Psychological Assessment in Children with Chronic Kidney Disease on Regular Hemodialysis

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Abstract

Introduction: Interestingly, health care professionals have the tendency to focus on the biological dimension of the disease or other technical issues related to hemodialysis machine and usually underestimate symptoms from mental sphere. Encouraging patients to express their feelings and addressing their psychological needs may be an essential measure to confront with this debilitating disease. Aim of Study: The objective of our study were to assess the presence, possible factors related and consequences of psychological disorders in children with CKD on regular hemodialysis. Methods: This study was cross sectional study which carried out in nephrology unit of the pediatric department during the period from February 2021 to January 2022.It were comprised (141) children with CKD on regular hemodialysis of both sexes after obtaining informed consent from children's parents. All patients were subjected to history (age, sex, residence, birth order, level of education, socioeconomic status), examination and specific investigations. Results: This study showed that, a male predominance. Regarding anxiety grade, mild were 18 (12.8%), moderate were 54 (38.3%) and severe were 69 (48.9%). Regarding depression grade, mild were 50 (35.5%), moderate were 54 (38.3%), and severe were 19 (13.5%) while no depression was found among 18 (12.8%). There were statistically significant positive correlations between anxiety score and duration of dialysis. There were statistically significant positive correlations between anxiety score and depression score. Conclusion: Frequency of anxiety and depression is high in CKD Patients. There were statistically significant positive correlations between anxiety score and depression score.

Keywords: CKD- hemodialysis - Psychological disorders.

Introduction

Anxiety and depression are common psychiatric disorders among patients undergoing hemodialysis (HD). Several factors seem to trigger anxiety and depression in hemodialysis patients such as co-morbidities, frequent hospitalizations, chronic pain, sleep disturbances, chronic inflammation, increased

fatigue, uremia, failure of family support restrictions in daily life, non-compliance to therapeutic regimen including restrictions in diet and fluids, and dependency upon treatment and health professionals (Gerogianni et al., 2019)

Interestingly, health care professionals have the tendency to focus on the biological dimension of the disease or other technical issues related to hemodialysis machine and usually underestimate symptoms from mental sphere. Encouraging patients to express their feelings and addressing their psychological needs may be an essential measure to confront with this debilitating disease (Vasilopoulou et al., 2015)

Consultation-liaison psychiatry in renal medicine provides a unique experience for the psychiatrist as it provides the opportunity to work with a specialist multi-disciplinary team managing patients with chronic and complex physical problems in in-patient and out-patient settings. 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 (Goyal et al.,2018).

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 (Nazar et al., 2015).

Aim of the study

The objective of our study were to assess the presence, possible factors related and consequences of psychological disorders in children with CKD on regular hemodialysis.

Methods

This study was cross sectional study which carried out in nephrology unit of the pediatric department from February 2021 to January 2022. It was comprised (141) children with CKD on regular hemodialysis of both sexes after obtaining informed written consent from children's parents.

The study were under the following inclusion and exclusion criteria; Inclusion criteria: children with CKD on regular hemodialysis, both sexes, children age from 6 years up to 18 years. Exclusion criteria: children suffering from other chronic diseases, children with neurological diseases, children diagnosed with mental disorders before starting hemodialysis.

All patients included in this study were subjected to: full history taking in form of; Personal history (age, sex, residence, birth order, level of education, socioeconomic status). Present history (cause & duration of the disease, duration of dialysis session, frequency of dialysis, any complains before & after dialysis session, complications of hemodialysis as hypotension, infection & bleeding, used medications. Daily physical activities as:

Nutritional habits, e.g., appetite change in desire or amounts, number of meals per day, and preferred restricted food and types of food prepared for the child at home.

(a) Sleeping patterns, e.g., place of sleeping, number of hours of sleep per day, and naps and sleep problems. (c) Exercise habits. (d) School attendance and achievements

Clinical examination: General examination: vital signs , anthropometric measurements (weight, height, body mass index), face, color (pallor, jaundice, cyanosis), limb edema and skin rash, chest, heart, neurological and Local abdominal examination. Routine laboratory investigations (CBC, serum electrolytes (Na, K, Ca, Po4), kidney function tests and liver function tests).

Self-reporting scales:

(A) Children anxiety scale (Beblawi., 1987):

o This scale consists of 42 items to measure anxiety in children which is considered a group of symptoms which can be classified into 3 groups physiological, behavioral and verbal measures.

o   11 items were added as lie scale to ensure the reliability of answers of these children.

o   If the patient's answers more than 3 degrees on lie scale, this patient is excluded from the study.

o   The total number of items in the scale are 53 and each item consists of one

o   Statement which has two answers yes or no.

o   If the answer is Yes → score 1

o lf the answer is No → score 0

o   Total score ranges from (0-53)

o   According to their scores, they were classified into mild, moderate and severe degree of anxiety as shown in (Table 1).

Past history (complications of hemodialysis as hypotension, infection and bleeding, other diseases and operations, previous medications). Family history (similar conditions, consanguinity, psychiatric conditions, attitude of family, accompanying family member to dialysis session).

(B)   Children depression inventory scale (CDI) (Ghareeb & Beshai., 1989):

o   This scale is designed to assess mood disturbance, ability of enjoyment, growth functions, self-esteem and behavior with others.

o   The scale includes 27 items; each item consists of 3 choices of answers and the patient should choose one.

o   According to the severity, the degrees ranges from 0-2 as follows:

No symptoms = 0, Mild to moderate = 1, Severe symptoms = 2, Total score ranges from (0-54), as shown in (Table 2).

Procedures:

o   This questionnaire was applied individually.

o   Every child had given 2 questionnaire sheets (one for anxiety & the other for depression) & a pen.

o   The questionnaire was explained for all children & how to answer it after having their agreement to share in this study.

o   70% (98 children) answered the questionnaire by themselves.

o   30% (43 children) could not read well so i asked them and wrote their answers in the sheet.

o   The average time for application of the questionnaire differs according to level of education of children and their ability to read and understand the questions.

o   According to anxiety test it took about 15 to 40 minutes.

o   According to depression test it took about 20 to 45 minutes.

o   7 children did not complete the tests because they had finished their sessions and wanted to leave.

o   5 children did not complete the tests because they had complications during dialysis session as hypotension.

o   11 children had more than 3 in lie scale so they were excluded from the study.

o   10 children refused to share because they were tired and not interested in the study.

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 24.0. Armonk, NY: IBM Corp.). Data were presented and suitable analysis was done according to the type of data obtained for each parameter. Mean, Standard deviation (± SD) for parametric numerical data, while Median and range for non- parametric numerical data. Shapiro test was done to test the normality of data distribution. Significant data was considered to be nonparametric. 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. Correlation analysis: To assess the strength of association between two quantitative variables.

Table 1: Children anxiety scale

Children anxiety score	Children anxiety status
<18	Mild
19-28	Moderate
>29	Severe

Table 2: Children depression inventory scale

Depression	Gender	Depression status
0-9		Normal
9-14	Male	Mild
9-16	Female	Mild

14-18	Male	Moderate
16-22	Female	Moderate
>18	Male	Severe
>22	Female	Severe

Results

This cross sectional study was carried out from February 2019 to December 2019. It comprised 141 children with CKD on regular hemodialysis of both sexes after obtaining an informed consent from the children care givers. Ages of the children included in this study ranged from 7 to 18 years and the study shows male predominance as (51.8%) were males. Most of the children were accompanied by their mothers (85.1%) during the dialysis sessions as shown in (Table 3).

Table 3: Demographic data of children undergoing renal dialysis.

Age (years)		Range	Mean ± SD
		7.0 - 18.0	13.13 ± 3.28
		No. (141)	%
Age Categories	7-10	38	27.0
	10 - <14	37	26.2
	>14	66	46.8
Sex	Male	73	51.8
	Female	68	48.2
Residence	Urban	80	56.7
	Rural	61	43.3
School Enrollment	Enrolled	122	86.5
	Not enrolled	19	13.5
Grade	Primary	47	33.3
	Preparatory	45	31.9
	Secondary	30	21.2
Accompanying Person	Mother	120	85.1
	Grand ma	2	1.4
	Father	3	2.1
	No one	15	10.6
	Sister	1	0.7

Regarding anthropometric measurement < 3rd percentile of weight and height were the most frequent as shown in (Table 4). This study shows that unknown causes were the most frequent (35.4%) and trauma was the least frequent (0.7%) cause of renal failure as shown in (Table 5).

Table 4

		Range	Mean ± SD
Weight(kg)		18 - 100	33.37 ± 13.47
Height(cm.)		90 - 170	121.08 ± 21.579
		No.	%
Weight Percentile	< 3	70	49.6
	> 97	2	1.4
	10	14	9.9
	10--25	18	12.8
	25	4	2.8

	25-50	4	2.8
	3	9	6.4
	3--5	4	2.8
	5	7	5.0
	5--10	5	3.5
	50-75	3	2.1
	97	1	.7
Height Percentile	< 3	61	43.3
	10	15	10.6
	10--25	9	6.4
	25	10	7.1
	25-50	1	.7
	3	14	9.9
	5	17	12.1
	5--10	6	4.3
	50	8	5.7

Table 5

		No.	%
	Unknown	50	35.4
	Congenital	31	21.9
	Metabolic	6	4.3
	HUS	7	4.9
Cause of renal failure	Glomerulonephritis	6	4.3
	Nephrotic Syndrome	11	7.8
	Nephrotoxic Drugs	2	1.4
	Obstructive Uropathy	22	15.6
	Trauma	1	0.7
	Vaculitis	5	3.5

Although some patients had abnormal electrolyte levels (calcium, sodium, potassium and phosphorus) the mean values of these electrolytes were within normal ranges. On the other hand the mean level of creatinine and urea were high but the mean level of hemoglobin was low because most of patients were anemic (Table 6).

Table 6: Laboratory investigation among the studied cases

	Range	Mean ± SD
Hemoglobin (g/dL)	6.5 - 15.3	10.07 ± 1.55
Calcium (mg/dL)	3.7 - 17.0	8.51 ± 2.19
Sodium (mEq/L)	125.0 - 160.0	137.64 ± 4.42
Potassium (mmol/L)	2.3 - 8.5	5.88 ± 1.02
Phosphorus (mg/dL)	1.2 - 11.0	4.81 ± 2.11
Urea (mg/dL)	4.9 - 189.0	76.49 ± 31.19
Creatinine (mg/dL)	0.9 - 14.8	7.07 ± 2.17

Among the studied cases sever anxiety was the commonest (48.95) as shown in (Table 7). Regarding depression (12.8%) of cases were normal, (35.5%) were mild, (38.3%) were moderate, (13.5%) were sever as shown in (Table 8). This study shows that mean value of anxiety score was significantly higher among Cases with depression than those without (28.02, 17.72 respectively) $p = 0.000$. there is a high significance correlation between duration of dialysis & depression grade.

Table 7: Anxiety score among the studied cases.

		Range	Mean ± SD
Anxiety Score		9 - 39	26.71 ± 7.85
		No.	%
Anxiety Grade	Mild	18	12.8
	Moderate	54	38.3
	Severe	69	48.9

Table 8: Depression grade among the studied cases.

		Range	Mean ± SD
Depression Score		6 - 29	15.33 ± 5.53
		No.	%
Depression Grade	Normal	18	12.8
	Mild	50	35.5
	Moderate	54	38.3
	Severe	19	13.5

This study shows absolute significant correlations between depression score and (age, weight, height, ca, potassium, po4, urea and duration of dialysis). There were statistically significant negative correlations between depression score & (height). There were no statistically significant correlations between depression score & other numerical data as shown in (Table 9).

Table 9: Correlation between depression score and other numerical data.

Correlation	Pearson's correlation	
	r	p
Age	.347	0.000**
Weight	.352	0.000**
Height	-.222	0.008**
Hemoglobin	.033	0.694
Calcium	-.238	0.004**
Sodium	-.016	0.854
Potassium	.055	0.017*
Phosphorous	126	0.013*
Urea	.209	0.013*
Creatinine	.157	0.062
Duration Of Dialysis	.419	0.000**
Duration Of Session	.139	0.101

This study also shows statistically significant positive correlations between anxiety score & (age, weight, potassium, po4, duration of dialysis & depression score). There were statistically significant negative correlations between anxiety score & (height). There were no statistically significant correlations between anxiety score & other numerical data as shown in (Table 10).

Table 10: Correlation between anxiety score and other numerical data.

Correlation	Pearson's correlation	
	r	p
Age	.309	0.000**
Weight	.311	0.000**
Height	.229	0.006**
Hemoglobin	-.005	0.949
Calcium	-.087	0.306
Sodium	.031	0.716
Potassium	.077	0.036*
Phosphorous	.202	0.016*
Urea	-.061	0.473
Creatinine	.045	0.598
Duration Of Dialysis	.446	0.000**
Duration Of Session /Hour	-.007	0.939
Depression Score	.519	0.000**

Discussion

This study showed a male predominance (51.8%) and females (48.2%). Our results are in agreement with who found the incidence and prevalence of CKD is greater in males than females because of the higher frequency of congenital abnormalities of the kidney and urinary tract (CAKUT) in males (Harambat et al., 2012).

In our work, growth impairment is common among the studied cases as it shows that weight percentile <3 (49.65) and height percentile <3 (43.4%). Our results are in agreement with who found that, growth impairment is a common and perhaps the most visible complication of CKD in children. This finding was in accordance with the study of who found, height was the most severely affected anthropometric parameter in children with CKD on regular HD (92%). On the other hand, data from developed countries generally show a less severe effect on height, and the literature shows that only 36.6%, 47.0% and 43% among children with chronic renal insufficiency, dialysis and transplantation, respectively, have short stature (Seikaly et al., 2016; Lotfy et al., 2015; National Kidney Foundation., 2000).

In the current study, the causes of renal failure among the studied cases, unknown causes were the most frequent (35.4%) followed by congenital causes (21.9%). This is in concordance with the results from, where unknown causes, nephritis, congenital anomalies, posterior urethral valves (PUV) and stones were the most common causes of CRF in Egyptian children (Safouh., 1996).

Also the results are in agreement with who aimed to assess the nutritional status of Egyptian children with end-stage renal disease (ESRD) on regular hemodialysis (HD). Their study included 50 Egyptian children with ESRD on regular HD, following-up at the Pediatric Nephrology unit, Cairo University.

They found that urological disorders, followed by hypoplastic, unknown and glomerular disease, were the most frequent causes of CKD. But the results are in disagreement with who revealed that, primary causes of CKD in children significantly differ from those that are responsible for the adult onset of the disease. In fact, the main etiologic factors of CKD in children are represented by congenital abnormalities of the kidney and urinary tract (CAKUT) (Tsagalis., 2011; Lotfy et al., 2015).

This study showed that, laboratory investigations found that most patients enrolled in the study group had some degree of anemia. A recent review of renal anemia concluded that anemia in CKD is due to two mechanisms; (a) reduced production of erythropoietin in the kidney and (b) due to shortened red cell survival (Vivante &Hildebrandt., 2016) .

This study demonstrated regarding to anxiety score among all studied cases ranged between 9 and 39 with Mean +SD was 26.71 ± 7.85, Regarding anxiety grade, mild were 18 (12.8%), moderate were 54 (38.3%) and sever were 69 (48.9%). The increased level of anxiety-state among patients on HD may be explained by the specificity of this renal replacement therapy. The hemodialysis sessions in themselves are commonly associated with acute feelings of anxiety. According to the studies by anxiety among hemodialyzed patients was triggered when patients arrived for HD treatment, when they heard alarm and machine sound or when new staff connected the patient to dialysis machine. These observations suggest that the modification in the conduct of hemodialysis may reduce some anxiety during the dialysis treatment (Feroze et al., 2012).

Our results are in agreement with who found that, there was a high prevalence rate of anxiety among hemodialysis patients, majority of pediatric patients undergoing hemodialysis were severely anxious (Abdel Salam et al., 2014). They found anxiety (severe '65%', moderate '27.5%', and mild '7.5 %'). 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 (Cukor et al., 2009).

Our results are in agreement with who found anxiety were present in 111 (71.2%) of dialysis patients (Shafi &Shafi., 2017). Yet our results were in disagreement with the results of who followed up 159 patients with CKD, and only 50 patients (31.8%) had anxiety. 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 (Ng et al., 2015). Thus, it is important to identify anxiety symptoms in dialysis patients (Cukor et al., 2009).

This study showed that, regarding to depression score among all studied cases ranged between 6 and 29 with Mean +SD was 15.33 ± 5.53, Regarding depression grade, mild were 50 (35.5%), moderate were 54 (38.3%), and sever were 19 (13.5%) while no depression was found among 18 (12.8%). The exact pathogenesis of depression is still unknown but the genetic and environmental factors are believed to be important (Sullivan et al., 2000).

The higher prevalence of depression in chronic kidney disease (CKD) patients may be related to higher prevalence of comorbid chronic diseases, complications of anemia and vitamin B 12 deficiency, genetic factors, greater mental stress, and hyperinflammatory status. The presence of uremic products may also contribute to depression (Hsu e al., 2013). Our results are in disagreement with who found prevalence of depression (severe '95%' and moderate '5 %') (Abdel Salam et al., 2014).

Our results are in agreement also with Ahlawat et al., 2018 who found that, about 44% of the patients were found to have depression and with Shafi& Shafi 2017 who found depression were present in 113 (72.4%) of patients on hemodialysis. Nomani et al., 2016 had a close resemblance with the current data as they proved that depression is present in 75- 83.8% of children on hemodialysis. However in some studies, frequency of depression was found to be lower (48.8- 57.3%) (Tanvir et al., 2013). Prevalence of depression was found lower than

that of the study carried out by Makara-Studzińska et al., 2011 (66%); (57%); Bossola et al., 2010 (52.5%); (47%). Over 50% of the patients were found depressed according to the study carried out by Lee et al., 2013 and Macaron et al., 2014. This study demonstrated that, there were statistically significant positive correlations between anxiety score and duration of dialysis. A study by Roozbeh et al., 2011 who find significant correlation between anxiety and the duration of HD resembles our results. This is in accordance also with the study by Dziubek, et al., 2016 who found the change in anxiety as a state correlated with the disease duration, duration of dialysis.

In the current study, there were statistically significant positive correlations between anxiety score and depression score. Our results are in agreement with Abdel Salam et al., 2014 who found there was highly significant positive correlation between anxiety and depression. This is in accordance with the study by Dziubek, et al., 2016 who found the change in anxiety was highly significant positive correlated to depression and with El Filali et al., 2017who they found that, there were statistically significant positive correlations between anxiety score and depression score.

The current findings concerning the association between anxiety and depression among patients seems to be consistent with literature. Several explanations may account for this observed association. For instance, an untreated anxiety may lead to depression, and may have a negative effect on interpersonal relationships, thus leading to failure in adapting to demands of this chronic treatment [1].

Conclusion

Frequency of anxiety and depression is high in CKD Patients. There were statistically significant positive correlations between anxiety score and depression score. Many factors contribute to increased anxiety and depression among these patients as complications of hemodialysis, lack of friends, being refused from society, inability to live a normal life as other children, loss of hope to be cured and fear of death. Although frequency of psychological problems among children with CKD, there is no psychological follow up for these patients.

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