Archives of Nephrology

ISSN: 2639-3573 | Volume 4, Issue 1, 2021

DOI: https://doi.org/10.22259/2639-3573.0401001

Epidemiological and Clinical Profile of Patients with Autosomal Dominant Polycystic Kidney Disease in a Dakar Single Centre

Mouhamadou Moustapha Cissé[1], Ameth Dieng[1], Modou Ndongo[2], Mamadou Aw Ba[2], Babacar Ndiaye[2], Abou Sy[2], Niakhaleen Keita[2], Bacary Ba[2], Seynabou Diagne[2], Mame Selly Diawara[1], Mansour Mbengue[3], Moustapha Faye[2], Maria Faye[2], Ahmed Tall Lemrabott[2], El Hadji Fary Ka[2]

[1]Nephrology and Dialysis Department of thies Regional Hospital Center, Thiès, Senegal.

[2]Department of Dialysis Nephrology and Kidney Transplantation of the Aristide Le Dantec Hospital and University Centre, Dakar, Senegal.

[3]Nephrology Department of the Dalal Jamm National Hospital Center, Dakar, Senegal.

***Corresponding Author:** Dr Ameth Dieng, Department of Nephrology, Thies Regional Hospital Center, Thiès, Senegal.*

Abstract

***Introduction:** Autosomal dominant polycystic kidney disease (ADPKD) is the most common genetic disease leading to end-stage renal disease (ESRD). In Africa, the prevalence of ADPKD varies between countries. However in Senegal, less than one percent (1%) of the haemodialysis population undergoes ADPKD. The exact prevalence of the disease is very difficult to estimate, and patients referred to nephrology centres are probably only the tip of the iceberg.*

***Patients and Method:** We conducted a retrospective, descriptive and analytical study over a 12-year period included all medical records of patients with ADPKD followed in the nephrology department of Aristide Le Dantec Teaching Hospital in Dakar.*

***Results:** The overall prevalence was 1.36% with an incidence of 14 new cases/year. The mean age of the patients was 59.5 ± 6,4 years with a female predominance (59%). High Blood Pressure (HBP), low back pain and enlarged kidneys were found in 46.5%, 36.2% and 22.4% respectively. Extra-renal cysts were found in the liver (69%), spleen (3.4%) and ovaries (1.7%). Progression to ESRF was noted in 21% of patients and 9% were put under chronic haemodialysis. Urinary tract infection was found in 12% and intracystic haemorrhage in 3.4%. Death occured in three patients (5.1%)*

***Conclusion:** ADPKD is not very well described in black people. Our study showed that in Senegal its prevalence is increasing compared to previous years.*

Keywords: *Autosomal dominant polycystic kidney disease ; High Blood Pressure ; Extra-renal cysts ; end-stage renal disease*

Introduction

Autosomal dominant polycystic kidney disease (ADPKD) is an inherited disease characterised by the formation of countless cysts from renal tubular cells. It is the most common genetic disease leading to end-stage renal disease (ESRD) in about 5-10% of cases **[1, 2]**. A German study, based on a population over 2.7 million people, argues for a lower prevalence slightly over 1 in every 2000 patients **[3]**, the threshold below which a disease can be classified as a rare disease. In Africa, the prevalence of ADPKD varies between countries **[4,5]**. In Senegal, the overall prevalence of ADPKD is not known. However, less than one percent (1%) of the haemodialysis population undergoes

ADPKD **[6, 7]**. Recently Kane et al found a prevalence of 0.3% in 3 semi-urban centres **[8]**.

Patients can present at any age, but more often after 30 years of age **[9]**. Although the palpation of the abdomen occasionally suggests the presence of ADPKD, radiographic procedures are necessary for setting the diagnosis **[1, 9]**. For this reason, the exact prevalence of the disease is very difficult to estimate, and patients referred to nephrology centres are probably only the tip of the iceberg **[10]**. ADPKD can be clinically characterised by abdominal pain, high blood pressure and episodes of gross haematuria, polyuria, urinary stones, urinary tract infections, headache, aortic and cerebral aneurysms, mitral valve prolapse and polycystic liver disease **[2, 9, 11]**.

This study aims to determine the epidemiological, clinical, biological, therapeutic and evolutionary features of patients with ADPKD.

Patients and Method

We conducted a retrospective, descriptive and analytical study over a 12-year period range from 1 January 2006 to 31 December 2017. It included all medical records of patients with ADPKD followed in the nephrology department of Aristide Le Dantec Teaching Hospital in Dakar. The diagnosis of polycystosis was based on Ravine's criteria **[12]**. We excluded in this work inexploitable cases, subjects with autosomal recessive polycystic renal disease (ARPRD) and subjects with renal cysts but not meeting the Ravine criteria. Socio-demographic data (age, gender, occupation and marital status), circumstances of discovery (low back pain, macroscopic haematuria, incidental, enlarged kidney, family survey, high blood pressure, renal failure and others), family history (inbreeding, kidney disease, dialysis or death), personal history (high blood pressure, diabetes, stroke, digestive haemorrhage, etc.), extra-renal manifestations (liver, heart, brain involvement) were collected through a medical records review process using pre-printed forms. Morphological (kidney size, number of cysts, other localisations), biological (creatininemia, DFG according to MDRD, 24h proteinuria, urine cyto-bacteriology) and therapeutic (antihypertensive drugs, antibiotics, analgesics, dialysis) aspects were also recorded.

High blood pressure was defined in the study by a BP ≥ 140/90 mmHg and/or taking antihypertensive medication while urinary tract infection consisted of a positive cyto-bacteriological urine examination (CBUE).

The data were entered from patient medical records and analysed through EPI info software version 7.

Results

During this period, 12348 patients were received in the department, 168 of whom underwent ADPKD. The overall prevalence was 1.36% with an incidence of 14 new cases/year. One hundred and ten patient medical records were incomplete. Therefore, the study was carried out on 58 patient medical records. The mean age of the patients was 59.5 years ± 6,4 with a female predominance (59%). The notion of consanguinity was reported in 3 cases (5%). Fifteen patients (26%) had a family history of ADPKD, six (10.3%) had a family history of dialysis and nine (15.5%) family deaths related to ADPKD were noted. The circumstances of discovery of the disease were dominated by low back pain in 34% and incidental pain in 31% of cases **(Figure 1)**. On clinical examination, HBP, low back pain and enlarged kidneys were found in 46.5%, 36.2% and 22.4% respectively. Hepatomegaly was noted in 15.15%. The mean creatinine levels was 31.91 mg/L ± and the mean GFR was 61.69 ml/min/1.73m2 ±. Impaired renal function was found in 19 patients (32.7%). The transaminases sought in 6 cases were unremarkable. The remaining clinico-biological characteristics are listed in **Table I**. Extra-renal cysts were found in the liver (69%), spleen (3.4%) and ovaries (1.7%). Five patients had a cardiac ultrasound (8.62%) and it was normal in 3 patients (5.2%). Left ventricular hypertrophy (LVH) was noted in 2 patients (3.4%) and a valvular impairment (mitral and tricuspid) in 1 patient (1.7%). Converting enzyme inhibitors (ACE inhibitors) and angiotensin-2 receptor blockers (ARB-2) were prescribed in 27.6% and 15.5% respectively. The remainder of the treatment is shown in **Table II**. Progression to ESRD was noted in 21% of patients and 9% were put under chronic haemodialysis. None had undergone nephrectomy or kidney transplant. Urinary tract infection was found in 12% and intracystic haemorrhage in 3.4%. One case of hemorrhagic stroke was recorded. Death occured in three patients (5.1%) and was attributed to poorly tolerated chronic uremia.

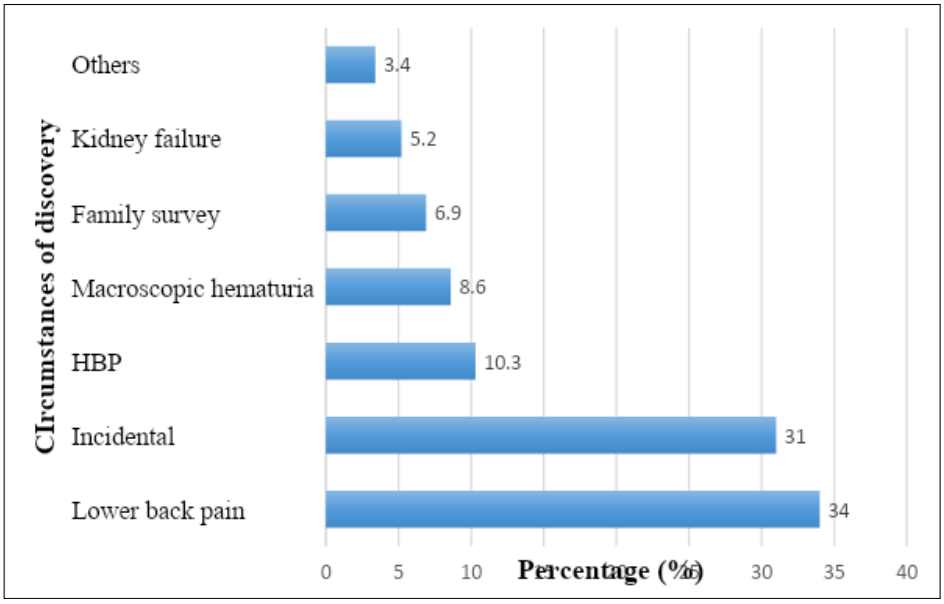

Figure1. *Distribution of patients according to the circumstances of discovery*

TableI. *clinico-biological profile of patients*

Characteristics	Numbers
Mean age (year)	59,5 ± 6,4
Female (%)	59
Family history of ADPKD n (%)	15 (26)
renal manifestations	
HBP, n (%)	27 (46,5)
Lombalgia, n (%)	21 (36,2)
Enlarged kidney, n (%)	13 (22,41)
macroscopic hematuria, n (%)	4 (6,89)
Mictional burn, n (%)	3 (5,17)
Edema, n (%)	2 (3,44)
Creatininemia (mg/L)	31,91 ± 46,28
GFR (ml/min/1,73m²)	61,69 ± 41,38
Urea (g/L)	0,96 ± 1,04
Proteinuria (g/24h)	0,45 ± 0,98
extra-renal manifestation	
Hepatomegaly, n (%)	9 (15,51)
Valvular impairments, n (%)	1 (1,72)
LVH, n (%)	2 (3,4)
Other localisations of the cysts	
Liver, (%)	69,4
Spleen, (%)	5,5
Ovaries, (%)	2,8

Complications	
ESRD, n (%)	12 (21)
Urinary tract infection, n (%)	7 (12)
Intracystic hemorrhage, n (%)	2 (3,4)
Hemorrhagic stroke, n (%)	1 (1,7)
Death, n (%)	3 (5,2)

TableII. *Distribution of the different therapeutic classes*

	Number (n)	Percentage (%)
Antihypertensive drugs		
CEI	16	27,6
ARA-2	9	15,5
Calcics inhibitors	13	22,4
Diuretics	11	19
Bêta-blockers	4	6,9
Analgesics		
Paracetamol	16	27,6
Tramadol	8	13,8
Antibiotics		
Quinolones	3	5,2
Amoxicilline- clavulanic acid	3	5,2
3rd generation cephalosporin	2	3,4
Metronidazole	1	1,7
Hemodialysis	5	9

Discussion

In our series, the proportion of ADPKD was 1.36% of patients followed in nephrology. This study shows an increased prevalence in Senegal compared to previous studies regarding this subject. Ka in 2010 and Samb in 2001 reported prevalence of 0.4% and 0.5% respectively in an urban centre **[6, 13]**. Kane Y et al in 2019 found a prevalence of 0.3% in 3 semi-urban centres. This could be explained by a better knowledge of the pathology and the increase in the number of specialists in the country, but also by systematic screening of other affected family members.

Out of the 58 included patient medical records, the mean age was higher than in other studies **[4, 14]**, suggesting a late discovery of the disease which could be due to a consultation delay of our patients, or to a particularly slow and progressive evolution of the disease which only becomes symptomatic at an advanced age. There was a female predominance, which corroborated Agboton's study in Benin.

The familial nature of the disease was found in 51.7%, which was similar to the literature data [**8, 13, 14]**. The finding circumstances were dominated by low back pain in 34% while Laleye et al reported a higher proportion with 62% of cases **[15]**. The finding was incidental in 31% in our study, this result was consistent with Genkyst's cohort (2014) which reported a percentage of 25% **[16]**. The prevalence of HBP was 46.5%, a much lower rate compared to the other series. In the study conducted by Seck SM, high blood pressure was found in 73.8% of patients and it preceded the diagnosis of ADPKD in 28.8% of them **[17]**. Agboton in Benin had returned to a prevalence of HBP of 83% **[4]**. Gomez in Spain found 87.23% of HBP after clinical examination of his patients **[18].** This could be explained by the fact that the diagnosis

is now much earlier. Hepatic cysts were the most common extra-renal manifestation in 69.4% of our study. This proportion was higher than those found by Kane Y in Senegal **[8]** and Kazancioglu in Turkey **[14]** with 28% and 37.9% respectively. Gomez had a similar result with 62% of liver cysts **[18]**. These variations in the proportions can be explained by the fact that the result of ultrasound is operator-dependent, and its sensitivity also depends on the quality of the device used. We have also found a case of hemorrhagic stroke which could be related to a rupture of an unknown aneurysm. The diagnosis of the mutation relies on genetical approach. But in current practice this analysis is not carried out as in the case of our work.

Impaired renal function was found in 19 patients (32.7%). Ka et al **[6]** found 45.3% of RI, Kane Y **[8]** (64%) in 2018. In Agboton's series 72% of patients had chronic kidney disease (CKD) **[4]**. Kidney failure appears to be less frequent in our series. This is explained by the fact that most patients are now seen early with regular follow-up and well-controlled blood pressure compared to other studies.

There are several experimental and clinical observations that show increased activity of the renin-angiotensin-aldosterone system (RAAS) in patients with ADPKD. Given the potential adverse renal and cardiac effects related to angiotensin II, it is reasonable to treat hypertensive patients with ADPKD with ACE inhibitors or ARA-2 **[19]**. RAAS inhibitors decrease and prevent LVH and cardiac complications while slowing progression to ESRD **[19, 20, 21, 22]**. In our study, RAAS inhibitors were prescribed in 43.1% of cases.

Progression to ESRD was noted in 21% of cases and 9% of patients were put under chronic haemodialysis. The likelihood of reaching ESRD is variously assessed in the literature. However, it may be related to the genetic form: PKD1 is thought to be more pejorative than PKD2 **[23]**. Death occurred in 3 patients (5.2%) and were all attributed to poorly tolerated chronic uremia. The uremia-related case fatality rate in our study is explained by the fact that haemodialysis is not always affordable in our regions **[24]**.

Conclusion

ADPKD is not very well described in black people, especially in Africa where some data show that the disease is exceptional. Our study showed that in Senegal its prevalence is increasing compared to previous years. This would be due to a better knowledge of the disease and the improvement of the facilities with an increase in the number of specialists and the development of imaging during the last decade.

References

[1] Ecder T, Fick-Brosnahan G, Schrier RW: Polycystic kidney disease; in Schrier RW (ed): Diseases of the Kidney and Urinary Tract. Philadelphia, Lippincott Williams and Wilkins, 2007, pp 502–539

[2] Pei Y: Molecular genetics of autosomal dominant polycystic kidney disease. Clin Invest Med 2003; 26: 252–258

[3] Neumann HPH, Jilg C, Bacher J, et al. Epidemiology of autosomaldominant polycystic kidney disease: an in-depth clinical study for south-western Germany. Nephrol Dial Transplant, 2013, 28(6): 1472-87

[4] Agboton BL, Vigan J, Azonbakin S et al. Polykystose rénale autosomique dominante au CNHU-HKM de Cotonou : profil épidémiologique, clinique, biologique et intérêt du dépistage familial. The Pan Afr Med Journal. 2015;22 :203-08

[5] N'Guessan AC, Lagou Da, Loukou K et al. L'insuffisance rénale chronique au cours de la polykystose rénale autosomique dominante en Afrique noire : étude rétrospective. Rev int Sc Med. 2015 ; 17(3) : 152-158

[6] Ka EL F, Seck S, Niang A, Diouf B. Patterns of autosomal dominant polycystic kidney diseases in black africans. Saudi J Kidney Dis Transpl. 2010 ; 21(1) : 81-6.

[7] Diouf B , Dia D,Ka MM, Diop T M et al. La polykystose autosomique dominante en milieu hospitalier à Dakar (sénégal) Dakar-Méd, 1998; 43,2: 205-208

[8] KANE et al. Polykystose Rénale Autosomique Dominante : Expérience de Trois Centres Semi-Urbains du Sénégal. health sciences and deseases Vol 20, No 6 (2019)

[9] Fall PJ, Prisant LM: Polycystic kidney disease. J Clin Hypertens 2005; 7: 617–619, 625

[10] Emilie Cornec-Le Gall, Yannick Le Meur. Polykystose rénale autosomique dominante. In : Eric thervet. Traité de néphrologie. Paris : Lavoisier ; 2017, 297-306

[11] Sessa A, Righetti M, Battini G: Autosomal recessive and dominant polycystic kidney diseases. Minerva Urol Nefrol 2004; 56: 329–338

[12] Ravine D, Gibson RN, Donlan J. An ultrasound renal cyst prevalence survey : specificity data for inherited renal cystic diseases. Am J Kidney dis, 1993, 22(6): 803-7

[13] Samb El H M. La polykystose rénale autosomique dominante (Aspects épidémiologiques, cliniques et biologiques à propos de 53 cas) ; thèse de médecine, 2001, université de Dakar ; n° 112

[14] Kazancioglu et al. Demographic and Clinical Characteristics of Patients with Autosomal Dominant Polycystic Kidney Disease: A Multicenter Experience. Nephron Clin Pract 2011;117:c270–c275

[15] Laleye A, Awede B, Agboton B. Autosomal dominant polycystic kidney disease in university Clinic of Nephrology and Haemodialysis of Cotonou : clinical and genetical findings. Genet Couns. 2012 ; 23(4) : 435-45

[16] Cornec-Le Gall, E., Renaudineau, E., Kersalé, A., Hourmant, M., Morin, M. P., Jousset, P., … Le Meur, Y. (2014). Aspects cliniques et génétiques de la polykystose rénale autosomique dominante (PKAD) liée à une mutation du gène PKD2 : résultats de la cohorte Genkyst. Néphrologie & Thérapeutique, 10(5), 275

[17] Seck SM, Cisse MM, Ka EF, Diallo I, Gueye S, et al. (2011) Hypertension in Black Africans with Autosomal Polycystic Kidney Disease. J Nephrol Therapeutic 1:102

[18] Gomez PF, Garcia-Cosme P. L'analyse clinique d'une population avec la maladie polykystique rénale autosomique dominante, CHU SALAMANQUE, Espagne. Nefrologia 2010 ;30 (1):87-4

[19] Ecder T, Edelstein CL, Chapman AB, Johnson AM, Tison L, Gill EA, Brosnahan GM, Schrier RW: Reversal of left ventricular hypertrophy with angiotensin converting enzyme inhibition in hypertensive patients with autosomal dominant polycystic kidney disease. Nephrol Dial Transplant 1999; 14: 1113–1116

[20] Schrier RW: Optimal care of autosomal dominant polycystic kidney disease patients. Nephrology 2006; 11: 124–130

[21] Taylor M, Johnson AM, Tison M, Fain P, Schrier R: Earlier diagnosis of autosomal dominant polycystic kidney disease: importance of family history and implications for cardiovascular and renal complications. Am J Kidney Dis 2005; 46: 415–423

[22] Schrier RW, McFann K, Johnson A, Chapman A, Edelstein C, Brosnahan G, Ecder T: Cardiac and renal effects of standard versus rigorous blood pressure control in autosomal-dominant polycystic kidney disease: results of a seven-year prospective randomized study. J Am Soc Nephrol 2002; 13: 1733–1739

[23] Cornec-Le Gall E, Audrézet MP, Chen JM, et al. Type of PKD1 mutation influences renal outcome in ADPKD. J Am Soc Nephrol JASN, 2013, 24(6) : 1006-13

[24] Rahman E, Faraz A, Hammad D. Analysis of Causes of Mortality in Patients with ADPKD; A single Center Study. Saud J Kidney Dis Transplant 2009. 20(5) 806-10

Citation: **Mouhamadou Moustapha Cissé, Ameth Dieng, et al.** *Epidemiological and Clinical Profile of Patients with Autosomal Dominant Polycystic Kidney Disease in a Dakar Single Centre. Archives of Nephrology. 2021; 4(1): 1-6. DOI: https://doi.org/10.22259/2639-3573.0401001*