in patients with ESRD .We were

unable to come across any study in the literatures where LNNB has been applied

The Halstead Reitan Battery was administered by Souheaver et al, 1992 to 24 patients with advanced renal failure, 24 patients with neurological disorders, and 24 patients with medical and or non psychotic psychiatric condition. Their results indicated that the uremic and neurological group was equal in the overall level of neuropsychological impairment and that were significantly more impaired than the medical-psychiatric group. However, the uremia group showed a pattern of deficits that was qualitatively different from both the neurological and medical – psychiatric groups. In a further study the group also compared patients on chronic haemodialysis with undialysed patients with uraemia and a third group of medical – psychiatric patients. The three groups of 16 patients each did not differ significantly in age, education, verbal intelligence, or degree of affective disturbance. Halstead – Reitan Battery subtest comparisons demonstrated that dialysis patients performed significantly better than uraemic patients and were equivalent to medical-psychiatric subjects on tasks of psychomotor problem-solving and spatial ability. Dialysis patients were impaired relative to medical psychiatric patients on a task of flexible thinking. Dialysis patients were impaired relative to medical-psychiatric subjects and equivalent to uraemic patients on tasks which required complex analysis, auditory information processing, language capacities and sensory –perceptual functions. The impairment of language functions observed by the authors seems to be part of the uraemic process; which does not improve with dialysis. Pliskin et al, 1996 in a similar study comparing 16 well dialyzed patients with

12 controls did not find any significant difference. However, they noted a significant deficit in language ability and intelligence in patients who scored well above the median on the BDI. In our study, we also attempted to find out the effect of depression on the intellectual and neuropsychological functions by doing a correlation study of the BDI score with the performance IQ and the clinical subscales of the LNNB before and after renal transplant (table 8).

However, the BDI did not correlate with any of the subscales of the LNNB both pre and post-transplantation. Analysis of results on the Life satisfaction scale (table 9) showed that the majority in both the pre-transplant as well as the post-transplant groups scored in the high range. None of the patients scored low on the Life satisfaction scale. This is surprising especially as patients with ESRD undergo considerable stress due to the diseases. Probably the support extended by the service in the form of attachment to the nearest unit in the station having a renal transplant facility, the availability of out-of-turn accommodation on medical grounds, continuation of employment and free – hospitalization play a major role in achieving high scores on the Life satisfaction scale. Also, this may be a cultural variant where our patients seem generally satisfied with their lives notwithstanding the problems they face. We administered the Life satisfaction scale that seemed to answer the question about the quality of life satisfactorily. Quality of life has been linked to outcome in various studies. However, with our patients being generally satisfied with their lives, this finding could not be corroborated. Religious beliefs may also act as coping

mechanisms and help in improving the quality of life in these patients.

Conclusion

Neuropsychiatric evaluation of patients with ESRD on haemodialysis before and after transplantation revealed that 86.7% of the population was depressed before transplantation. Depression was significantly ameliorated in the post-transplant. The BDI ii was found to be a sensitive and effective tool for detecting depression in this population. Significant differences were observed in the IQ performance as well as the language subscales of LNNB before and after transplant. Life satisfaction scores also showed a significant improvement following renal transplant.

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الجوانب النفسية لمرضى الفشل الكلوى المتأخر مقارنة التغيرات المعرفية والمزاجية قبل وبعد عملية زرع الكلى

لقد أظهرت الدراسات الحديثة وجود تغيرات فى الوظائف المعرفية وأعراض إكتئابية لدى مرضى الفشل الكلوى المتأخر وكذلك ممن أجريت لهم عمليات زراعة الكلى. وهناك دراسات محدودة عن مدى التغير فى الوظائف المعرفية والناحية المزاجية فى مرضى الفشل الكلوى قبل وبعد زراعة الكلى. ولهذا الهدف أجريت هذه الدراسة على ٣٠ مريض من مرضى الفشل الكلوى الذين يخضعون للغسيل الدموى فى دولة الكويت حيث تم مقارنة التغيرات المزاجية والمعرفية فى هؤلاء المرضى قبل شهر وبعد ٣ أشهر من عملية زرع الكلى. وقد أظهرت النتائج أن هناك تحسن ذو دلالة إحصائية فى الحالة المزاجية والقدرات المعرفية مع تحسن فى الاستمتاع بالحياه لدى هؤلاء المرضى.