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Research Article

Assessment of depressive and anxiety symptoms in Children with Chronic Kidney Diseases

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Abstract

Background: Although psychological impairment as depression and anxiety are prevalent in adults has chronic kidney disease (CKD), less is known about how common these issues in adolescents and children with CKD and their affection on measurements of health-related quality of life. **Aim of the work:** Assess the incidence of depression and anxiety symptoms in children with chronic kidney disease either hemodialysis (HD) maintained or not maintained, and to compare them with healthy children. **Methods:** This study was conducted on 100 children aged 6-12 years, 50 were CKD patients, 30 maintained on HD and 20 not maintained on HD; 50 healthy children (control) from January 2023 to December 2023. The patients were undergone history taking, general examination, laboratory investigations, and subjective assessment of depression and anxiety was done using the Birleson Depression Scale-Questionnaire and Spence Children's Anxiety Scale-(SCAS) respectively. **Results:** Height, weight, and BMI were significantly less in CKD patients on dialysis than other two groups. Depression and anxiety symptoms were significantly higher in CKD patients on dialysis than hemodialysis nondependent patients and control. **Conclusion:** Depression and anxiety disorders are common in children with CKD. Moreover, compared to the children who hemodialysis non-dependent, those on dialysis develop both disorders with higher prevalence rates.

Key words: depression, anxiety, chronic kidney disease, hemodialysis.

Introduction

Chronic kidney disease (CKD) is a clinical syndrome characterized by progressive and irreversible decrease in kidney functions, that gradually progressed to end-stage kidney disease, and it is induced by multiple disorders .[(1)]

Compared to age- and gender-matched groups, children who have been diagnosed with chronic diseases that require lifelong medication and long-term lifestyle modifications have been found to have two to three times greater incidence of serious depression.[(2)]

Garralda et al. [(3)] and Fukunishi & Kudo [(4)] demonstrated that children with CKD often present with higher depressive scores, marked anxiety and worry, school maladjustment and poor relationships with peers.

The burden of the disease, life-long treatment, and costly management are the elements that participate to the mental status alteration of CKD patients [(5)]. Anxiety and depression are the common psychiatric disorders associated with CKD, which is proved to be higher than other chronic diseases. These psychiatric disorders are attributed to repeated hospitalization, uremia, restrictions in diet and fluids, strict pharmacotherapy regimen and repeated infection. Moreover, hemodialysis (HD) adds more burden to children with CKD due to procedure.[(6)]

These psychological disorders may lead to functional impairment, suicidal attempts, compromise of the immune system and worsening of nutritional status, with subsequent increased morbidity and mortality especially with diagnosis of both depression and anxiety in CKD .[7]

Aim of the work :

Determine the prevalence of depressive and anxiety symptoms in children with chronic renal disease who are receiving hemodialysis (HD) or not, and compare them to age and sex matched children in good health.

Patients and Methods:

Patients:

Sample size was calculated by Isaac and Michael (8) formula which was computed as (N= n×30/100) in which (N= sample size) and (n= total number of patients with chronic kidney disease in the past year). The average number of chronic kidney disease children who visited the nephrology unit in Minia University Hospital was 160 in the last year. So, sample size = 160×30/100= 48 .

The study included 100 children; 50 of these patients had chronic kidney disease (CKD), 30 were on HD, and 20 were not; the control group consisted of 50 healthy children of the same age and sex who visited the Minia University hospital's pediatric clinic between January 2023 and December 2023.

Patients aged 6-12 years, children diagnosed kidney diseases with laboratory and imaging study and children on hemodialysis were included in this study. Whereas children less than 6 years or elder than 12 years, or suffering from any other chronic illness were excluded from the study.

Methods:

All studied children were subjected to:

-History taking then general physical examination & anthropometric measures (Weight (kg)، Height, BMI) .

-Birleson Depression self-rating scale for Children (DSRS-C)[9]

The children completed the Arabic version of the DSRS-C questionnaire. If children reported difficulty in reading or understanding the questions, the researcher may help in reading out the statements in a neutral tone of voice to avoid preference in what they wish to hear. DSRS-C has been translated into several languages including Arabic. The scale consists of 18 items, and the child is asked to mark their response for each item in the box that corresponds to their condition. These boxes are labeled as (No, Sometimes, Always). Responses to questions are simply scored in the direction of disturbance, i.e. non-depressive items score 0, depressive items score 2, "sometimes" items score 1. A total score is obtained by adding the scores. No typical child should have a score exceeding 11. However, clinically diagnosed children experiencing depression may have a total score of 17 or more.

-Spence Children's Anxiety Scale-(SCAS).[10]

It is a 45-item self-report measure used to gauge how severe children's anxiety symptoms are. The children completed the Arabic version of the questionnaire which was translated and validated for this population and culture. The researcher may assist in reading the statements to children who have expressed difficulties understanding or reading the questions, but it should be done in a neutral tone of voice to prevent preference for what the researcher wants to hear. The SCAS-Child, consists of six subscales which assess six anxiety dimensions, giving six sub-scale scores and the overall raw score, which ranges from 0 to 114. Severe anxiety symptoms are indicated by higher scores. These scores are transformed into percentiles according to age and gender. Clinically significant anxiety symptoms are indicated by a percentile score of 84 or higher for any subscale score or the overall SCAS score.

Procedures of the study:

Following Minia University Hospital for Children Committee's approval regarding the use of the study instruments on the study participants, we conducted routine visits to the pediatric outpatient clinic beginning in January 2023 to complete patient data sheets and questionnaires, which took approximately fifteen minutes each tool .

Ethical considerations:

This study was approved byMinia University Faculty of Medicine's Research Ethics Committee with ethical approval No. (634). Additionally, all patients' parents gave their informed written consent to participate in the

study after being fully informed of its purpose and methods.

Statistical analysis:
Descriptive statistics were calculated using SPSS V.25 as numbers and percentages for categorical variables and the mean ± SD for continuous variables. One-way ANOVA was used for continuous variables, and the chi-square test was used to analyze group differences in categorical variables. In every study, a significance level of less than 0.05 was used.

Results:
Concerning demographic data, the three studied groups (CKD children on HD, CKD children not on HD & control) were comparable to each other regarding age, sex, and residence (p value = 0.64, 0.36, 0.55 respectively). While there is significant difference between studied groups regarding weight, height, and BMI (p value = 0.001 for all of them) as CKD children had less weight, height and BMI compared to control, also CKD children on HD had less weight, height and BMI compared to CKD children not on HD (table 1).
The incidence of depressive and anxiety symptoms was reported to be significantly higher in CKD children on HD than CKD children not dialysis dependent and both of them were higher than control (p value <0.05) as (23.3% & 20%) of CKD children on HD had depressive and anxiety symptoms compared to (15% & 15%) in non-dialysis dependent CKD children and (4%& 2%) in control as illustrated in table.(2)

Table (3) shows the comparison of demographic data in-between cases with depression and cases without depression, it was found that there is statistically significant difference regarding height percentile (p value <0.05) as the majority of cases with depression had height less than the third percentile (91.7%) and the remaining cases had height percentile from 3 to 10 (8.3%) compared to only 8% and 48.9% among cases without depression .

On other hand, there is non-statistically significant difference regarding age, gender, residence, weight, and BMI (p value >0.05), however, percentage of females among cases with depression were slightly higher (58.3%). Also, percentage of rural residents among cases with depression was slightly higher .(%58.3)

Regarding the comparison of demographic data between cases with anxiety and cases without anxiety, it was found that there is statistically significant difference regarding height percentile (p value <0.05) as the majority of cases with anxiety had height less than the third percentile (70%) and the remaining cases had height percentile from 3 to 10 (30%) compared to only 12.2% and 45.6% among cases without anxiety .

On other hand, there is non-statistically significant difference regarding age, gender, residence, weight, and BMI (p value >0.05), however, percentage of females among cases with anxiety were higher (70%). Also, percentage of urban residents among cases with anxiety was slightly higher (80%) as shown in table (4).

Table (1): Demographic data between the studied groups.

		CKD on hemodialysis *(n=30)*	***CKD not on hemodialysis*** *(n=20)*	***Control*** *(n=50)*	***P value***
Age *(years)*	*Mean ± SD* *Median (Range)*	10.2± 1.8 10(6:12)	9.5 ± 2.5 10.5(6:12)	9.6 ± 2.2 10(6:12)	0.64
Sex	*Male*	21(70%)	12(60%)	*27(54%)*	0.36
	Female	9(30%)	8(40%)	*23(46%)*	
Residence	*Urban*	18(60%)	10(50%)	*32(64%)*	0.55
	Rural	12(40%)	10(50%)	*18(36%)*	
Weight	*Mean ± SD* *Median (Range)*	26.5 ±7.5 27(14.5:40)	37.1 ±13.2 36.5(20:61)	*40.5* ±8.3 40(27:55)	0.001*

Post hoc analysis: p1= (0.001*), p2(<0.001*), p3(0.13)					
Height	*Mean ± SD* *Median (Range)*	109.5 ±18.5 100(85:150)	124.2 ±23.2 122.5(70:160)	*125* ±15.5 120(100:150)	**<0.001***
Post hoc analysis: p1(<0.001), p2(0.002*), p3(0.82)*					
BMI	*Mean ± SD* *Median (Range)*	22.8 ±6.4 21(14.2:35.1)	24.1 ±6.2 23(14:37)	*26* ±3 261(21:31)	**0.001***
Post hoc analysis: p1(0.25), p2(<0.001*), p3(0.04*)					

**mean significant difference at p value <0.05*
P1 mean p value between CKD on dialysis and not on dialysis
P2 mean p value between CKD on dialysis and control
P3 mean p value between CKD not on dialysis and control

Table (2): Comparison between the three groups regarding depression and anxiety disorder

	CKD on hemodialysis (n=30)	***CKD not on hemodialysis (n=20)***	***Control (n=50)***	***P value***
Total score of DSRS-C ***Depression*** ***No***	 7(23.3%) 23(76.7%)	 3(15%) 17(85%)	 2(4%) 48(96%)	0.03*
Total score of SCAS ***Anxiety*** ***No***	 6(20%) 24(80%)	 3(15%) 17(85%)	 *1(2%)* *49(98%)*	0.02*

**mean significant difference at p value <0.05*

Table (3): Comparison of demographic data regarding depression

Demographic data		***Cases without depression*** *(n=88)*	***Cases with depression*** *(n=12)*	***P value***
Age *(years)*	*Mean ± SD* *Median (Range)*	9.6±2.4 10.2(6:12)	9.8 ± 2.1 10(6:12)	0.75
Sex	*Male*	55(62.5%)	5(41.7%)	0.16
	Female	33(37.5%)	7(58.3%)	
Residence	*Urban*	55(62.5%)	5(41.7%)	0.16
	Rural	33(37.5%)	7(58.3%)	
Weight	*Mean ± SD* *Median (Range)*	31±13.5 28.7(15-60)	36.4 ±10.6 37(14.5:61)	0.11
Height	*Mean ± SD* *Median (Range)*	114.9 ±23.7 110(85-160)	120.9 ±18.7 120(70-155)	0.31
Height percentile	*<3* *3-10* *10-50* *51-97*	7(8%) 43(48.9%) 23(26.1%) 15(17%)	11(91.7%) 1(8.3%) 0(0%) 0(0%)	<0.001*
BMI	*Mean ± SD* *Median (Range)*	23.3 ±7 22.4(14.2-40)	23.3 ±6.2 22.7(13.8:44.8)	0.99

Table (4): Comparison of demographic data regarding anxiety

Demographic data		***Cases without anxiety*** *(n=90)*	***Cases with anxiety*** *(n=10)*	***P value***
Age *(years)*	*Mean ± SD* *Median (Range)*	8.8±2 9(6:12)	9.9 ± 2.1 10.7(6:12)	0.12
Sex	*Male*	57(63.3%)	3(30%)	0.08
	Female	33(36.7%)	7(70%)	
Residence	*Urban*	52(57.8%)	8(80%)	0.17
	Rural	38(42.2%)	2(20%)	
Weight	*Mean ± SD* *Median (Range)*	31.3±14.8 29.5(15-60)	36.3 ±10.5 37(14.5:61)	0.17
Height	*Mean ± SD* *Median (Range)*	114.9 ±23.2 108.5(90-160)	120.8 ±18.9 120(70-155)	0.36
Height percentile	*<3* *3-10* *10-50* *51-97*	11(12.2%) 41(45.6%) 23(25.6%) 15(16.7%)	7(70%) 3(30%) 0(0%) 0(0%)	<0.001*
BMI	*Mean ± SD* *Median (Range)*	22.22±3.5 21(18.5-30)	23.5 ±6.8 23(13.8-44.8)	0.40

Discussion

Anxiety and depressive symptoms are common issue in particular, especially in cases with advanced disease [(11)]. Therefore, this study aimed to assess the prevalence of depressive and anxiety symptoms in children with chronic kidney disease either maintained on hemodialysis (HD) or not maintained and to compare them with age and sex matched healthy children.

In terms of demographic data, our study found no significant differences between studied groups regarding age, gender, and residency, but there is a significant difference in weight, height, and BMI between studied groups as CKD children had less weight, height, and BMI compared to controls, in addition CKD children on HD had less weight, height, and BMI compared to CKD children not on HD

This was in agreement with Gotta et al. [(12)], who reported low BMI and short stature among their patients due to chronic hypoxia and anemia. Therefore, for many years, the goal of managing chronic kidney disease in children has been to maximize development and eventual adult height because growth failure and short stature are clinically evident in those patients and cause anxiety for children, families, and doctors. The body's response to chronic hypoxia may involve alterations in metabolism and nutrient utilization, leading to lower BMI. Additionally, Gotta et al. [(12)], found that anemia's influence on diminished energy levels and appetite can contribute to poor nutritional intake and hinder growth. Addressing these issues in pediatric CKD patients requires a comprehensive approach, including targeted interventions to manage anemia, optimize oxygenation, and ensure adequate nutritional support to promote healthy growth and development .

The occurrence of both depression and anxiety symptoms was significantly elevated in CKD children undergoing HD in comparison to those not dependent on dialysis, and both CKD groups exhibited higher rates than the control group. This was in agreement with Afifi et al. [(13)] who reported that prevalence of depression and anxiety symptoms was significantly higher in CKD children on HD than CKD children not on HD.

The prevalence of depression and anxiety reported in our study was 23.3% and 20% consequently in CKD children on HD, in comparison to 15% and 15% in non-dialysis

dependent CKD children, and 4% and 2% in the control group. These results coincide with khan et al. [14] regarding depression as it was observed in 19.2% of children with CKD, while they reported higher prevalence of anxiety than our results (32.2 %) of the CKD patients.

In the same direction, Rasheed et al. [15] revealed that anxiety and depression prevalence among CKD children was 37.2% and 30.8% consequently of the studied children admitted to Pediatric Nephrology Unit, Zagazig University.

On the other hand, Shafi & Shafi [16] reported higher prevalence of depression and anxiety 72.4 % and 71.2 % respectively of children in Pakistan on HD than our study. They attributed this high prevalence in both anxiety and depression to different geographic distribution with different socio-economic factors.

The high prevalence of depression and anxiety in children with CKD can be attributed to the nature of being diagnosed with chronic disease which impact the life of the child from several aspects; as decreased in level of energy which impact his physical activity, need to avoid special types of food, fear of parent about the child health that led to several more restrictions, presence of external stressors, socioeconomic factors, and degree of familial and peer support [17. 18]

Our results revealed that height percentile was significantly affected either in cases with depression or anxiety more than cases without; this aligns with Afifi et al. [13] who reported statistically significant negative correlations among depression and anxiety with height.

Growth retardation is a hallmark in CKD as mentioned by Dieter [19], its pathogenesis is multifactorial, may be due to poor nutrition, anemia, electrolyte disturbance and growth hormone insensitivity associated with CKD with mineral and bone disturbance. Those patients suffer from decrease self-esteem related to self-imaging issues with subsequent development of psychological disturbance as depression and anxiety .[20]

These results revealed that age, gender, residence, weight and BMI had insignificant difference in-between children with and without depression, and also among children with and without anxiety. These data are partially comparable with Afifi et al. [13] who stated that weight is significantly correlated negatively with depression and anxiety, but age has no significant difference.

Moreover, these results concluded that females developed depression and anxiety more than males, this is in accordance with Kogon et al. [21] who mentioned that the males with CKD had a lower prevalence of depression than the girls with CKD. This can be explained due to differences in brain chemistry and hormones as well as how men and women tend to cope with stress differently [22] .

It should be noted that HD subgroup exhibits a higher prevalence of anxiety and depression, which may be explained by Gadia et al [6] due to burden of the dialysis procedure added to repeated hospitalization, uremia, restrictions in diet and fluids, strict pharmacotherapy regimen and repeated infection.

Conclusions:

Based on our results, we conclude that depressive and anxiety symptoms are commonly associated with CKD, more over hemodialysis causes more impairment than non-dialysis dependent patients indicating the need for specialized therapies and psychological support for those children in order to address, treat and improve the mental health issues they may suffer from.

References

1. Lelii M, Senatore L., Paglialonga F., Consolo S., Montini G., Rocchi A., et al., (2023): Respiratory complications and sleep disorders in children with chronic kidney disease: A correlation often underestimated. Paediatric Respiratory Reviews; 45: 16-22.
2. Ali, S., Stone, M. A., Peters, J. L., Davies, M. J., & Khunti, K. (2006): The prevalence of co-morbid depression in adults with Type 2 diabetes: a systematic review and meta-analysis. Diabetic medicine; 23(11): 1165-1173.
3. Garralda, M. E., Jameson, R. A., Reynolds, J. M., & Postlethwaite, R. J. (1988). Psychiatric adjustment in children with chronic renal failure. Journal of Child Psychology and Psychiatry; 29(1): 79-90.
4. Fukunishi, I., & Kudo, H. (1995): Psychiatric problems of pediatric end-stage renal failure. General hospital psychiatry; 17(1): 32-36.
5. Alshelleh, S., Alhouri, A., Taifour, A. et al. (2022): Prevalence of depression and anxiety with their effect on quality of life in

chronic kidney disease patients. Sci Rep 12; 17627

6. Gadia P, Awasthi A, Jain S, Koolwal GD. (2020): Depression and anxiety in patients of chronic kidney disease undergoing haemodialysis: A study from western Rajasthan. J Family Med Prim Care;9:4282-6.
7. Aggarwal, H. K., Jain, D., Dabas, G. & Yadav, R. K. (2017): Prevalence of depression, anxiety and insomnia in chronic kidney disease patients and their co-relation with the demographic variables. Prilozi; 38(2): 35–44.
8. Isaac,S , and Michael, W.B. (1995). Handbook in research and evaluation: A collection of orinciples, methods and strategies useful in the planning, design, and evaluation of studies in education and the behavioral sciences (3rd ed.) EdITS Publisher.
9. Birleson P. Hudson I, Grey-Buchanan D, Wolff S. (1987): Clinical Evaluation of a SelfRating Scale for Depressive Disorder in Childhood (Depression Self-Rating Scale). J. Child Psychol. Psychiat; 28: 43-60.
10. Spence, S. H. (1997). Spence Children′s Anxiety Scale (SCAS) [Database record]. PsycTESTS.
11. Ali FKE, Abdelaziz FS, Elmawafie SM (2024): Assessment of Anxiety and Stress Levels in Children Undergoing Hemodialysis. Egyptian Journal of Health Care, ;15 (1): 1-21.
12. Gotta, V., Marsenic, O., & Pfister, M. (2018): Age-and weight-based differences in haemodialysis prescription and delivery in children, adolescents and young adults. Nephrology Dialysis Transplantation; 33(9): 1649-1660.
13. Afifi WE, El gendySA, El hakim RA, et al., (2020): psychological assessment in children with chronic kidney disease on regular hemodialysis. The journal of Egyptian society of pediatric nephrology and transplantation; 15 (2): 48-59.
14. Khan A, Amin S, Ahmad S, Khan M S A (2022): Prevalence of Depression and Anxiety in Chronic Kidney Disease Patients on Hemodialysis. Pakistan Journal of Medical & Health Sciences 16(9):403-405..
15. Rasheed E M, Tolba S A R, Raya Y M, El-Nabarawy S H M (2020): Prevalence of Psychiatric Disorders in Children with Chronic Kidney Disease in Zagazig University Hospitals. The Egyptian Journal of Hospital Medicine; 80 (3): 1054-1059.
16. Shafi, S. T., and Shafi, T. A (2017): comparison of anxiety and depression between pre-dialysis chronic kidney disease patients and hemodialysis patients using hospital anxiety and depression scale. Pakistan Journal of Medical Sciences; 33(4): pp876–880.
17. Clavé, S., Tsimaratos, M., Boucekine, M., Ranchin, B., Salomon, R., Dunand, O., ... & Berbis, J. (2019). Quality of life in adolescents with chronic kidney disease who initiate haemodialysis treatment. BMC nephrology, 20, 1-10.
18. Abrão, R. O., Lopes, M., Silva, G. J., Ferraro, A. A., & Koch, V. H. (2021). Study of the association between generic and disease-specific quality of life and behavior problems in pediatric patients with chronic kidney disease stage 3 or higher and the quality of life and mental health of their primary caregivers. Pediatric Nephrology, 36, 3201-3210.
19. Dieter H (2020): Strategies for Optimizing Growth in Children With Chronic Kidney Disease. Frontiers in Pediatrics; 8: (399): 1-10.
20. Dryjańska N and Kiliś-Pstrusińska K (2023): Depression in Children and Adolescents with Chronic Kidney Disease—Review of Available Literature. J Clin Med. ; 12(10): 3554.
21. Kogon A J, Stoep A V, Weiss N S, Smith J, Flynn J T, and McCauley E (2013): Depression and its associated factors in pediatric chronic kidney disease. Pediatr Nephrol.; 28(9): 1855–1861
22. Albert, P. R. (2015). Why is depression more prevalent in women?. Journal of Psychiatry and Neuroscience, 40(4), 219-221.