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Kidney Failure Screening In The General Population Of Rural Africa

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SUMMARY

Kidney failure is a silently progressive disease too often unknown to the patients. The objective of the study was to assess the impact of kidney disease in Conakry so as to develop strategies for early detection and prevention. This was a descriptive type prospective study done during a period of six months, from 31 January to 31 July 2012, carried out in two areas: in health facilities where the populations have higher risks of developing kidney disease (diabetes, uropathies, infectious diseases and HIV, hypertension and cardiovascular disease) and in apparently healthy populations. We included into the study: black subjects hospitalized in different targeted wards and fully active apparently healthy subjects of the general population.

Renal function was assessed with the simplified MDRD formula.

Data collection included clinical parameters: blood pressure, weight, height and blood laboratory parameters (creatinine, glucose) and urine (urine dipstick, 24h quantitative proteinuria).

One hundred and ninety-nine patients were selected for the study, 117 men and 82 women aging from 20 to 90 years. The prevalence of renal failure was 59% in the population at risk with 53.3% of men and 16% in apparently healthy population with 60% of men with a statistically significant difference: p = 0.00000001. Proteinuria was observed in 86 patients in the population at risk against 19 in the healthy population.

Keywords: conakry, screening, kidney disease, african population

INTRODUCTION

Chronic kidney disease is a major public health problem. Its true incidence is unknown in Africa; it is linked to an increase in certain chronic diseases that may be responsible for renal failure. Among these diseases, diabetes and hypertension are predominant and account for 50-60% of end stage renal disease (ESRD) [1]. Urological diseases, cardiovascular diseases, HIV infection, and nephrotoxic drugs are also responsible for this condition. As recommended by K / DOQI, early detection of chronic kidney disease (CKD) can be achieved simply through the evaluation of serum creatinine and / or albuminuria [2]. Kidney failure is a silently progressive disease too often unknown by patients; clinical signs appear late, when renal function is impaired. Therefore, the high incidence of renal failure in our hospital activities (60% of hospitalizations in Nephrology, of which 65% are end-stage renal disease), as well as difficulties in their care (11 hemodialysis stations for 11 000 000 inhabitants) have motivated us to do a study on screening for kidney failure.

The objective was to determine the epidemiology of renal disease in Conakry to develop strategies for early detection and prevention thereby contributing to the reduction of morbidity and mortality of kidney disease.

MATERIAL AND METHODS

This study was conducted in the city of Conakry, the capital of the Republic of Guinea. The study was conducted at: the Diabetes Services, Infectious Diseases, Cardiology and Urology, University Hospital, University Gamal Abdel Nasser and the People's Palace.

This was a descriptive type prospective study of a six-month period from January 31 to July 31, 2012.

This study was conducted in two areas: health facilities with a population the classic risk of kidney disease and apparently healthy population.

Criteria for inclusion were:

1. Black subjects
2. Populations at risk for chronic kidney disease: patients in the different wards mentioned above
3. Apparent healthy general population: participation in the study was voluntary.

Were not included those who did not agreed to participate in the study.

Renal function was assessed with the simplified MDRD formula:

$186 \times (\text{serum creatinine})^{-1.154} \times \text{age}^{-0.203} \times K$ (K = 0.742 for women and 1.21 for men).

Definition of variables:

1. Renal failure was defined as a creatinine clearance calculated by the MDRD formula below 90 ml / min (MDRD).
2. Population with classic risk factors: were patients hospitalized in Diabetology, Infectious diseases, Cardiology and Urology wards;
3. The apparently healthy general population: were of students, civil servants, housewives, merchants, and fully active workers, with no medical history and with no alcohol and tobacco abuse, not on medication and who had not consulted a health facility in the last 3 years.

Data collection included clinical parameters: blood pressure, weight, height and blood laboratory parameters (creatinine, glucose) and urine (urine dipstick, quantitative proteinuria 24h).

Our results were presented in charts, Word, Excel 2007 and Epi-info version 3.5.1 were used for data processing and statistical analysis.

Ethics

After obtaining permission to survey the patients from department heads, we saw each patient individually to explain the objectives of the study so as to obtain their verbal, free and informed consent. Patients with a clearance under 90 ml / min and abnormal dipstick were referred to the Nephrology department. The confidentiality clause was observed.

RESULTS

One hundred and ninety-nine patients were selected for the study, 117 men and 82 women, ages 20 to 90 years. They were divided into 2 groups:

1. The population at risk for renal disease was 105 patients, 61 men and 14 women. The average age was of 52.45 ± 19.85 years. The most affected age group was 61-70 years (32%), followed by 51-60 years (19%).
2. In the apparently healthy population we found 94 people (56 men and 38 women). The average age was of 24.6 ± 12.66 years.

The prevalence of renal failure was 59% in the at risk population (53.3% men) and 16% in the apparently healthy population (60% men) with a statistically significant difference: Chi 2 = 38.63; p = 0.00000001; relative risk = 3.71.

Among the at risk population, renal failure was observed in 65.21% of the cases of hypertension, in 57.89% of uropathies, in 50% of HIV, in 50% of diabetes mellitus, in 100% of uropathies associated with hypertension, in 73.68% of diabetes associated with hypertension and 50% of uropathies with HIV. Among them, out of 62 cases of renal insufficiency, we found that 25 had a creatinine clearance between 60 and 89 ml / min, 25 had a creatinine clearance between 30 and 59 ml / min, it was between 15 and 29 ml / min for 8 patients and ≤ 15 ml / min for 4 patients.

In this at-risk population, proteinuria was positive in 86 patients, hematuria in 42 patients, leucocyturia in 40 patients, nitrates 15 patients and glycosuria in 31 patients.

In the apparently healthy population, renal failure was observed in 15 patients out of the 94. Among them, 12 had a creatinine clearance between 60 and 89 ml / min, 2 had a creatinine clearance between 30 and 59 ml / min and 1 had a creatinine clearance between 15 and 29 ml / min.

In this apparently healthy population, were found 19 individuals with proteinuria, hematuria in 3, six with leucocyturia , nitrates in 2 and glycosuria in one individual.

DISCUSSION

This study, a first time in Guinea, established the prevalence of chronic kidney disease not only in subjects exposed to kidney disease, but in apparently healthy subjects with no risk factor for renal disease as well as. These two populations were not matched by age and sex. The “at risk” population was hospitalized in the departments where renal disease was common. The apparently healthy population was carefully selected: fully active subjects, with no medical history, non drikers and no smokers, not on medication and had not consulted a health facility in the last 3 years. We found that the incidence of renal failure was higher in the at risk population than in apparently healthy population with a statistically significant difference

(p = 0.00000001). Although this difference in prevalence could be partly explained by the age difference, we can say that there is an association between exposure and disease onset. The traditional cardiovascular risk factors such as hypertension, diabetes mellitus become increasingly common in developing countries and are often associated with chronic kidney disease [3, 4].

The prevalence of CKD was reported mainly in developed countries. In the United States of America, it has recently increased from 11% between 1988 and 1994 [5] to 13% between 1999 and 2004. [6] The prevalence of this condition is reported to be 16% in Australia [7], 10.1% in China [8], but 3.3% in Italy [9]. In developing countries, all available data on CKD come from in hospital studies. In

Kinshasa, a screening study in the general population of unknown CKD noted a prevalence of 33% [10]. In our study, the age average of patients of the at risk population was 2 times higher than in the other population, this is explained by the fact that hospitalized patients had chronic diseases, while the 'health" population was recruited among young fully active subjects (mean age 24.6 ± 12.66 years). These patients were particularly young subjects similar to the reported profiles in most studies done in developing countries [10]. Indeed, the average age of terminal chronic renal failure patients in Senegal and Burkina Faso was of 46 years [11, 12]. These youths provide the human resources needed for the economic development of developing nations.

We noted that in these two groups, there was a male predominance; this was consistent with previous studies that have reported that the male gender is a risk factor for chronic kidney disease, probably because of hyperandrogenism [13].

In our series, a significant number of adults had proteinuria and CKD risk factors (hypertension, diabetes mellitus, uropathies, and HIV) and these factors were often associated. In Kinshasa, Sumaili noted a high prevalence of CKD and its risk factors [10]. An increase in the annual incidence of admissions for CKD was observed in Kinshasa according Sumaili. This might actually reflect an outbreak of this disease in the general population but also due to a better understanding of Nephrology department by the population.

In our series, no renal biopsy was performed but patients with abnormalities were referred in the Nephrology department. We can say with a high presumption that glomerular disease (proteinuria and hematuria), urinary tract infection (pyuria and nitriuria), hypertension and diabetes mellitus were the leading causes of kidney disease in our population. This observation is similar to that reported in Senegal [14].

CONCLUSION

Chronic kidney disease is a common condition whose clinically silent symptoms are responsible for the delay in diagnosis in developing countries. Risk factors for developing renal disease were hypertension, diabetes mellitus, uropathies and HIV. In apparently healthy populations, glomerular diseases and urinary tract infections were the leading cause of chronic kidney disease. Therefore, characterized by its latency and quiet character, only routine screening or in high-risk groups, would allow early diagnosis and possibly adequate care.

This screening study could be feasible in a large part of our population, thereby enabling the establishment of a national registry for renal disease.

Conflict of interests: None.

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Table I: Overview of the study population

	At risk population		Healthy population			
Gender Age	Male	Female	Male	Female	Total	%
20 – 30	4	11	35	26	76	38,19
31 – 40	6	6	11	9	32	16,08
41 – 50	10	4	4	1	19	9,54
51 – 60	8	8	2	1	19	9,54
61 – 70	15	12	4	1	32	16,08
71 – 80	13	3	0	0	16	8,04
81 – 90	5	0	0	0	5	2,53
Total	61	44	56	38	199	100

Table II: Prevalence of kidney disease in the general population

	At risk population	Healthy population	Total
Renal disease	62 (59%)	15 (16%)	77
Normal renale Fonction	43 (41%)	79 (84%)	122
Total	105	94	199

OR = 7.59; RR = 2.28; 95% CI
Chi2 Yates corrected = 37.03; p = 0.00000001

Table III: Distribution of populations with renal disease by gender

	At risk population	Healthy population	Total
Male	33(53,3%)	9(60%)	39(50,6%)
Female	29(46,7%)	6(40%)	38(49,4%)
Total	62	15	77

Table IV: Distribution of patients with risk factors according to the creatinine clearance.

Clairance	Diabetes	HTA	VIH	Uro	Diab+ HTA	HTA+Uro	VIH+Uro	Tot
60 – 89	2	6	3	5	8	2	1	27
30 – 59	3	7	8	3	2	0	0	23
15 – 29	1	2	1	2	2	0	0	8
≤ 15	1	0	0	1	2	0	0	4
Total	7	15	12	11	14	2	1	62

Table V: Distribution of the apparently healthy population with renal disease

Clairance (ml/mn)	60 – 89	30 – 59	29 – 15	≤ 15
Male	7	2	0	0
Female	5	0	1	0
TOTAL	12	2	1	0

Table VI: Changes in urinary parameters in the study population (n = 199)

Parameters	At risk population	apparently healthy population	Total
Proteins	86 (82%)	19 (20%)	105 (53%)
Blood	42 (30%)	3 (3%)	45 (22%)
Glucose	31 (30%)	1 (1%)	32 (16%)
Nitrites	15 (14%)	2 (2%)	16 (9%)
Leucocytes	40 (38%)	6 (6%)	46 (23%)