

Prevalence of Psychiatric Disorders in Children with Chronic Kidney Disease in Zagazig University Hospitals

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ABSTRACT

Background: Psychiatric manifestations as depression, periods of adjustment, low self-Esteem, cognitive dysfunction, anxiety, and attention deficit disorders occur with chronic kidney disease (CKD).

Objective: The aim of the work was to assess the association between psychiatric disorders and chronic kidney disease in Pediatric Nephrology Unit, Zagazig University Children's Hospital.

Patients and Methods: This cross-sectional study included a total of 156 patients with Chronic Kidney Disease, attending at Pediatric Nephrology Unit, Zagazig University Children's Hospital. All patients were subjected to complete history taking and psychiatric assessment of children that was based on the Semi Structured Clinical Interview for Children and Adolescents AGES 6-18 PROTOCOL FORM (SCICA) and the diagnostic and statistical manual of mental disorders 5th edition (DSM-5). **Results:** Among CKD children the prevalence of anxiety was 37.2%, prevalence of eating disorder was 15.4%, prevalence of elimination disorder was 19.2% and prevalence of attention deficit was 43.6%. Prevalence of depression among CKD children was 30.8%. CKD patients on dialysis were more likely to be depressed than the pre-dialysis patients. Prevalence of psychiatric disorders among CKD children was 64.7 %. This study showed that, CKD patients on dialysis were more likely to had psychiatric disorders than the pre-dialysis patients.

Conclusion: Psychiatric disorders were significantly higher in CKD patients. The most common psychiatric comorbidity in CKD patients was attention deficit (43.6%), followed by disruptive disorder (40.4%) and depression (30.8%). Patients with dialysis are significantly more prone to develop psychiatric disorders.

Keywords: Psychiatric Disorders; Children; Chronic Kidney Disease.

INTRODUCTION

Chronic kidney disease (CKD) is defined as an abnormality of kidney function, as determined by laboratory tests, urine analysis, or imaging tests, which have been present for at least 3 months. CKD is under diagnosed and underreported worldwide, partly due to the asymptomatic nature of the disease ⁽¹⁾.

A value called glomerular filtration rate (GFR) is determined to help estimate kidney function. Note that GFR values for CKD staging are for children older than 2 years of age, because the GFR values for children under two are low due to ongoing kidney growth ⁽²⁾.

CKD is the new term defined by the national kidney foundation Kidney Disease and Outcome Quality Initiative KDOQI group to classify any patient who has kidney damage lasting for at least 3 months with or without a decreased GFR or any patient who has a GFR less than 60 ml/min per 1.73 m² lasting for 3 months with or without kidney damage ⁽³⁾.

Generally, these disturbances become clinically manifest with CKD stages 4-5 (GFR > 30 ml/min per 1.73 m²), patients with tubulointerstitial disease, cystic diseases, nephritic syndrome and other conditions associated with "positive" symptoms e.g. polyuria, hematuria, edema) are more likely to develop signs of disease at earlier stages ⁽⁴⁾.

Uremic manifestations in patients with CKD stage 5 are believed to be primarily secondary to an accumulation of multiple toxins. Metabolic acidosis in stage 5 may manifest as Protein-energy malnutrition,

loss of lean body mass, and muscles weakness. Altered salt and water handling by the kidney in CKD can cause peripheral edema and pulmonary edema ⁽⁵⁾.

Psychiatric morbidity is defined as the presence of handicapping abnormalities of emotions, behavior, and relationships that impede personal and social functioning ⁽⁶⁾. Psychiatric manifestations as depression, periods of adjustment, low self-Esteem, cognitive dysfunction, anxiety, and attention deficit disorders occur with CKD ⁽⁷⁾.

Any chronic illness is a potential life crisis for patients and their family. Chronic kidney disease (CKD) is emerging as an important chronic disease globally ⁽⁸⁾.

Advances in medical care, including improvements in dialysis and transplantation, have increased the survival rates for children with chronic renal failure (CRF). This long survival increases the opportunities for the development of psychiatric morbidity among these children ⁽⁹⁾.

The aim of this work was to assess the association between psychiatric disorders and chronic kidney disease in Pediatric Nephrology Unit Zagazig University Children's Hospital.

PATIENTS AND METHODS

This cross-sectional study included a total of 156 patients with Chronic Kidney Disease, attending at Pediatric Nephrology Unit, Zagazig University Children's Hospital. Written informed parental consent



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from every case or their caregivers that participates in this research was taken.

Ethical Consideration:

This study was ethically approved by Institutional Reviewer Board (IRB) in Faculty of Medicine, Zagazig University Hospital

Sample size: By assuming that attendance of children with chronic kidney disease in Zagazig university hospital was 156 patients in 6 months and all was included as a comprehensive sample.

Target population: Children with impairment of the kidney function more than 3 months.

Inclusion criteria: Any patient with impairment of the kidney function more than 3 months:

- ◆ Children with ESRD before and after dialysis
- ◆ Nephrotic syndrome
- ◆ Systemic Lupus Erythematosus (S L E).
- ◆ Renal Tubular Acidosis (R T A).
- ◆ Obstructive uropathy with impairment of kidney function.
- ◆ Persistent microscopic hematuria.

Exclusion criteria:

- ◆ Anatomical brain lesion.
- ◆ Psychiatric disease before onset of renal disease.
- ◆ Family history of psychiatric disease.

All patients were subjected to the following:

1. **Complete history taking** including demographic data (age and sex).
2. **examination**
 - Psychiatric assessment of children was based on the Semi Structured Clinical Interview For Children And Adolescents AGES 6-18 PROTOCOL FORM (SCICA) and the diagnostic and statistical manual of mental disorders 5th edition (DSM-5)
 - The SCICA was designed to sample functioning for nine areas of patient's life: activities, school, job, friends, family relations, fantasies, self perception, feelings and parent/teacher reported problems. The SCICA was not designed to obtain yes/no reports if symptoms, but it utilizes open-ended questions and structured tasks to encourage subjects to talk and behave in ways that will reveal their thoughts, feelings, concerns and interests as well their interaction style in a prototypic mental health assessment situation.

Statistical Analysis

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 24. Descriptive statistics: Mean, Standard deviation (\pm SD) for parametric numerical data. Frequency and percentage of non-numerical data. Analytical statistics: Student T Test was used to assess the statistical significance of the difference between two study group means. Chi-Square

test was used to examine the relationship between two qualitative variables. P value >0.05 is non-significant (N-S). $P<0.05$ is significant (S).

RESULTS

Table 1 shows that there were no statistically significant differences between dialysis patients and predialysis patients regarding sex and residence. Mean age was significantly higher in dialysis than in predialysis. There were no statistically significant differences between dialysis patients and predialysis patients regarding Adjustment, Adjustment with depression and Adjustment with anxiety. Adjustment was present in 55 patients (35.3%), 16 of them in dialysis patients and 39 of them in predialysis patients. Adjustment with depression was present in 29 patients (18.6%), 8 of them in dialysis patients and 21 of them in predialysis patients. Adjustment with anxiety was present in 26 patients (16.7%), 8 of them in dialysis patients and 18 of them in predialysis patients (table 2). Table 3 shows that anxiety was present in 58 patients (37.2%), 15 of them in dialysis patients and 43 of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding anxiety (table 3). Depression was present in 48 patients (30.8%), 17 of them in dialysis patients and 31 of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding depression as (table 4). Eating disorder was present in 24 patients (15.4%), 7 of them in dialysis patients and 17 of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding eating disorder (table 5). Elimination disorder was present in 30 patients (19.2%), all of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding elimination disorder (table 6). Table 7 shows that Attention deficit was present in 68 patients (43.6%), 20 of them in dialysis patients and 48 of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding attention deficit as shown in table (7). Table 8 shows that disruptive disorder was present in 63 patients (40.4%), 21 of them in dialysis patients and 42 of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding disruptive disorder (table 8). Psychiatric disorders was present in 101 patients (64.7%), 25 of them in dialysis patients and 76 of them in predialysis patients. There were no statistically significant differences between dialysis patients and predialysis patients regarding psychiatric disorders (table 9). There were no statistically significant differences between present and absent psychiatric disorders regarding demographic data as shown in table (10).

Table (1): Comparison between Dialysis and Predialysis regarding demographic data.

			Dialysis (No.= 32)	Predialysis (No.= 124)	X ²	P. value
Age (years)	Mean ± SD		13.06 ± 3.37	9.21 ± 2.89	t.test 6.483	.001
sex	Male	No.	13	54	0.089	0.766
		%	40.6%	43.5%		
	Female	No.	19	70		
		%	59.4%	56.5%		
Residence	Urban	No.	12	37	0.693	0.405
		%	37.5%	29.8%		
	Rural	No.	20	87		
		%	62.5%	70.2%		

Table (2): Comparison between Dialysis and Predialysis regarding Adjustment.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Adjustment	present	No.	16	39	55	3.834	.05
		%	50.0%	31.5%	35.3%		
	absent	No.	16	85	101		
		%	50.0%	68.5%	64.7%		
Adjustment with depression	present	No.	8	21	29	1.093	.296
		%	25.0%	16.9%	18.6%		
	absent	No.	24	103	127		
		%	75.0%	83.1%	81.4%		
Adjustment with anxiety	present	No.	8	18	26	2.013	.156
		%	25.0%	14.5%	16.7%		
	absent	No.	24	106	130		
		%	75.0%	85.5%	83.3%		

Table (3): Comparison between Dialysis and Predialysis regarding Anxiety.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Anxiety	Present	No.	15	43	58	1.620	.203
		%	46.9%	34.7%	37.2%		
	absent	No.	17	81	98		
		%	53.1%	65.3%	62.8%		

Table (4): Comparison between Dialysis and Predialysis regarding Depression.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Depression	present	No.	17	31	48	9.445	.002
		%	53.1%	25.0%	30.8%		
	absent	No.	15	93	108		
		%	46.9%	75.0%	69.2%		

Table (5): Comparison between Dialysis and Predialysis regarding Eating disorder

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Eating disorder	present	No.	7	17	24	1.303	.254
		%	21.9%	13.7%	15.4%		
	absent	No.	25	107	132		
		%	78.1%	86.3%	84.6%		

Table (6): Comparison between Dialysis and Predialysis regarding Elimination disorder.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Elimination disorder	present	No.	0	30	30	9.585	.002
		%	.0%	24.2%	19.2%		
	absent	No.	32	94	126		
		%	100.0%	75.8%	80.8%		

Table (7): Comparison between Dialysis and Predialysis regarding Attention deficit.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Attention deficit	present	No.	20	48	68	5.855	.016
		%	62.5%	38.7%	43.6%		
	absent	No.	12	76	88		
		%	37.5%	61.3%	56.4%		

Table (8): Comparison between Dialysis and Predialysis regarding Disruptive disorder.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
Disruptive disorder	present	No.	21	42	63	10.65	.001
		%	65.6%	33.9%	40.4%		
	absent	No.	11	82	93		
		%	34.4%	66.1%	59.6%		

Table (9): Comparison between Dialysis and Predialysis regarding psychiatric disorders.

			Dialysis (No.= 32)	Predialysis (No.= 124)	Total	X ²	P. value
psychiatric disorders	present	No.	25	76	101	3.158	.049
		%	78.1%	61.3%	64.7%		
	absent	No.	7	48	55		
		%	21.9%	38.7%	35.3%		

Table (10): Comparison between present and absent psychiatric disorders regarding demographic data.

			present (No.= 101)	Absent (No.= 55)	X ²	P. value
Age	Mean ± SD		9.797 ± 3.3654	10.373 ± 3.3792	t.test - 1.019-	.310
Sex	male	No.	40	27	1.308	.253
		%	39.6%	49.1%		
	female	No.	61	28		
		%	60.4%	50.9%		
Residence	urban	No.	31	18	.068	.794
		%	30.7%	32.7%		
	rural	No.	70	37		
		%	69.3%	67.3%		

DISCUSSION

In the current study, mean value of age was significantly higher in dialysis than predialysis patients. This agrees with **Shafi and Shafi** ⁽¹⁰⁾ who found that patients with ESRD had higher mean age compared to pre-dialysis CKD patients.

This study showed that, there was no statistically significant difference Dialysis and

Predialysis regarding sex. This disagrees with **Tanvir et al.** ⁽⁶⁾ who stated that hemodialysis patients were found to be more in male sex. Anxiety is an emotional state in which the individual experiences intense fear, uncertainty, and dread from the anticipation of a threatening situation ⁽¹²⁾.

Anxiety disorders are one of the most common emotional disorders in the general population. It is

believed that the prevalence of anxiety disorders among children/adolescents with different chronic medical illnesses is higher compared to their healthy counterpart ⁽¹³⁾.

The rates of anxiety symptoms in pediatric patients range from 7 to 40%, depending on the type of disease, examined group or used methods ⁽¹⁴⁾.

This study demonstrated that prevalence of anxiety among chronic kidney disease children was 37.2% of the studied sample. These results were consistent with the results of **Ng et al.** ⁽¹¹⁾ who followed up 159 patients with CKD, 50 patients (31.8%) had anxiety.

This study showed that, there were no statistically significant difference Dialysis and Predialysis regarding Anxiety. These results were consistent with the results of **Abdel Salam et al.** ⁽¹⁵⁾ who did not find any significant correlation between anxiety and Dialysis or Predialysis.

The importance of anxiety may have been underestimated in HD patients. Notably, anxiety is a common psychological problem that may emerge during the initial course of dialysis. Thus, it is important to identify anxiety symptoms in dialysis patients ⁽¹⁶⁾.

This study demonstrated that prevalence of depression among chronic kidney disease children was 30.8% of the studied sample. Our results are in agreement with **Amira** ⁽¹⁷⁾ who found the prevalence of depression among the CKD patients was 23.7%.

Our results are in agreement also with **Ahlawat et al.** ⁽¹⁸⁾ who found that, about 44% of the patients were found to have depression. Prevalence of depression was found lower than that of the study carried out by **Bossola et al.** ⁽¹⁹⁾.

This study showed that, CKD patients on dialysis were more likely to be depressed than the pre-dialysis patients. Our results are in agreement with **Amira** ⁽¹⁷⁾ who stated that patients on dialysis are at higher risk of depression in comparison to those not on dialysis.

Our results are in agreement also with **Ahlawat et al.** ⁽¹⁸⁾ who found that, patients with on dialysis were more likely to be depressed when compared to those not on dialysis.

Frequency of depression in pre-dialysis CKD patients in our study was 25%, which is comparable to that of study by **Nomani et al.** ⁽²⁰⁾. But, Depression was found in 75-83.8% of hemodialysis patients ⁽²⁰⁾. **Tanvir et al.** ⁽⁶⁾ also found, frequency of depression was to be 48.8-57.3%.

This study demonstrated that prevalence of eating disorder among chronic kidney disease children was 15.4% of the studied sample. There were no statistically significant difference Dialysis and Predialysis regarding Eating disorder. **Bakr et al.** ⁽²¹⁾ found that prevalence of eating disorder among chronic kidney disease children was 5.1%

This study demonstrated that prevalence of elimination disorder among chronic kidney disease

children was 19.2% of the studied sample. **Bakr et al.** ⁽²¹⁾ found that prevalence of elimination disorder among chronic kidney disease children was 2.6%

This study demonstrated that prevalence of attention deficit among chronic kidney disease children was 43.6% of the studied sample. **Chaijan et al.** ⁽²²⁾ found that, ADHD inattentive type was observed in 8 cases (10.6%) with CKD. **Bakr et al.** ⁽²¹⁾ found, prevalence of attention deficit among chronic kidney disease children was 5.3%

This study demonstrated that prevalence of psychiatric disorders among chronic kidney disease children was 64.7 %. This study showed that, CKD patients on dialysis were more likely to had psychiatric disorders than the pre-dialysis patients.

This observation may be explained by the fact that children on dialysis experience more distressing physical symptoms, more medications and investigations and more dependence on machines that could possibly malfunction at any time. Also, they receive more attention from their physicians and parents, meaning more fostered dependency, which decreases the functionality of these children. Accordingly, they realize that their physical health and even life are in danger. This alarms and augments their psychological resources to cope with these stresses. Denial of the illness or its dreadful complications is one of the coping mechanisms of patients with a chronic illness. It serves to reject feelings associated with severe events or thoughts, thus protecting patients against severe anxiety and depression.

Sometimes the impact of biological factors such as the exposure to dialysis and medications as well as the dependency of patients on others at a time when they should be more independent may exceed the capacity of the child to adjust, which dooms such denial mechanisms and leads to the development of many maladaptive behavior patterns exhibited by the dialysis patients. On the other hand, the lower percentage of psychiatric disorders in the predialysis group could be explained by the extensive use of the denial, which acts as a protective psychological mechanism against overwhelming anxiety.

Studies on psychiatric disorders among children with CRF are few in number ⁽²¹⁾. The results of these studies are variable because of the heterogeneity of the cohort of the studied patients as well as the tool of psychiatric assessment. **Fukuniski et al.** ⁽²³⁾ reported that 17 of the 25 (65.4%) Japanese children with ESRD on continuous ambulatory peritoneal dialysis exhibited psychiatric disturbances. **Bakr et al.** ⁽²¹⁾ reported that the prevalence rate of psychiatric disorders among children with CRF was 52.6%. However, psychiatric assessment of 26 British children with end-stage renal failure treated by home HD revealed psychiatric morbidity in 19.2% of the studied children ⁽²⁴⁾.

The high prevalence of these psychiatric disturbances may be explained by the fact that children on dialysis experience more distressing

physical symptoms, more medication and investigations, and more dependence on machines that could possibly malfunction at any time ⁽²¹⁾.

This study demonstrated that, there were no statistically significant difference present and absent psychiatric disorders regarding demographic data. This agrees with **Ramasubramanian *et al.*** ⁽²⁵⁾ study done in India which showed relation between sex and psychiatric illness and showed a similar finding with no statistical difference.

This study demonstrated that, there were no statistically significant difference present and absent psychiatric disorders regarding duration of kidney disease and duration of renal impairment (months) This agrees with **Bakr *et al.*** ⁽²¹⁾ who found, there was no correlation between the psychiatric disorders and age, sex, the duration of CKD, the duration and efficiency of HD.

CONCLUSION

It could be concluded that psychiatric disorders were significantly higher in CKD patients. The most common psychiatric comorbidity in CKD patients was attention deficit (43.6%), followed by disruptive disorder (40.4%) and depression (30.8%). Patients with dialysis are significantly more prone to develop psychiatric disorders. Patients with dialysis had significantly higher attention deficit, disruptive disorder and depression than non-dialysis patients.

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