Brief Communication

Comparison of quality of life in children undergoing peritoneal dialysis versus hemodialysis

Ola A. Alhusaini, MD, Lamis A. Wayyani, MD, Hadeer E. Dafterdar, MD, Mariyah M. Gamlo, MD, Zainab A. Alkhayat, MD, Abeer S. Alghamdi, MD, Osama Y. Safdar, MBBS, FRCP.

ABSTRACT

Objectives: To record pediatric end stage renal disease (ESRD) patients' quality of life (QOL) in relation to peritoneal dialysis (PD) and hemodialysis (HD). Chronic kidney disease is a rising global epidemic yielding worldwide prevalence of 11-13%. It could possibly lead to ESRD, thus imposing serious burdens on patients and reducing their QOL. These burdens may affect their family members as well.

Methods: This cross-sectional study examined 23 pediatric ESRD patients aged 2-18 years who were undergoing peritoneal dialysis and hemodialysis at King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia, in July 2018. Data were collected using the validated Pediatric Quality of Life Inventory™ 3.0 ESRD Module questionnaire.

Results: The sample included HD (n=9, 40.9%) and PD (n=14, 60.9%) patients. According to the parent-proxy report, we found that the QOL among PD pediatric patients was significantly higher than HD patients (p=0.045). Also, male HD patients had a significantly better QOL on the interaction subscale (70.83±15.95 compared to 30.00±24.00 for females [p=0.023]).

Conclusion: Quality of life was found to be better among PD pediatric patients in King Abdulaziz University Hospital, Kingdom of Saudi Arabia.

Saudi Med J 2019; Vol. 40 (8): 840-843
doi:10.15537/smj.2019.7.12747

Chronic kidney disease (CKD) is indicated by a glomerular filtration rate (GFR) of <60 for 3 months or more or a GFR of >60 in the presence of kidney damage, which could also manifest as high levels of urine albumin.[1] When GFR is below 15, end stage renal disease (ESRD)is identified.[2] Chronic kidney disease has increasingly become a global epidemic leading to ESRD, with a prevalence of 11-13%.[3] Quality of life (QOL), is one of the prognostic indicator for ESRD.It is defined by the World Health Organization as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships, and their relationship to salient features of their environment".[4] Quality of life questionnaires have been used on other pediatric patients with different chronic diseases; however, ESRD patients showed a significant lower QOL in comparison with children with other chronic illnesses, regardless of the treatment method.[5]

According to previous studies, ESRD can affect multiple organ systems; therefore, it significantly affects QOL. End stage renal disease patients are at greater risk of having cardiovascular diseases, hypertension, and psychosocial problems. Numerous international studies have been conducted and aimed at comprehending the factors associated with ESRD patients' better QOL.[6]

Studies showed that there were no differences between peritoneal dialysis (PD) and hemodialysis (HD) modalities, denoting that PD patients are more fulfilled with the type of care they receive.[7]

Despite the number of international studies conducted on this subject, there is still a paucity of information on the national level. Here, we attempt to bridge this gap through a study to record the QOL among pediatric ESRD patients on PD and HD.

Methods. Ethical approval was obtained from the Biomedical Ethics of King Abdulaziz University Hospital (KAUH), Riyadh, Saudi Arabia (reference number 210-18). A cross-sectional study was conducted at the Department of Pediatric Nephrology, King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia in July 2018. Pediatric patients with ESRD aged from 2 to 18 years old who were undergoing HD and peritoneal PD were included. We started with a sample size of 28 patients, and 23 were included in this study. Five children were excluded due to unavailability or parent refusal.

The validated Pediatric Quality of Life Inventory™ (PedsQL™) version 3.0 ESRD Module questionnaire developed by Varni,[8] which has been used previously in several studies, was used in this study. It includes questions for both parents and their children ages 5

Disclosure. Authors have no conflict of interests, and the work was not supported or funded by any drug company.

to 18 years. This questionnaire consists of 34 items on 7 scales: general fatigue, about my kidney disease, treatment problems, family and peer interaction, worry, perceived physical appearance, and communication. The parent's form contained the same items as the children's questionnaire, but from the parent's perspective.

Three-step linguistic validation of the Arabic translation was based on PedsQL protocol, as follows: 2 forward translations from English into Arabic were made by a bilingual expert, and then one Arabic version was chosen by the principal investigator; a backward translation was carried out by another bilingual expert; and then the translation underwent; patient testing.[9]

The questionnaire was orally administered by medical students. Verbal informed consent from parents and child assent were obtained.

Statistical analysis was carried out by using the Statistical Package for Social Sciences version 21 (IBM Corp., Armonk, NY, USA). Independent T-tests and one-way ANOVAs were conducted, and a $p<0.05$ was considered significant.

Results. This study was conducted in 23 children aged 2 to 18 years who were chosen through convenience sampling. The sample included patients who were undergoing HD (n=9, 40.9%) and PD (n=14, 60.9%) at King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia. For 10 patients, only parent proxy-reports were available. On the contrary, 11 patients had both parent proxy-reports as well as child self-reports available. **Table 1** shows the participants' characteristics according to treatment modality. **Table 2** shows the parents' characteristics.

Quality of life. Parental proxy-reports. Parents of PD patients reported significantly higher scores (63.32±21.18) (p=0.045), indicating a higher QOL. However, those of HD patients reported lower scores (45.66±16.14), indicating a lower QOL. Additionally, parents of PD patients demonstrate significantly higher scores in both the interaction (p=0.036) and communication (p=0.014) subscales. For the remaining domains, no other significant differences were noted.

A significant difference was noted in terms of gender and academic delay. Parents of male HD patients reported higher scores in the interaction subscale (70.83±15.95) than did the parents of female patients (30.00±24.00) (p=0.023). Additionally, parents of academically delayed PD patients reported that their children had higher scores in the appearance subscale (78.33±16.24) compared with parents whose children were not delayed (36.66±25.00) (p=0.012). For HD patients, preschool children had better scores on the treatment subscale (68.75±17.67) than did school age children with academic delay (43.75±13.97) or without academic delay (12.50±17.67) (p=0.024).

Table 1 - Patient characteristics according to treatment modality groups (N=23).

Characteristics	PD (n=14)	HD (n=9)
Nationality		
Saudi	1 (20)	1 (16.7)
Non-Saudi	4 (80)	5 (83.3)
Gender		
Male	10 (71.4)	4 (44.4)
Female	4 (28.6)	5 (55.6)
Age (years)		
2-4 (toddler)	3 (21.4)	-
5-7 (young child)	3 (21.4)	2 (22.2)
8-12 (child)	6 (42.9)	2 (22.2)
13-18 (adolescent)	2 (14.3)	5 (55.6)
Age at diagnosis of ESRD		
<4	6 (42.9)	1 (11.1)
≥4	8 (57.1)	8 (88.9)
Duration of illness		
<5	12 (85.7)	4 (44.4)
≥5	2 (14.3)	5 (55.6)
Comorbidity		
Yes	12 (85.7)	8 (88.9)
No	2 (14.3)	1 (11.1)
Academic delay		
Yes	5 (35.7)	5 (55.6)
No	5 (35.7)	2 (22.2)
Preschooler (2-5 years)	4 (28.6)	2 (22.2)
Parent marital status		
Married	12 (85.7)	8 (88.9)
Divorced	1 (7.1)	1 (11.1)
Widow	1 (7.1)	-

Values are presented as number and percentage (%).
ESRD - end stage renal disease, PD - peritoneal dialysis, HD - hemodialysis

Table 2 - Parent characteristics of study participants (N=23).

Characteristics	n (%)
Father's age	
<40	7 (30.4)
≥40	15 (65.2)
Educational level of fathers	
High school and below	12 (52.2)
College and above	10 (43.5)
Mother's age	
<40	13 (56.5)
≥40	9 (39.1)
Educational level of mothers	
High school and below	12 (52.2)
College and above	11 (47.8)
Marital status	
Married	20 (87.0)
Divorced	2 (8.7)
Widow	1 (4.3)

Table 3 - Pediatric Quality of Life Inventory™ (PedsQL™) end stage renal disease module scores of the child reports and parent reports.

Renal disease	Parent proxy-report		Child self-report		Difference
	n	Mean±SD	n	Mean±SD	*P*-value
Peritoneal dialysis					
General fatigue	5	51.25 ± 30.07	5	71.25 ± 18.00	0.245
About my kidney disease	5	68.00 ± 18.57	5	76.00 ± 6.51	0.405
Treatment problems	5	56.25 ± 16.53	5	55.00 ± 14.92	0.903
Family and peer interaction	5	68.33 ± 27.88	5	78.33 ± 20.06	0.533
Worry	5	43.00 ± 35.06	5	49.50 ± 4.10	0.701
Perceived physical appearance	5	45.00 ± 32.05	5	73.33 ± 24.57	0.055
Communication	5	63.00 ± 23.87	5	64.00 ± 38.41	0.962
Total score	5	54.55 ± 12.51	5	63.38 ± 11.14	0.273
Hemodialysis					
General fatigue	6	41.66 ± 34.38	6	47.91 ± 32.51	0.753
About my kidney disease	6	53.33 ± 16.32	6	56.66 ± 19.14	0.752
Treatment problems	6	36.45 ± 21.80	6	47.91 ± 36.79	0.527
Family and peer interaction	6	41.66 ± 24.72	6	45.83 ± 40.39	0.834
Worry	6	45.41 ± 22.43	6	49.58 ± 20.51	0.744
Perceived physical appearance	6	70.83 ± 27.74	6	62.50 ± 27.25	0.605
Communication	6	48.33 ± 23.59	6	49.16 ± 29.56	0.958
Total score	6	47.42 ± 16.40	6	50.98 ± 25.94	0.782

Children's self-reports. Children on PD recorded higher scores (63.38±11.14). However, children on HD patients recorded lower scores (50.98±25.94) (p=0.349). Similarly to the parent proxy-reports, these results demonstrate that PD patients have a higher QOL in all domains except the worry subscale, which is almost equal among the PD (49.50±4.10) and HD (49.85±20.51) patients (p=0.993).

Children's reports versus parents' reports. We compared the results of parent reports with child reports and concluded that the parents recorded lower scores for their children for almost all subscales, as shown in **Table 3.**

Discussion. In this study, we concluded that pediatric patients on PD had a better QOL in comparison to pediatric patients on HD according to the parent proxy-reports. This conclusion is similar to a Korean study of 79 ESRD pediatric patients aged 8 to 18 years using the PedsQL TM 3.0 ESRD Module and PedsQLTM FIM questionnaires.[10] The parent reports showed patients on PD had much better QOL than the HD patients. Our study demonstrated that males had higher scores in the family and peer interaction subscales compared to females. A literature review regarding health-related QOL reported a similar gender difference, and that male patients had higher scores for all subscales, indicating a better QOL.[11] This could be explained by the differences between the 2 genders in terms of handling their emotions. We came upon a unique finding regarding school performance in children. The academically delayed PD patients had better outcomes on the perceived physical appearance subscale. This may be due to the fact that children in this group do not interact with other children in their age group on a regular basis. This could be attributed to the fact that the school attendance rates dramatically dropped. A cross-sectional multicenter study in Europe including 192 children on dialysis using the PedsQL™ 3.0 ESRD Module found that all patients had difficulties in regards to functioning at school subscale (missing school due to hospital visits).[5]

As for HD patients, higher scores have been noted among preschool children on the treatment problems subscale compared to school age children, which might be the result of the parents being responsible for their young children's medication.

In our attempt to compare the parent proxy-reports with the child self-reports, children's QOL scores were reported as lower by parents than what was self-reported by the children. This finding is supported by several studies that also compared parent proxy with child self-reports.[12]

Study limitations. This study was conducted in only one center, King Abdulaziz University Hospital, Jeaddah, Kingdom of Saudi Arabia. Adding examinations of other centers might give better results, as it would increase the sample size. We believe that adding other dialysis centers, increasing the sample size, and using the updated questionnaire SF36 will produce stronger, more conclusive results.

In conclusion, QOL for PD pediatric patients was found to be better than that among HD patients at King Abdulaziz University Hospita, Jeddah, Kingdom of Saudi Arabia. Due to the paucity of studies conducted on this issue, more research is needed to support our current findings.

Acknowledgment. *The authors gratefully acknowledge Editage for English language editing.*

Received 31st March 2019. Accepted 6th June 2019.

From the Pediatric Nephrology Center of Excellence, Faculty of Medicine, King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia.

Address correspondence and reprints request to: Dr. Osama Y. Safdar, Pediatric Nephrology Center of Excellence, Faculty of Medicine, King Abdulaziz University Hospital, Jeddah, Kingdom of Saudi Arabia. E-mail: safderosama@hotmail.com
ORCID ID: orcid.org/0000-0002-7773-6687

References

1. National Kidney Foundation. About chronic kidney disease [Internet]. [Updated 2018; Accessed 2018 June 28]. Available from: https://www.kidney.org/atoz/content/about-chronic-kidney-disease
2. National Kidney Foundation. Dialysis [Internet]. National Kidney Foundation [Updated 2018; Accessed 2018 June 28]. Available from: https://www.kidney.org/atoz/content/dialysisinfo
3. Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, et al. Global prevalence of chronic kidney disease - a systematic review and meta-Analysis. ***PLoS One*** 2016; 11: e0158765.
4. World Health Organization. WHOQOL: Measuring quality of life [Internet]. [Updated 2018; Accessed 2018 June 18]. Available from: https://www.who.int/healthinfo/survey/whoqol-qualityoflife/en/
5. Splinter A, Tjaden LA, Haverman L, Adams B, Collard L, Cransberg K, et al. Children on dialysis as well as renal transplanted children report severely impaired health-related quality of life. ***Qual Life Res*** 2018; 27: 1445-1454.
6. Becherucci F, Roperto RM, Materassi M, Romagnani P. Chronic kidney disease in children. ***Clin Kidney J*** 2016; 9: 583-591.
7. Griva K, Kang AW, Yu ZL, Mooppil NK, Foo M, Chan CM, et al. Quality of life and emotional distress between patients on peritoneal dialysis versus community-based hemodialysis. ***Qual Life Res*** 2014; 23: 57-66.
8. Goldstein SL, Graham N, Warady BA, Seikaly M, McDonald R, Burwinkle TM, et al. Measuring health-related quality of life in children with ESRD: performance of the generic and ESRD-specific instrument of the Pediatric Quality of Life Inventory (PedsQL). ***Am J Kidney Dis*** 2008; 51: 285-297.
9. Varni JW. PedsQL translations [Internet]. [Updated 1998; Accessed 2018 July 18]. Available from: http://www.pedsql.org/translations.html
10. Baek HS, Park KS, Ha IS, Kang HG, Cheong HI, Park YS, et al. Impact of end-stage renal disease in children on their parents. ***Nephrology (Carlton)*** 2018; 23: 764-770.
11. Tjaden LA, Grootenhuis MA, Noordzij M, Groothoff JW. Health-related quality of life in patients with pediatric onset of end-stage renal disease: state of the art and recommendations for clinical practice. ***Pediatr Nephrol*** 2016; 31: 1579-1591.
12. Lopes M, Ferraro A, Koch VH. Health-related quality of life of children and adolescents with CKD stages 4-5 and their caregivers. ***Pediatr Nephrol*** 2014; 29: 1239-1247.