Revista de Ciencias Médicas de Pinar del Río

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

ORIGINAL ARTICLE

Clinical-epidemiological characterization of chronic kidney disease. Provincial Pediatric Hospital "Hermanos Cordové"

Caracterización clínico-epidemiológica de la enfermedad renal crónica. Hospital Pediátrico Provincial "Hermanos Cordové"

Niurka María Escalona-Zaldívar[1], **Yunior Meriño-Pompa** [2], **Barbaro Yasel Guerrero-Vázquez** [1], **Sulanys Yainet Naranjo-Vázquez** [2] ✉, **Delmis Esther Montero-Verdecia** [1]

[1]Universidad de Ciencias Médica de Granma Hospital Pediátrico Provincial "Hermanos Cordové" de Manzanillo, Granma, Cuba.
[2] Universidad de Ciencias Médica de Granma. Facultad de Ciencias Médicas de Manzanillo "Celia Sánchez Manduley". Granma, Cuba.

Received: May 20, 2024
Accepted: May 31, 2024
Published: September 02, 2024

Citar como: Escalona-Zaldívar NM, Meriño-Pompa Y, Guerrero-Vázquez BY, Naranjo-Vázquez SY, Montero-Verdecia DE. Caracterización clínico-epidemiológica de la enfermedad renal crónica. Hospital Pediátrico Provincial "Hermanos Cordové". Rev Ciencias Médicas [Internet]. 2024 [citado: fecha de acceso]; 28(2024): e6421. Disponible en: http://revcmpinar.sld.cu/index.php/publicaciones/article/view/6421

ABSTRACT

Introduction: chronic kidney disease is a global health problem, due to its epidemic character and devastating complications. It is one of the leading causes of death in developed countries, without excluding pediatric age groups.
Objective: to describe the clinical-epidemiological characteristics of chronic kidney disease in children treated at the "Hermanos Cordové" Pediatric Hospital in Manzanillo.
Methods: an observational, descriptive and cross-sectional study was carried out in 42 patients admitted in the years 2022 and 2023 with the diagnosis of chronic kidney disease in "Hermanos Cordové" Provincial Pediatric Hospital of Manzanillo, Granma. We worked with 100 % of the universe. Descriptive statistics were used for data analysis by calculating absolute and relative percentage frequencies.
Results: age older than five years (61,9 %) and male sex (57,1 %) predominated. The main cause of chronic renal failure was vesico-ureteral reflux (33,3 %) and anemia as the most frequent clinical manifestation (52,3 %). Clinical stage II chronic kidney disease was present in 52,4 % of pediatric patients.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

Conclusions: chronic kidney disease in pediatric age is a challenge for the medical and scientific community. The male sex is usually the most affected. The main causes of chronic renal failure are reflux and obstructive uropathies. Anemia is the main manifestation and is mainly due to erythropoietin deficiency. Stage II is the most frequent at the time of diagnosis.

Keywords: Preterm Birth; Gestational Age; Low Weight; Gestational Hypertension.

RESUMEN

Introducción: la enfermedad renal crónica es un problema de salud global, por su carácter epidémico y complicaciones devastadoras. La misma instituye una de las causas primeras de defunciones en los países desarrollados, sin excluir a las edades pediátricas.
Objetivo: describir las características clínico-epidemiológicas de la enfermedad renal crónica en niños atendidos en el Hospital Pediátrico "Hermanos Cordové" de Manzanillo.
Métodos: se realizó un observacional, descriptivo y corte transversal en 42 pacientes ingresados en los años 2022 y 2023 con el diagnóstico de enfermedad renal crónica en Hospital Pediátrico Provincial "Hermanos Cordové" de Manzanillo, Granma. Se trabajó con el 100 % del universo. Para el análisis de los datos se empleó estadística descriptiva mediante el cálculo de frecuencias absolutas y relativas porcentuales.
Resultados: predominaron las edades mayores de cinco años (61,9 %) y el sexo masculino (57,1 %). La principal causa del fallo renal crónico fue el reflujo vesico ureteral (33,3 %) y la anemia como manifestación clínica más frecuente (52,3 %). El 52,4 % de los pacientes pediátricos presentó una enfermedad renal crónica de estadío clínico II.
Conclusiones: la enfermedad renal crónica en edades pediátricas es un reto para la comunidad médica y científica. El sexo masculino suele ser el más afectado. Las principales causas del fallo renal crónico lo constituyen el reflujo y uropatías obstructivas. La anemia es la principal manifestación y se debe sobre todo al déficit de eritropoyetina. El estadío II es el más frecuente al momento del diagnóstico.

Palabras clave: Enfermedad Renal Crónica; Malformaciones Congénitas; Niños.

INTRODUCTION

Chronic kidney disease (CKD) is a global health problem due to its epidemic nature and devastating complications.[1,2] CKD is one of the leading causes of death in developed countries, including in children. The prevalence of this disease in this population group in terminal stage (ERT) is one to three per million live births.[3]

Worldwide, the incidence of stage I and II chronic kidney disease in pediatric populations ranges from 18,5 to 58,3 per million children. This disease in childhood has reached incidences of around 10 to 12 patients per 1,000,000 cases reported at that stage of life.[4] An incidence of chronic kidney disease in first world countries is estimated at up to 309,5 cases per million in children under 20 years of age.[5] European records show incidences of 10 to 20 patients per million inhabitants in the pediatric population and prevalences of around 59-74 ppmp.[6]

A study conducted in Europe revealed that 63,3 % of males were affected by ERN. In Madrid, a survey conducted by a group of researchers on kidney diseases revealed that 66 % of the population was male and 63,6 % of them were adolescents with this disease.[7]

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

In 2017, nearly 1,2 million patients died worldwide due to CKD, the incidence of mortality from this disease increased by 41,5 % (95 % CI: 35,2-46,5) between 1990 and 2017. Similarly, 697,5 million (95 % CI: 649,2-752,0) cases of chronic kidney disease were diagnosed this year, which projected a global prevalence of 9,1 %.[8]

In Latin America and the Caribbean, the countries with the highest prevalence rate per 100,000 inhabitants of CKD in ages under 20 years are: Guatemala (2,7), El Salvador (2,4), Haiti (2,2), Antigua and Barbuda (2,0).[9]

In Cuba, the prevalence rate of CKD in people under 20 years of age is 0,3 per 100,000 inhabitants. In 2021, the country recorded 1,448 deaths (55,9 % male and 44,1 % female). However, in 2022, the number of cases diagnosed with this disease decreased significantly to 1,278 deaths (55,2 % male and 44,8 % female). These results demonstrate the efforts made by the National Health System to reduce morbidity and mortality rates due to this disease.

Due to the importance of this topic for the scientific community and the implementation of new research that allows for better treatment of the disease, this study was carried out with the aim of describing the clinical-epidemiological characteristics of chronic kidney disease in children treated in the Provincial Pediatric Hospital "Cordové Brothers" of Manzanillo in the period 2022-2023.

METHODS

An observational, descriptive and cross-sectional study was conducted on 42 patients admitted in 2022 and 2023 with a diagnosis of chronic kidney disease at the "Cordové Brothers" Provincial Pediatric Hospital in Manzanillo, Granma. 100% of the population was studied.

Study variables:

1. Age: It was considered according to the years completed. Scales [age in years (under five and five years or older)].
2. Sex: defined by biological sex. Scales (male and female).
3. Etiology: Defined as the causes that led to CKD. Scales [reflux and obstructive uropathies (vesicoureteral reflux, posterior urethral vulva, neurogenic bladder); renal alterations in number, position and shape (renal agenesis, renal ectopia, horseshoe kidney); renal cystic diseases (renal cyst, multicystic kidney); glomerular diseases (minimal damage, lupus nephritis, IgA nephritis, SH anaphylactoid purpura).
4. Clinical manifestations: are the symptoms and signs that appear as a result of the disease. Scales [anemia, malnutrition due to defect, arterial hypertension].
5. Stadium Clinical: It was defined as the stadium evolution of chronic kidney disease taking into account the glomerular filtration rate and the Schwartz formula. Scales [I (Kidney damage with normal or elevated filtration rate greater than 90 milliliters per minute per 1,73 square meters of body surface area), II (mild chronic renal failure (between 60 and 89 ml per minute per 1,73 m2 of body surface area), III (Moderate chronic renal failure with filtration between 30 and 59 milliliters per minute per 1.73 square meters of body surface), IV (Severe chronic renal failure with filtration between 15 and 29 milliliters per square meter of body surface), V (End-stage renal disease, with less than 15 ml per minute per 1,73 m2 of body surface area)].

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

Empirical and general theoretical methods were used to guide the process of constructing scientific knowledge according to the objectives of the proposed research. These were based on measurement; analysis-synthesis and induction-deduction methods, mathematical-statistical methods and descriptive statistics. Methods from Medical Sciences such as the scientific method were also used.

Data were collected from individual patient medical records during the study period and recorded manually, processed automatically using Microsoft Excel 2016 for Windows, from which statistical analysis was performed and organized into frequency tables in which the behavior of the variables studied was illustrated for the purpose of facilitating their understanding.

The data obtained from the sources were treated in accordance with the ethical guidelines established in the Declaration of Helsinki, guaranteeing confidentiality and anonymity in all cases. The research did not require any financial expenses, since digital means were used to process the data.

RESULTS

57,1 % of the patients were female and ages older than five years were predominant (6,9 %). (Table 1)

Table 1. Distribution of patients with chronic kidney disease according to age and sex.

Ages	Male		Female		Total	
	No	%	No	%	No	%
< 5 years	10	23,8	6	14,3	16	38,1
≥5 years or older	14	33,3	12	28,6	26	61,9
Total	24	57,1	18	42,9	42	100

Source: individual medical history.

According to the etiologies causing chronic kidney disease in children, vesicoureteral reflux was the most frequent (33,3 %), followed by neurogenic bladder and minimal kidney damage with 14,3 proportionally. (Table 2)

Table 2. Distribution of patients with chronic kidney disease according to etiology

Etiologies		No	%*
Reflux and obstructive uropathies	Vesicoureteral reflux (VUR)	14	33,3
	Posterior urethral valve	2	4,8
	Neurogenic bladder	6	14,3
Renal alterations in number, position and shape	Renal agenesis	2	4.9
	Renal ectopia	0	0
	Horseshoe kidney	0	0
Cystic kidney diseases	Kidney cyst	1	2,4
	Multicystic kidney	3	7,1
Glomerular diseases	Minimum damage	6	14,3
	Lupus nephritis	4	9,5
	IgA nephritis	3	7,1
	Anaphylactoid purpura SH	1	2,4

Source: individual medical history. *Total number of patients withchronic kidney disease=42.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

According to the clinical manifestations presented by pediatric patients, a predominance of anemia (52,3 %) was observed, followed by arterial hypertension (42,9 %). (Table 3)

Table 3. Distribution of patients with chronic kidney disease according to clinical manifestations

Clinical manifestations	No	%*
Anemia	22	52,3
Malnutrition	14	33,3
High blood pressure	18	42,9

Source: individual medical history.
*Total number of patients with chronic kidney disease=42.

52,4 % of pediatric patients presented clinical stage II chronic kidney disease. (Table 4)

Table 4. Distribution of patients with chronic kidney disease according to clinical stage

Clinical stage	No	%
Yo	16	38,1
II	22	52,4
III	4	9,5
IV	0	0
V	0	0
Total	42	100

Source: individual medical history.

DISCUSSION

In the present investigation, the female sex was the most prevalent. The authors of the present investigation consider that this result is due to the fact that many obstructive renoureteral malformations predominate in the male sex, such as the posterior urethral valve exclusive to men, and although children begin with clinical manifestations of urinary infection secondary to obstructions due to malformations at infant and preschool ages, evidence of chronic renal failure, due to renal scarring, manifests itself after five years of age in most cases, at which time chronic renal failure is diagnosed.

Ibarra M et al,[10] in their research the male sex was the most affected (62,2 %), which agreed with those of the present study. However, Iraizoz A et al.,[11] and Lopez M et al.,[12] showed opposite results, with the female sex being the most affected with 51,2 % and 56,7 % respectively.

In terms of age, in the present research children aged five years or older predominated. A result that coincided with the research of Gomez A and col.,[4] where these ages represented 63,1 % of the total. Likewise, Lopez et al.,[12] in their study reported a preponderance of ERC in pre-school children (28,8 %) and school children (29,3 %)

Regarding the etiologies that caused CKD in children, a preponderance of the present study was observed vesicoureteral reflux and minimal renal damage. The authors consider that this result is due to the fact that renal and urological malformations are the main causes that lead to chronic kidney disease in children, these anomalies affect the structure and function. A decrease in the number, absence or poor development of renal structures and compromised renal arterial supply

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

are observed. In addition, they are accompanied by obstructive anomalies of the urinary tract and if there is a bacterial presence, infection occurs, increasing chronic kidney damage and its progression. It should be noted that these malformations can be prevented with adequate prenatal screening and CKD can be avoided.

Likewise, primary and secondary glomerulopathies cause persistent proteinuria and arterial hypertension, which lead to chronic kidney damage in the future.

Gomez A et al.,[4] in their research revealed that congenital malformations were the most frequent causes with 75 %, being the vesicoureteral reflux the most frequent (53,3 %). 61 % of the patients presented glomerulopathies and of these, minimal damage was the most common. These results are similar to those obtained in the present investigation.

Countries such as the United States, Italy, Belgium and France claim that renal deformities are a primary risk factor for the development of CKD; while in others such as Nigeria, despite the detection of congenital defects, the most frequent causes of this disease are: glomerular diseases, toxic nephropathies, chronic pyelonephritis, sickle cell nephropathy, nephropathy associated with the human immunodeficiency virus and diabetic nephropathy. In Iraq, focal segmental glomerulosclerosis, polycystic kidney disease and cystinosis have been recognized as causes of CKD in children.[13]

Regarding clinical manifestations, anemia was the most frequent manifestation. The authors of this article report that there are few studies conducted on anemia and its association with chronic kidney disease in pediatric ages.

It is known that anemia contributes directly to the stages of evolution of CKD and the same it appears due to an inflammatory state typical of kidney disease, anorexia and restrictive diets.

The fundamental factor involved in anemia in CKD is the decrease in erythropoietin synthesis. Other factors involved are: iron deficiency, vitamin B12 deficiency and folic acid deficiency. Its frequency and severity are inversely related to the degree of renal function and usually appear from the stage. [14]

Gomez A et al.,[4] In their study they showed that 46,2 % of patients had asymptomatic CKD; while Robalino M et al.,[15] arterial hypertension was the most frequent clinical manifestation in patients with chronic kidney disease. These results were opposite to those obtained in the present investigation.

A study has shown that children and older adults are more likely to present anemia in CKD, a very unique case occurred in Paraguay where the percentage of patients reached 77,5 %.[16]

Regarding the most frequent type of anemia, in most cases it is iron deficiency anemia, which occurs when the body does not have enough iron. There is a strong link between normochromic normocytic anemia and CKD.[17]

Regarding the clinical stage of CKD, type II was the most frequent. This result agrees with the research of Medeiros M et al.,[18] on the prevalence of kidney disease in apparently healthy children with a family history of renal replacement therapy in a hospital in Mexico in which 64,6 % of the children presented astadium II of kidney damage. Globally, the prevalence of CKD instadium II is about 18,5-58,3 per 1,000,000 inhabitants.[7]

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

However, Gómez A et al [4] showed in their study results opposite to the present investigation, with stage I of CKD being the most predominant in 120 patients (100 %).

CONCLUSIONS

Chronic kidney disease in children is a challenge for the medical and scientific community. Males are usually the most affected. The main causes of chronic kidney failure are reflux and obstructive uropathies. Anemia is the main manifestation and is mainly due to erythropoietin deficiency. Stage II is the most frequent at the time of diagnosis.

Conflicts of Interest
No conflicts of interest declared.

Authorship Contribution
NMEZ: conceptualization, formal analysis, methodology, writing, review and editing.
YMP: conceptualization, formal analysis, methodology, writing, review and editing.
BYGV: conceptualization, formal analysis, methodology, writing, review and editing.
SYNV: conceptualization, formal analysis, methodology, writing, review and editing.
DEMV: formal analysis, methodology, writing, review and editing.

Sources of Financing
No funding was received for the development of this work.

Additional material
Additional material to this article can be consulted in its electronic version available at: www.revcmpinar.sld.cu/index.php/publicaciones/rt/suppFiles/6421

BIBLIOGRAPHIC REFERENCES

1. Rivera Alvarez A, Us Rojas J, Ramay BM, Chocó Cedillos A, Ceron A, Bonilla Félix M, et al. Accesibilidad, disponibilidad y asequibilidad de medicamentos para niños con Enfermedad Renal Crónica en Guatemala. Rev.Cient [Internet]. 2024 [citado 25/04/2024]; 32(1). Disponible en: https://rcientifica.com/index.php/revista/article/view/318

2. Dolores Arenas M, Collado S, Fernández Chamarro M. Pautas de derivación a la Unidad de Enfermedad Renal Crónica Avanzada (ERCA). En: Lorenzo V, López Gómez JM (Eds). Nefrología al día [Internet]. 2024 [citado 25/04/2024]. Disponible en: https://www.nefrologiaaldia.org/374

3. Lagos Antonietti K, Rivas Riveros E, Sepúlveda Rivas C. Representaciones y perspectivas de los cuidadores principales de niños con enfermedad renal crónica. Enfermería (Montevideo) [Internet]. 2022 [citado 25/04/2024]; 11(1): e2615. Disponible en: http://www.scielo.edu.uy/scielo.php?script=sci_arttext&pid=S2393-66062022000101204&lng=es

4. Gómez Morejón A, Pérez González L, Chaviano Mendoza O, González Ramos J, Yanes Macías J, Quintana Marrero A. La prevención del daño renal crónico: una prioridad desde la niñez. Rev Fin [Internet]. 2021 [citado 25/04/2024]; 11(1): 31-40. Disponible en: https://revfinlay.sld.cu/index.php/finlay/article/view/945

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

5. Esparza Aguilar M, Ochoa Esquivel RC, Barajas González A, Ávila Rosas H. Mortalidad en México por enfermedad renal crónica en menores de 20 años de edad, 2000-2014. Rev. mex. pediatr [Internet]. 2019 [citado 25/04/2024]; 86(2): 58-64. Disponible en: http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0035-00522019000200058&lng=es

6. Bernal Jaén FD, Villavicencio Bautista KG, Serrano Figueroa LA. Alteraciones del metabolismo óseo mineral (calcio) en población pediátrica en diálisis crónica. Universidad de Guayaquil. Facultad de Ciencias Médicas [Tesis] Guayaquil-Colombia; 2023 [citado 25/04/2024]. Disponible en: https://repositorio.ug.edu.ec/server/api/core/bitstreams/1e800d69-e717-4332-bcb6-bcf9a43f3d0d/content

7. Castro Jalca AD, Párraga Zambrano AA, Moreira Moreira JT, Ortega Macías HA. Insuficiencia Renal Infantil: Prevalencia, factores de riesgo y diagnóstico de laboratorio. Higía [Internet]. 2023 [citado 30/04/2024]; 9(2). Disponible en: https://revistas.itsup.edu.ec/index.php/Higia/article/view/837

8. GBD Chronic Kidney Disease Collaboration. Global, regional, and national burden of chronic kidney disease, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet [Internet]. 2020 [citado 30/04/2024]; 395(10225): 709-33. Disponible en: https://doi.org/10.1016/S0140-6736(20)30045-3

9. Organización Panamericana de la Salud (OPS). La carga de enfermedades renales en la Región de las Américas, 2000-2019. Portal de Datos [Internet]. 2021 [citado 30/04/2024]. Disponible en: https://www.paho.org/es/enlace/carga-enfermedes-renales

10. Ibarra Rodríguez MR, Antón Gamero M, Parente Hernández A, Wiesner Torres SR, Vargas Cruz V, Paredes Esteban RM. Malformaciones congénitas del tracto urinario (CAKUT): evolución a enfermedad renal crónica. Cir Pediatr [Internet]. 2022 [citado 30/04/2024]; 35(4): 172-179. Disponible en: https://secipe.org/coldata/upload/revista/2022_35-4ESP_172.pdf

11. Iraizoz Barrios AM, Brito Sosa G, Santos Luna JA, León García G, Pérez Rodríguez JE, Jaramillo Simbaña RM, et al. Detección de factores de riesgo de enfermedad renal crónica en adultos. Rev Cub Med Gen Integr [Internet]. 2022 [citado 30/04/2024]; 38(2): e1745. Disponible en: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21252022000200007&lng=es

12. López Santisteban M, Yanez Salguero V, Ramírez Izcoa R, Díaz Valle DJ, Rivas SevillaII K. Estudio epidemiológico y demográfico de la consulta externa de Nefrología Pediátrica. Rev Cubana Pediatr [Internet]. 2018 [citado 30/04/2024]; 90(1). Disponible en: https://revpediatria.sld.cu/index.php/ped/article/view/342/172

13. Saura Hernández MC, Duménigo Lugo D, Gómez Milián TM. Enfoque médico social de la enfermedad renal crónica en Pediatría. Medicentro Electrónica [Internet]. 2021 [citado 30/04/2024]; 25(4): 670-690. Disponible en: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1029-30432021000400670&lng=es

14. Fernández Camblor C, Melgosa Hijosa M. Enfermedad renal crónica (ERC) en la infancia: diagnóstico y tratamiento. Protoc diagn ter pediatr [Internet]. 2022 [citado 08/05/2024]; 1: 437-57. Disponible en: https://www.aeped.es/sites/default/files/documentos/protocolos_aenp-aep_2022-final.pdf

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2024; 28(2024): e6421

15. Robalino Rivadeneira M, Urdaneta Carruyo G, Robalino Gualoto R, Cobos Castillo M, Andrade Zuña K, Chanaguano Tixelema C. Caracterización clinicoepidemiológica de pacientes con enfermedad renal crónica, Riobamba, Talentos [Internet]. 2021 [citado 08/05/2024]; 8(2): 56-7. Disponible en: https://talentos.ueb.edu.ec/index.php/talentos/article/view/266

16. Arraya Borges VD. Anemia en pacientes con enfermedad renal crónica. Residencia Médica [Tesis]. Universidad Mayor de San Simón; 2021 [citado 08/05/2024]. Disponible en: http://ddigital.umss.edu.bo:8080/jspui/handle/123456789/23586

17. Barcia Menéndez CR, Ponce Pincay BD, Toala Morán MJ. Anemia y su relación con la enfermedad renal crónica. Pentaciencias [Internet]. 2023 [citado 08/05/2024]; 5(1): 359-72. Disponible en: https://editorialalema.org/index.php/pentaciencias/article/view/453

18. Medeiros M, Andrade Veneros GD, Martínez de Castro GT, Ortiz Vásquez L, Hernández Sánchez AM, Olverad N, et al. Prevalencia de enfermedad renal en niños aparentemente sanos con antecedente familiar de terapia de reemplazo renal. Bol. Med. Hosp. Infant. Mex [Internet]. 2015 [citado 08/05/2024]; 72(4): 257-261. Disponible en: http://dx.doi.org/10.1016/j.bmhimx.2015.07.004