

CLINICAL-EPIDEMIOLOGICAL COMPONENTS OF CHILDREN AND ADOLESCENTS IN HEMODIALYSIS*

Reginaldo Passoni dos Santos¹, Daniele Laís Brandalize Rocha², Vera Hermina Kalika Koch³

¹Nurse. Pontifical Catholic University of Paraná. Toledo-PR-Brazil.

²Nurse. Master in Nursing. Pontifical Catholic University of Paraná. Toledo-PR-Brazil.

³Doctor. Ph.D. in Medicine. University of São Paulo. São Paulo-SP-Brazil.

ABSTRACT: This study aimed to identify the clinical-epidemiological aspects of children and adolescents receiving hemodialysis and was undertaken through a documental investigation. The hospital records of all the patients who received hemodialysis in a pediatric hospital in the state of Paraná, Brazil, in January 2013 were analyzed, using a semistructured script for recording information relating to the clinical-epidemiological variables. The results of the analysis of 22 hospital records indicated a homogenous distribution between the sexes, with 59.1% aged between 11 and 15 years old, 86.1% having received hemodialysis for up to two years, and 59.1% with the arteriovenous fistula (AVF) as the vascular access. The most prevalent causes for Chronic Kidney Disease were congenital anomalies of the urinary tract (45.5%) and systemic hypertension (31.8%). The results allow the specification and directing of preventive, nursing and health actions.

DESCRIPTORS: Renal dialysis; Child's health; Adolescent's health; Epidemiology; Nursing.

COMPONENTES CLÍNICO-EPIDEMIOLÓGICOS DE CRIANÇAS E ADOLESCENTES EM HEMODIÁLISE

RESUMO: Este estudo objetivou identificar os componentes clínico-epidemiológicos de crianças e adolescentes em hemodiálise e foi realizado por meio de investigação documental. Foram analisados os prontuários de todos os pacientes que realizavam hemodiálise em um hospital pediátrico do Estado do Paraná-Brasil em janeiro de 2013, utilizando um roteiro semiestruturado para o registro das informações relativas às variáveis clínico-epidemiológicas. Os resultados da análise de 22 prontuários apontaram distribuição homogênea entre os gêneros, sendo que 59,1% tinham entre 11 e 15 anos, 86,1% tempo de permanência em hemodiálise de até dois anos e 59,1% fístula arteriovenosa como via de acesso vascular. As causas mais prevalentes para a Doença Renal crônica foram anomalias congênitas do trato urológico (45,5%) e hipertensão arterial sistêmica (31,8%). Os resultados possibilitam especificar e direcionar ações de prevenção e de cuidados de enfermagem e de saúde.

DESCRIPTORES: Diálise renal; Saúde da criança; Saúde do adolescente; Epidemiologia; Enfermagem.

COMPONENTES CLÍNICO-EPIDEMIOLÓGICOS DE NIÑOS Y ADOLESCENTES EN HEMODIÁLISIS

RESUMEN: Este estudio tuvo el objetivo de identificar los componentes clínico-epidemiológicos de niños y adolescentes en hemodiálisis y fue realizado por medio de investigación documental. Fueron analizados los prontuarios de todos los pacientes que realizaban hemodiálisis en un hospital pediátrico del estado de Paraná, Brasil, en enero de 2013, utilizándose un guión semiestructurado para el registro de las informaciones referentes a las variables clínico-epidemiológicas. Los resultados del análisis de 22 prontuarios apuntaron distribución homogénea entre los géneros, siendo que 59,1% tenían entre 11 y 15 años, 86,1% tiempo de permanencia en hemodiálisis hasta dos años y 59,1% fístula arteriovenosa como vía de acceso vascular. Las causas más prevalentes para la enfermedad renal crónica fueron anomalías congénitas del aparato trato urológico (45,5%) e hipertensión arterial sistémica (31,8%). Los resultados posibilitan especificar y direccionar acciones de prevención y de cuidados de enfermería y de salud.

DESCRIPTORES: Diálisis renal; Salud del niño; Salud del adolescente; Epidemiología; Enfermería.

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Corresponding author:

Reginaldo Passoni dos Santos
Pontifícia Universidade Católica do Paraná
Avenida da União, 500 - 85902532 Toledo-PR-Brasil
E-mail: regi-pas@hotmail.com

INTRODUCTION

Chronic Kidney Disease (CKD) is an irreversible and silent condition which affects millions of people worldwide. For a person to be diagnosed with CKD, it is necessary for there to be a presentation of kidney damage or a Glomerular Filtration Rate (GFR) <60 mL/min./1.73m² for, at a minimum, three consecutive months⁽¹⁾. Often, reduced kidney function is easily identified by determining the level of markers of the disease present in the blood or urine, as well as through an imaging study. It stands out, however, that for children and adolescents, the GFR must be determined based on an equation which takes into account the creatinine serum concentration and the height and sex of the patient, as the level of serum creatinine on its own must not be used for evaluating kidney function in pediatrics⁽¹⁾.

Due to the fact that reduction in GFR is progressive and slow, it is not rare for CKD only to be noticed when the individual already has a loss of kidney function of over 50%. In this regard, GFR <30 mL/min./1.73m² indicates severely compromised renal function, and the patient must be evaluated for entering a Renal Replacement Therapy (RRT) program⁽¹⁾.

There are currently three modes of RRT: peritoneal dialysis (PD), hemodialysis (HD) and kidney transplant (Tx kidney). In spite of HD being the predominant therapy among patients with CKD undergoing RRT, the choice of the most appropriate mode will depend on various factors, with the identification of the stage of the disease, established according to guidelines elaborated by the National Kidney Foundation, supporting the decision-making regarding the most appropriate mode for each patient⁽¹⁻²⁾.

It is stressed that RRT is a significant burden on the public coffers, with hemodialysis treatment being particularly so. In Brazil, the care for more than 80% of the patients on RRT is financed by the Unified Health System, entailing a cost of millions of reais per year⁽³⁾.

Although it does not require inpatient treatment, in many places, HD occurs within a hospital unit and this causes "[...] great psychological tension for the child/adolescent [...]"^(4:19). For this reason, the care for the patient must be undertaken by a multi-professional

team, aiming to meet all the needs presented⁽⁵⁾.

In this context of multi-professionalism for the care, the role of the nurse is, among others, to establish strategies for the Systematization of the Nursing Care (SNC) for the child and the adolescent on HD, so as to incorporate actions to be undertaken by her team, aiming not only for the technical-scientific quality of the care, but also for the promotion of the quality of life of the patients assisted, through specific and directed interventions⁽⁶⁻⁷⁾. For this it is necessary, in first place, for the team to know its clients' actual characteristics, taking into account that the pediatric patients on HD have specific characteristics which frequently contrast those observed in the adult population⁽⁸⁾.

In relation to the above, in Nephrology, as in the other health sciences, the patient's recovery long ago ceased to depend purely on curative actions. It is indicated as being of great importance that every health professional – regardless of her field – should seek the supporting pillar for her professional exercise in scientific evidence, professional exercise which must be undertaken through innovative care practices, which makes it viable to offer the patient the complete recovery of her physical, mental and social well-being as early as possible⁽⁹⁾.

However, a fairly limited number of studies regarding the clinical and epidemiological profile of children and adolescents with CKD receiving hemodialysis treatment is cited, there being a real need for this knowledge if care is to be offered comprehensively and effectively⁽¹⁰⁾.

In the light of this, as well as of the social, academic-scientific and professional relevance which permeates the issue, this study's objective was characterized as to identify the clinical-epidemiological aspects of children and adolescents with CKD receiving hemodialysis treatment, cared for in a pediatric hospital in the State of Paraná, Brazil.

METHOD

This documental study has a quantitative approach with a descriptive investigation. Regarding the study environment, a hemodialysis center was chosen in a pediatric nephrology

service in a large hospital in the city of Curitiba, Paraná, which is a national center of excellence in high complexity care for children and adolescents. The sample was made up of the hospital records of all the patients receiving hemodialysis treatment at the time of data collection, undertaken in January 2013 through the use of a semistructured script.

Data were collected referent to the following axes of analyses: identification of the patient (variables: sex, age range and geographical origin); clinical diagnosis (variables: basic cause of the CKD); hemodialysis treatment (variables: length of hemodialysis treatment and age at start of RRT); and clinical data (variables: serum creatinine at the start of RRT, comorbidities and vascular access route). The data for all the variables were analyzed using their absolute and relative frequencies, using the Microsoft program Windows Office Excel®, version 2010, presenting the results descriptively and in the form of tables.

In relation to the ethical principles for studies involving human beings, established by Resolution 466/2012, this study's research project was approved by the Research Ethics Committee of the institution where it was undertaken, with a favorable decision issued under N. 179,725, in December 2012.

RESULTS

Analysis and data extraction were undertaken using 22 hospital records, from which it may be observed that 50% (n=11) were of male patients and 50% (n=11) were of female patients; with a mean age \pm standard deviation of 11.5 ± 3.8 years old. The age range and origin of the patients are presented in Table 1.

The data relating to the basic (primary) cause of the CKD indicated that 45% (n=10) of the patients developed the disease due to some urological anomaly or congenital abnormality; the causes are presented in Table 2.

Equally, in relation to the comorbidities, seven (31.8%) hospital records indicated that the patient had systemic hypertension, three (13.6%) had myelomeningocele, and one (4.5%) had hepatic fibrosis. In the other hospital records, that is, in 11 (50%) there was no indication of a secondary condition.

In relation to the patients' ages when their hemodialysis treatment began, these presented a mean age \pm standard deviation of 12.3 ± 10.3 months; the mean, median and maximum-minimum values of the serum creatinine levels (mg/dL) were: ± 7.9 , 7.0 and 20.1 – 2.8 for boys; 6.2, 5.8 and 11.1 – 3.2, for girls. Data obtained in the mode of treatment and vascular access are presented in Table 3.

Table 1 - Distribution of the patients receiving hemodialysis by sex, age range and geographical origin. Curitiba-PR-Brazil, 2013

Variável	Men	Women	n	%
Genre	11	11	22	100
Age range				
≤ 05 years old	2	0	2	9,1
6 to 10 years old	2	3	5	22,7
11 to 15 years old	7	6	13	59,1
≥ 16 years old	0	2	2	9,1
Geographical origin				
Curitiba	9	9	18	81,8
Other cities in Paraná	2	2	4	18,2
Other States	0	0	0	0

Table 2 - Distribution of the patients receiving hemodialysis by basic cause of the Chronic Kidney Disease. Curitiba-PR-Brazil, 2013

Urological anomaly/congenital abnormality	Men	Women	n	Total %
Vesicoureteral reflux	3	1	4	18,2
Neurogenic bladder	0	3	3	13,6
Posterior urethral valves	2	0	2	9,1
Ureteropelvic junction obstruction	0	1	1	4,5
Total	5	5	10	45,5
Other causes				
Chronic glomerulonephritis	1	2	3	13,6
Nephrotic syndrome	1	0	1	4,5
Non-specific Chronic Kidney Disease	2	2	4	18,2
AIDS-associated Chronic Kidney Disease	1	0	1	4,5
Thrombolytic polyarthritis	0	1	1	4,5
Tubulopathy	1	0	1	4,5
Polycystic kidneys	0	1	1	4,5
Total	6	6	12	54,5

Table 3- Distribution of the patients receiving hemodialysis by clinical characteristics. Curitiba-PR-Brazil, 2013

Variáveis	Homens	Mulheres	n	%
Age at start of hemodialysis				
≤ 05 years old	2	0	2	9,1
6 to 10 years old	4	5	9	40,9
11 to 15 years old	5	5	10	45,5
≥ 16 years old	0	1	1	4,5
Duration of hemodialysis				
≤ 06 months	2	5	7	31,8
7 to 12 months	4	4	8	36,4
13 to 18 months	2	0	2	9,1
19 to 24 months	1	1	2	9,1
> 24 months	2	1	3	13,6
Vascular access				
AVF	5	8	13	59,1
CVC	6	3	9	40,9
Creatinine (mg/dl) at the start of the hemodialysis				
Mean	7,9	6,2	-	-
Median	7,0	5,8	-	-
Maximum - Minimum	20,1 – 2,8	11,1 – 3,2	-	-

DISCUSSION

Although other studies undertaken in Brazil^(7,11) indicate a predominance of males among the pediatric clients with CKD, the results obtained in this study did not evidence this same supremacy, with the distribution of patients, by sex, being 50%. On the other hand, the predominant age range in the present study was shown to be consonant with that indicated in the relevant literature, as well as by the Brazilian Association of Dialysis and Transplant Centers, which states that patients aged between 10 and 15 years old are more numerous in the pediatric RRT centers in Brazil⁽¹²⁾.

Regarding geographical origin, even though the results indicated that the majority of the patients were from the city where the RRT was undertaken, as only four (18.2%) hospital records included a different location, it is worth noting that the fact that the hemodialysis treatment requires the patient to be in the treatment center for a minimum of three days per week, in conjunction with the times of day when the sessions take place, causes this to become extremely tiring and often makes the long journey inviable. As a result, patients from other localities referred to the center of excellence are forced to go and live in the city where the treatment is offered.

As with the results related to age range, the data resulting from the search for the basic cause of the CKD in the clients investigated corroborated those presented in similar studies, evidencing that congenital abnormalities are shown to be the most prevalent primary cause among the pediatric population, with SH as the secondary illness prevalent among the diagnoses identified in this survey.

In one pediatric nephrology department in Belgium, the congenital abnormalities of the kidney and urinary tract also emerged as principal causes of CDK in its patients, representing 59% of the total of the cases⁽¹³⁾. In a study undertaken with 331 records of patients in Serbia and Montenegro, this same predominance was observed as the principal triggering factor for CKD in children and adolescents from that country. The authors of the above-mentioned study also described that the patients' mean age when they started clinical treatment was nine years old, while in

the present study the age was predominantly in the age range of six to 15 years old. Equally, the mean length of clinical follow-up found was four years, a much longer time than found in the present survey, which identified a larger number of patients receiving HD for a period of less than one year⁽¹⁴⁾.

Regarding the serum creatinine level (Cr), the present study only identified the measurement at the time of entering the hemodialysis program. In one study⁽⁷⁾, the mean Cr at the time of the clinical diagnosis of CKD was equal to 3.0 mg/dL and the GFR was approximately 27.4 (mL/min/1.73m²). In another similar study⁽¹⁴⁾, the subjects' mean GFR was 39.6 (mL/min/1.73m²). The constant presence of high levels of metabolic waste products entails various risks to the chronic kidney patient, principally cardiovascular ones. In this way, in spite of the hemodialysis treatment being the last choice mode of treatment for the pediatric patient with CKD, when there is azotemia, that is, excessive increase of metabolic excreta, such as creatinine, initiating HD becomes necessary, as it allows biochemical balance to be achieved rapidly and efficaciously, hence its indication also in acute situations⁽⁷⁾.

The Clinical Performance Measures Project undertaken in the United States made it possible to ascertain the predominance of CVC as the prevalent access route in the clientele evaluated, being observed in 61% of the patients⁽¹⁵⁾. In a report published by a North American database it is possible to observe that, in 2011, 78.7% of the pediatric patients receiving HD used the CVC as the access route⁽¹⁶⁾. The predominance of the same route was also identified in a study undertaken in Minas Gerais, Brazil⁽¹⁷⁾. That study's authors mentioned that this fact is related in many cases to the lack of professional expertise for the creation of the AVF, principally in children with a vascular compromise, as not every RRT center attends only pediatric clients.

In the present study, it was observed that the predominant access route was the AVF, as presented in Table 3. This fact shows the qualification and technical skill in the administration and clinical-assistential management of these patients, undertaken by the multi-professional team of the service in question, as scientific evidence points to various difficulties met by RRT centers in seeking to maintain the patency of the AVF in

pediatric patients⁽¹⁷⁾.

Besides this, the use of the CVC can increase the possibility of the child or adolescent receiving HD contracting an infection by up to 20 times, this being the second main cause of mortality among this client group^(10,18). Knowing this, one attribute of the nursing team is to establish behaviors which aim to prevent infections in those patients whose access route is through a CVC, including the adoption of asepsis and antisepsis measures when the dialysis machine is being connected/disconnected⁽¹⁸⁾.

For those using the AVF, the essential care is related to prevention of haemorrhages, local traumas, venous obstruction and others⁽¹⁹⁾. The nurse and nursing team must also be attent to complications during the hemodialysis procedure, in particular those arising from water-electrolyte and acid-base imbalance, hemodynamic instability and acute pain. As much as offering humanized care, having broad specialized technical-scientific knowledge is shown to be of fundamental importance in undertaking SNC so as to avoid malpractice and recklessness^(6,18).

CONCLUSION

This study's results resemble those of similar studies undertaken in Brazil and internationally. The undertaking of the present study allowed the researchers to list specific conclusions inherent to the clinical-epidemiological profile of children and adolescents receiving hemodialysis, namely: congenital abnormality of the urinary tract as the main primary diagnosis; prevalence of SH secondary to the primary illness; age range with a predominance of pre-adolescent/adolescent clients; and living mainly in the city of Curitiba.

Investigating the profile of the child and adolescent clients receiving hemodialysis makes it possible to acquire the evidence necessary for elaborating specific care strategies directed towards this clientele's specific needs, as well as contributing to the development of expandable interventions through bringing together results from various similar studies.

It is also considered that due to the nursing team performing an important care and educational role with this client group and their family members, approaching these patients with little-discussed issues such as sexuality could improve

the professional-patient relationship.

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