Journal of Kidney
ISSN: 2472-1220

Agboton, J Kidney 2017, 3:3
DOI: 10.4172/2472-1220.1000150

Research Article OMICS International

Hypertensive and Diabetic History of Patients on Chronic Dialysis Prior to Chronic Kidney Disease Stage in Benin

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Received date: Sep 8, 2017; **Accepted date:** Sep 25, 2017; **Published date:** Oct 3, 2017

Abstract

Background: The purpose of this study is to analyze the risk factors of kidney disease among our chronic hemodialysis patients.

Methods: It was a cross-sectional retrospective study aimed at describing and analyzing the subject matter. It was carried out from 1st July to 30th September 2016 at the dialysis unit of CNHU-HKM, Cotonou. We resorted to non-probabilistic sampling method with comprehensive census of hemodialysis patients aged 18 years and above, whose hypertension or diabetes history is known and confirmed prior to dialysis.

Outcomes: We selected 149 patients on chronic hemodialysis. Sex-ratio was 1.57 whereas average age was 48 ± 12.88 years. Eighty six point five eight percent (86.58%) (129/149) of the respondent hemodialysis patients were known and treated as hypertensive patients prior to CKD stage. 98.04% (100/102) had hypertension as medical history (P=0.0006). Fourteen patients out of 149 i.e. 9.40% were known and regularly treated diabetic patients prior to CKD. 64.28% (9/5) of the study population had diabetes as medical History (P=0.0003). In this cohort, the risk for a dialysis patient from hypertension prone family to be hypertensive was 2.66, whereas the risk to have diabetes was 2.28 when the patient is from diabetes-prone family.

Conclusion: The link between the occurrence of chronic diseases, the risk factors and the management of these factors is well known in the scientific literature. However, in Africa where there is an alarming increase of CKD, there is pressing need for in-depth analysis for more focused and structured management.

Keywords: Hypertension; Diabetes; Chronic kidney disease; Dialysis

Introduction

Chronic Non-Communicable Diseases (CNCD) are major public health concern. In fact, they represent the leading cause of death throughout the world [1]. In 2012, one out of three adults was affected by hypertension globally in Africa, more than 40% of adults in many countries are hypertensive and most of them remain undiagnosed [2]. In 2015, there were 415 million diabetic patients in the world and one adult of out eleven was diabetic. By 2040, there will be 642 million diabetic patients if no adequate preventive measures [3] are undertaken. In Cotonou-Benin, the prevalence of diabetes was respectively 2.9% and 4.6% in 2001 and 2012, whereas hypertension prevalence ranged respectively from 13.6 to 20.2% in 2001 and 27.3 in 2007 [4,5]. The prevalence of Chronic Kidney Disease (CKD) has been increasing drastically, this rise is largely attributable to the increasing prevalence of obesity, diabetes and hypertension [6]. This trend is observed both in developed and developing countries. In 2010, CKD was the 18th disease accounting for overall mortality in the world [7]. It also constitutes a public health concern across the world, its global prevalence is estimated between 8 and 16% [1,8].

In developed countries and many developing nations, diabetes and hypertension are the first two leading causes of CKD. In the Western world, diabetes is the leading cause, whereas in many undeveloped countries it is hypertension [8,9]. CKD is a common pathology in Africa however, its prevalence and incidence among the general population are unknown; the existing data relate to CKD in hospital setting [2]. The prevalence of CKD in sub-Saharan countries is poorly known. A recent meta-analysis including 90 studies conducted in 96 sub-Saharan countries reported 13.9% as medium prevalence, with extremes ranging from 2% in Côte d'Ivoire and 30% in Zimbabwe [10]. Mitigating the global impact of these diseases is an overriding priority and a prerequisite for sustainable development [1].

The primary prevention of Chronic Kidney Disease which is asymptomatic but detectable is essentially based on healthy lifestyle (physical activity, nutrition counseling, smoking-cessation…) for low

risk populations [3]. Regular checks of blood pressure and low albuminuria are vital for hypertensive and/or diabetic patients in the treatment of Chronic Kidney Disease, in order to reduce the risk of cardiovascular disease and slow the progression of renal impairment [4].

The family history suggests a genetic component, in the literature hypertension heritability ranges from 0% to 65%, depending on the studies [11-13]. A few very rare type of monogenic family history of hypertension were discovered [14]. However, over 95% of patients suffer from "essential hypertension" [15] whose cause is unknown, although genetics seems to play a significant role. In the light of the crucial search for developing different preventive strategies of kidney disease, this study aimed at analyzing the risk factors for kidney diseases among patients on chronic hemodialysis at CNHU-HKM.

Methodology

It was a cross-sectional retrospective study aimed at describing and analyzing the subject matter. It was carried out from 1st July to 30th September 2016 at the dialysis unit of CNHU-HKM, Cotonou. We reported that was non-probabilistic sampling method with comprehensive census of chronic hemodialysis patients supported in the dialysis unit during the study period. This study, carried out within the framework of academic work, was realized in strict compliance with the rules of good clinical practices (GCP). All patients gave their free and informed consent in writing. We strictly complied with confidentiality during data collection. All information obtained within the framework of this study was processed anonymously.

All dialysis patients aged eighteen years and above met the inclusion criteria. Those excluded were hypertensive or diabetic dialysis patients untreated prior to the dialysis stage; hemodialysis patients who were neither hypertensive nor diabetic, and whose history was discovered through end stage renal disease (ESRD). All patients whose personal or family history of hypertension or diabetes has not been confirmed or contradicted were excluded. Data were collected using a questionnaire on socio-demographic characteristics (age, gender, and level of education), personal and family history of hypertension and/or diabetes. Following the interview with each patient, we consulted their medical records prior to dialysis to compare the information collected.

The data collected were encrypted by EpiData version 3.1 and the analysis was carried out through Stata software version 11. Statistical analysis consisted in calculating the different frequencies of the variables studied for the purpose of description. We carried out comparisons of frequencies and sought links between the variables using Pearson Chi square test with a significance threshold of 5%.

Results

We included 149 patients on chronic hemodialysis during the period of study. We recorded a male predominance with 1.57 as sex ratio. Age ranged from 19 to 79 years with 48 ± 12.88 as mean age. Over half of our dialysis patients (61%) were aged below 50 years. Only 12.75% were out of school and 71.81% attended at least secondary level education. Three quarters (¾) of the respondents (75.84%: 113/149 hemodialysis) knew their family history of hypertension or diabetes (Table 1) and Hypertension (72.49%) was the leading cause of dialysis implementation followed by diabetes (9.40%) (Figure 1).

Hypertension and diabetes were respectively identified as family history among the respondent hemodialysis patients in 95.58% and 30.09% of cases. Furthermore, 86.58% of the hemodialysis patients (129/149) were hypertensive, known and treated prior to CKD stage whereas 9.40% (14/149) were diabetic, known and treated prior to CKD stage. 92.59% of the dialysis patients with personal history of hypertension had a family history of hypertension (Tables 2 and 3).

According to this study, the risk for dialysis patients from hypertensive parents to be hypertensive was 2.66 fold. The risk for a dialysis patient from diabetic parents to be diabetic was 2.28 fold.

Parameters	Frequency (%) median ± standard deviation
Age	
Mean age	56 ± 12.05
≤30	12 (8.05)
(30-40)	30 (20.13)
(40-50)	49 (32.89)
(50-60)	31 (20.81)
>60	27 (18.12)
Gender	
Female	58 (38.93)
Male	91 (at 61.07)
Level of Education	
Primary School	15.44
Secondary education	42.28
University	29.53
Out-of-school	12.75
Family History	
Known	113 (75.84)
Hypertension	108 (95.58)
Diabetes	34 (30.09)

Table 1: Patients distribution according to socio-demographic characteristics.

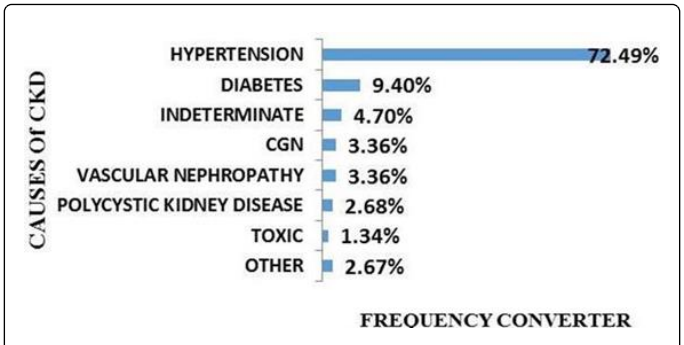

Figure1: Etiologies of chronic kidney disease.

Personal hypertension history prior to CKD	Family History of Hypertension		
	Presence	Absence	Total
	N (%)	N (%)	N (%)
Presence	100 (92.59)	2 (40)	102 (90.27)
Absence	8 (7.41)	3 (60)	11 (9.73)
Total	108 (100)	5 (100)	113 (100)
OR=2.66 with IC 95%=[2.72; 129.01]; P=0.0001			

Table 2: Distribution of dialysis patients known as hypertensive prior to CKD stage on the basis of their family history of hypertension.

Personal history of diabetes prior to CKD	Family History of Diabetes		
	Presence	Absence	Total
	N (%)	N (%)	N (%)
Presence	9 (26.47)	5 (6.33)	14 (9.40)
Absence	25 (73.52)	74 (93.67)	99 (90.60)
Total	34 (100)	79 (100)	113 (100)
OR=2.28 with IC 95%=[2.81; 68.46]; P=0.00008			

Table 3: Distribution of dialysis diabetic patients with family history of diabetes.

Discussion

Nowadays, chronic non-communicable diseases represent a major challenge for the world. Many prevention strategies are being implemented to significantly reduce the incidence of these diseases and prevent or mitigate their complications. Family history of type 2 diabetes are very common with type 2 diabetic patient. Environmental factors were the most involved in its etiopathogenesis. Several studies outlined the involvement of genetics in hypertension etiopathogenesis. The family nature of a feature is at least partly attributable to genetic effects, the rest of the resemblance could be ascribed to diverse environment-related factors [16,17]. In many African countries including Benin, the technical facilities are not able to accurately provide the causes of ESRD. The medical history of our patients plays a key role. In a context of limited resources and in view of optimizing the preventive measures in the occurrence of hypertension, diabetes and their complications, this study assessed the family history of hypertension or type 2 diabetes and the profile of dialysis patients prior to CKD stage. Among the study population the risk for a dialysis patient from hypertensive parents to be hypertensive was 2.66 fold, whereas the risk for a dialysis patient from diabetic parents to be diabetic was 2.28 fold. This risk factor is lower than the one reported by some studies suggesting that the chances of an individual below 55 years to develop hypertension are approximately four times higher when there is a family history of the disease [18,19].

In our study population, the high proportion of dialysis patients treated for hypertension for several years prior to dialysis stage could be due to a shortfall in the management process. This gap may be attributable to caregivers, or the patients themselves in the regular follow-up and therapeutic compliance, or finally the national health system. The prevention of chronic non-communicable diseases (CNCD) is given no priority by our Africa leaders. Indeed, our sociocultural context of the concept of illness in Africa negatively affects the therapeutic compliance in the care and support for CNCD. However, we could organize ourselves better if our governments really understand the urgency of the preventive component of these diseases in view of a sustainable development.

Conclusion

In Africa, we have been experiencing an alarming rise in hypertension, diabetes and their complications with important socio-economic impact. In the absence of prevention measures, individuals from hypertensive or diabetic families have a higher risk of developing these diseases. Likewise, the good follow up of hypertensive and diabetic patients is vital to prevent complications. Each of our developing countries must prioritize primary and secondary prevention to ensure sustainable development by investing in training in terms of quality and quantity human resources required to respond to this challenge.

Acknowledgment

We thank the authorities of the Teaching Hospital CNHU-HKM and the department of medicine and medical specialties for having made this work possible.

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