Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care
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Sleep Disorder and Health-Related Quality of Life in Pediatric Chronic Kidney Disease

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Case Study : Children with chronic kidney disease (CKD) often experience reduced health-related quality of life (HRQoL) and sleep disturbances, especially in advanced stages or on hemodialysis. Sleep problems can further impair daily functioning, emotional well-being, and cognition. This study aimed to assess the prevalence of sleep disorders and HRQoL in pediatric CKD patients and examine the impact of CKD stage and treatment modality on these outcomes. Mthods: across-sectional study included 100 children and adolescents (5–18 years) with CKD stages 2–5 at our Pediatric Dialysis and Nephrology Unit, Children's Hospital,Cairo-Egypt. Participants were grouped into conservatively managed CKD (stages 2–5) and stage 5 on hemodialysis ≥6 months. All underwent clinical, anthropometric, and laboratory assessments, including CBC, electrolytes, metabolic bone profile, and eGFR (Schwartz formula). Sleep quality and HRQoL were evaluated using the Arabic Children's Sleep Habits Questionnaire and PedsQL 4.0, respectively. Results: The mean age was 10.88 ± 2.4 years, with 55% males, and most patients (79%) were in CKD stage 5. Children on HD had significantly lower weight and height SDS and higher systolic blood pressure than those on conservative management. Sleep disorders were highly prevalent (96%), and 31% of patients had impaired HRQoL, particularly in school and physical functioning domains. HD patients showed significantly poorer sleep quality and lower HRQoL across all domains. Impaired HRQoL was associated with shorter CKD duration, CKD stage, higher anthropometric SDS, lower iPTH and ALP levels, and worse kidney function. Multivariate analysis identified poor sleep quality was the only independent predictor of impaired HRQoL (OR = 0.76; 95% CI: 0.66–0.86; $p < 0.001$). Conclusion: Sleep disturbances are highly prevalent in pediatric CKD and are the strongest predictor of impaired HRQoL, especially in children on hemodialysis. Addressing sleep problems may be key to improving quality of life, regardless of disease severity.

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Table 1: Behavior assessment scores between two study groups.

Behavior assessment			Groups		Statistical tests	
			CKD 2-5 (n= 50)	CKD5d (n= 50)	value	p-value
CHSQ		Mean ± SD Range	51.94 ± 7.91 (37 - 71)	59.54 ± 7.44 (41 - 73)	***t*=** -4.949	<0.001
Sleep disorder (≥ 41) (n, %)			47 (94%)	49 (98%)	FE	0.617
Peds QL 4.0	Physical	Median (IQR) Range	71 (44 - 81) (7 - 100)	40.5 (25 - 53) (6 - 94)	***z*=** -3.956	<0.001
	Emotional	Median (IQR) Range	80 (60 - 90) (0 - 100)	45 (25 - 65) (0 - 95)	***z*=** -4.495	<0.001
	Social	Median (IQR) Range	80 (60 - 95) (40 - 100)	60 (40 - 75) (0 - 100)	***z*=** -4.319	<0.001
	School	Median (IQR) Range	60 (35 - 70) (0 - 100)	25 (10 - 55) (0 - 95)	***z*=** -3.455	0.001
	Total	Median (IQR) Range	72 (54 - 79) (18 - 95)	43.5 (31 - 57) (5 - 96)	***z*=** -5.237	<0.001
HRQoL (n, %)	Impaired HRQoL		25 (50%)	6 (12%)	***X²*=** 16.877	<0.001
	Good HRQoL		25 (50%)	44 (88%)		

*Student t-test of significance (t), *Fisher's Exact test of significance (FE), *Mann-Whitney test of significance (z), *Chi-Square test of significance (X^2).
CKD: chronic kidney disease, CKD5d: chronic kidney disease grade 5 on hemodialysis, CHSQ: Children's Sleep Habits Questionnaire, HRQoL: health related quality of life, IQR: interquartile range, PedsQL 4.0: Pediatric Quality of Life Inventory, Version 4.0, SD: standard deviation.

Table 21: Relation between sleep assessment score and HRQoL.

Variables		HRQoL		Statistical tests	
		Impaired (n= 31)	Good (n= 69)		
		Median (IQR) N (%)	Median (IQR) N (%)	value	p-value
CHSQ		47.94 ± 4.88	59.25 ± 7.45	***t*=** -9.023	<0.001
Sleep disorder (≥ 41)	Had sleep disorder	28 (90.32%)	68 (98.55%)	FE	0.087
	Hadn't sleep disorder	3 (9.68%)	1 (1.45%)		

*Student t-test of significance (t), *Mann-Whitney test of significance (z), *Fisher's Exact test of significance (FE).
HRQoL: Health related quality of life, SD: standard deviation