

# Incidence Of Chronic Renal Failure Among Diabetic And Hypertensive Patients At The University College Hospital, Ibadan, Nigeria.

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## Abstract

Millions of people around the world suffer from chronic renal failure (CRF) and some of these patients will eventually need haemodialysis and/or renal transplant to prolong their lives. This study therefore examined the incidence of CRF among diabetes and hypertensive patients.

The study setting was the dialysis unit of the University College Hospital, Ibadan. Purposive sampling was used to collect data and the records of all the patients that developed CRF as a complication of diabetes and hypertension from January 2010 to December 2012 were used (retrospective). A checklist was developed to elicit data from admission register and patient's case files.

Two hundred and eighty eight (288) patients were identified, 123 (42.7%) had Diabetes Mellitus and hypertension while 165 (59.3%) were shared by other medical conditions.

Pearson Product Moment correlation was used to analyze the data collected. The results showed that DM and CRF were significantly correlated ( $p < 0.05$ ) and the relationship was positive and strong ( $r = 0.74$ ).

Hypertension and CRF were also significantly correlated ( $p < 0.05$ ), the relationship was positive but weak ( $r = 0.254$ ). The results also showed no significant difference between age and gender of patients developing CRF ( $p < 0.05$ )

It was concluded that there was need to replicate this study as a comparative study between 2 or 3 hospitals and explore the factors responsible for higher incidence of CRF among young adults.

## INTRODUCTION

The development of chronic renal failure (CRF) or end stage Renal Disease (ESRD) constitutes a traumatic event, while the patient directly experiences the kidney crisis, the family members experience psychological crisis. Chronic renal failure is a common cause of morbidity and mortality in developing countries. (Alebiosu, Ayodele, Abbas, Olutoyin, 2006).

The incidence of ESRD has risen dramatically in the past decade mainly due to the increasing prevalence of diabetes mellitus (DM), and both unpaired glucose tolerance and hypertension are important contributors (Akintoye, Odebode and Oyedele 2008). The risk factor of developing CRF is gradually increasing in the Nigerian population as we witness economic growth. This has been associated with improved standard of living and life expectancy,

urbanization and increasing affluence all of which tend the people towards adopting life styles that support the risk factors of hypertension, diabetes mellitus, glomerulonephriti, etc. (Akinkugbe 1992). This can be corroborated with the result of data analysis of patient with CRF in Nigeria. At Lagos State Teaching Hospital (LUTH) one out of 16 clients that report to the renal clinic weekly have kidney damage. At University College Hospital (UCH) 3 out of 4 cases seen weekly with CRF account for 5-10%. Of patients admitted at St Nicholas Private Hospital Lagos, 300 accounts of dialysis are carried out monthly and 2 new cases seen every week. (Akintoye, Odebode and Oyedele. 2008).

The first documented Kidney transplant in the United States was performed in June 1950 on a 44 year old woman, and in 1954 there was a Boston transplant between identical twins. The first documented case in the United Kingdom was in

1960 (Brook and Nicholson 2003). Figures are lacking in Africa and indeed, Nigeria.

CRF and ESRD are becoming increasingly prevalent in Nigeria and indeed worldwide; this poses a concern to the whole world at large. (Kadiri, S. 2006). In order to join the World (World Kidney Day, March 13) in drawing attention to the increasing pandemic of chronic renal disease, the Nigerian Association of Nephrology has embarked on various activities focused on primary, secondary, and tertiary prevention in various centers located in different states. (Arogundade, Sanusi, & Akinsola, 2006).

Patients with CRF require dialysis/kidney transplant to survive, and to save a kidney one needs N\$ 100,000 per month which do not offer much relief and kidney transplant in hospitals cost over 3 million naira (Kadiri & Salako, 1997).

## OBJECTIVES

To determine the incidence of CRF among patients with diabetes mellitus and hypertension.

To establish the relationship between age and development of CRF.

To establish the relationship between gender and incidence of CRF.

To assess the relationship between cigarettes, alcohol, and CRF

## MATERIALS AND METHODS

This retrospective study was carried out at the dialysis unit of the University College Hospital, Ibadan, Nigeria. Records of patients with CRF as a complication of diabetes mellitus and hypertension who have undergone hemodialysis or kidney transplant between January 2010 to December 2012 were purposively selected to extract demographic and clinical information. The dialysis unit was established in the early nineties. It is equipped with eight dialyzing machines.

A checklist was developed to elicit data from the admission register and patient case files

Permission was obtained from the ethical committee of the study setting and same was taken to dialyzing unit.

Descriptive statistical technique was used to analyze the data and was presented in percentages, tables and figures.

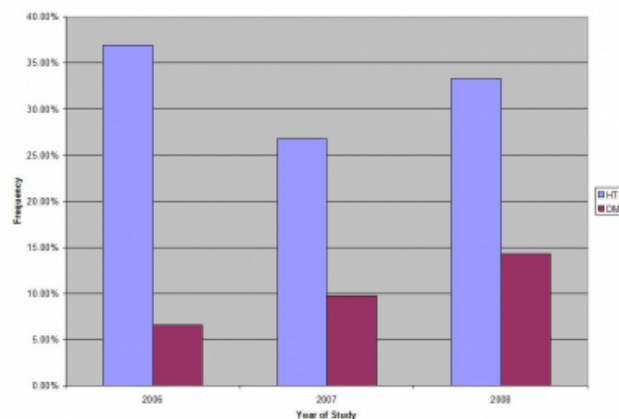
Pearson Product Moment (PPM) correlation was used to

analyze the hypotheses.

## RESULTS

**Figure 3**

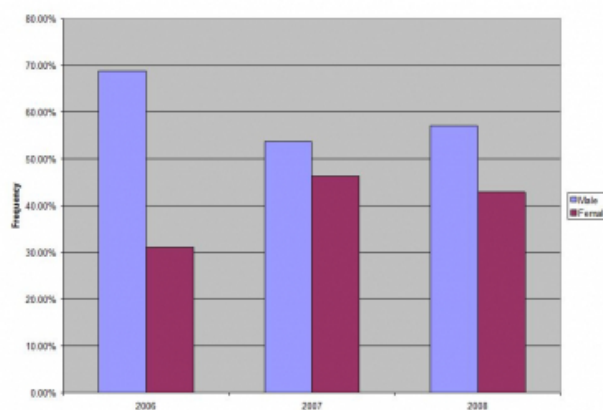
Distribution of Hypertensive and Diabetic patients with Chronic Renal Failure (CRF).



The total number of patients for the 3 year study was 288, 123(42.7%) had hypertension and diabetes while the remaining 165(59.3%) shared other medical conditions i.e. polycystic kidney disease, chronic Glomerulonephritis HIV/AIDS, sepsis, nephritic syndrome, HbSS, nephrosclerosis etc.

**Figure 4**

The relationship between gender and CRF



In 2006 the total number of patients with CRF were 122 males 84(68.9%) while females were 38(31.1%), while total number of patients in 2007 was 82, males 44(53.7%) and females 38(46.3%) and in 2008 was 84 male 48 (57.1%) females 36(42.9%).

## HYPOTHESIS TESTING

Hypothesis 1: Those patients with diabetes mellitus (DM)

are most likely to develop chronic renal failure (CRF).

**Table 2**

Pearson product Moment (PPM) correlation summary of patients with CRF secondary to DM.

Patients with DM	Pearson correlation	P value
28	.74	.019

The result of the Pearson product moment correlation coefficient analysis showed that diabetes and chronic renal failure are significantly correlated ( $p < 0.05$ ). The positive and strong relationship ( $r = 0.74$ ) implies that diabetic patients has a very high tendency to develop chronic renal failure. Therefore the null hypothesis was rejected while alternative was accepted.

Hypothesis 2: Those patients with hypertension are most likely to develop chronic renal failure.

**Table 3**

Patients with HTN	Pearson correlation	p. value
95	.154	.008

From the table, Pearson correlation showed that hypertension and chronic renal failure are significantly correlated ( $p < 0.05$ ). The relationship was positive but weak ( $r = 0.154$ ). This implies that hypertensive patients are likely to have chronic renal failure.

Frequency and percentage distribution of patients with chronic renal failure that drank alcohol between Jan 2010 and Dec. 2012.

**Table 4**

Response from record	Frequency	Percentages
Yes	100	34.7
No	121	42.0
No available data	67	23.3
Total	288	100.0

The table showed that the highest percentage of patients (42.0%) from their record history do not drink alcohol while 34.7% do drink and no available data for 23.3%.

Frequency and percentage distribution of patients with chronic renal failure that smoked cigarettes between Jan 2010 and Dec 2012.

**Table 5**

Response from record	Frequency	Percentages
Yes	38	13.2
No	182	63.2
No available data	68	23.6
Total	288	100.0

Out of the total number of 288 patients that had CRF between Jan 2010 and Dec 2012, 38 (13.2%) smoked cigarettes which was a smaller population out of the total number, 68 (23.6%) records were not available while the highest number 182 (63.2%) do not smoke cigarettes.

Frequency and percentage of patients with chronic renal failure that smoke cigarettes and drinks alcohol between Jan 2010 and Dec 2012.

**Table 6**

Response from record	Frequency	Percentages
Both	37	12.8
None	188	65.3
No available data	63	21.9
Total	288	100.0

From the table the total number of patient that drank alcohol and smoked were just 37 (12.8%) while majority do not take anything 188 (65.3%), and 63 (21.9%) data were not available.

Pearson product moment (PPM) correlation analysis of the relationship between CRF and cigarette and alcohol.

**Table 7**

Variable	Pearson correlation	P value	N
Cigarette	0.717	0.024	38
Alcohol	0.272	0.07	37

The result of the analysis showed that there was no significant correlation between cigarettes and development of CRF ( $p < 0.05$ ) but the relationship was positive and weak ( $r = 0.024$ ), this implies that people who smoke may likely develop CRF.

The correlation between CRF and alcohol also was not significant ( $p < 0.05$ ) and no relationship exist ( $r = 0.272$ ) i.e. people who use alcoholic beverages are not likely to develop CRF.

**Table 8**

Age	N	Mean	Std	df	t	P value
Young adult	226	1.9956	.6652	286	-0.797	.426
Older adult	62	2.0000	.0000			

From the table above, Pearson correlation showed that there is no significant difference between young adult and older adult developing CRF ( $p < 0.05$ ). This null hypothesis was accepted while alternative hypothesis was rejected. This implies that age was not a determinant of CRF.

**Table 9**

Age	N	Mean	Std	df	t	P value
Male	176	1.9943	.07538	286	-0.523	.601
Female	112	2.0000	.00000			

It was observed from the above table that there was no significant difference between male and female developing CRF ( $p > 0.05$ ).

Null hypothesis was accepted while alternative was rejected which implied that sex was not a determinant.

## DISCUSSION

This retrospective study is on the incidence of chronic renal failure among diabetic and hypertensive patients. Manual searches and internet were assessed in a bid to look for relevant studies. The subsequent review of the literature showed that several studies have been conducted in U.S, U.K, Australia, Japan as well as Nigeria to describe the prevalence as well as incidence of CRF among diabetic and hypertensive patients.

The results from this study showed that between January 2010 and December 2012, a total of 288 patients had chronic renal failure (CRF). The year - on - year numbers were as follows: 122 in 2010 hypertensive patients were 45 while only 8 had DM, 22 had HTN while 8 had DM in 2011, and in the year 2012; 28 patients had HTN while 12 had DM.

Fig 3 illustrated a comparison between the number of patients with HTN and DM that had CRF.

Table 2: showed that diabetic patients had a very high tendency to develop CRF ( $r = 0.74$ ).

This confirmed the study conducted by Alebiosu et al (2006) which stated that diabetes has been the leading cause of CRF in some countries (U.S, Europe, Japan, Canada, etc) But the study in Nigeria had diabetes for 11 % while

hypertension accounted for 61 %. This implied that individual with DM had a significantly greater likelihood of CRF than people with HTN. On the other hand Table 3: showed that the relationship between hypertension and CRF was weak ( $r = 0.154$ ) this implied those hypertensive patients are less likely to develop CRF compared to diabetic patients. This is contrary to Salako (2006) in a study which revealed hypertension as the leading cause of CRF in Nigeria while diabetes was the second leading cause. The study also stated that the control of hypertension, diabetes, obesity, smoking and preventing ingestion of heavy metals (e.g. lead) were intervention strategies that retard or prevent progression to CRF. This was consistent with Health Action Process Approach (HAPA) which stated that intention was the most significant predictor of health behavior. According to Fig 2 intention is to retard progression to CRF from either hypertension or diabetes and this leads to planning. This was confirmed by Alebiosu et al (2006) who stated that a comprehensive health education and regular screening of individuals with high risk are needed.

Relationship between age and development of CRF: Table 7: showed that there was no significant difference between young adult and older adult developing CRF therefore the null hypothesis was accepted while alternative was rejected. This implies that age is not a determinant of CRF. This is contrary to Alebiosu et al (2006) which stated that the prevalence of CRF was 6-10 times higher in patients between 70-90 years of age in the U.S. But the result of the study conducted in Nigeria revealed the peak prevalence between the third and fifth decade of life which also confirmed the findings of this study.

The finding from the study showed in Table 8: that sex was not a determinant of development of CRF. This was contrary to USRDS (2004) Annual Data Report which revealed that the incidence rate of CRF was higher for males (409/million) than females (276/million). The study also tried to assess the relationship between alcohol, cigarette and CRF, of the total population (288) 100 (34.7%) took alcohol (Table 4), .38(13.2%) smoked cigarette (Table 5) while 37 (12.8%) took both.

Pearson correlation showed that there was no significant relationship between alcohol cigarette and CRF ( $p > 0.05$ ). This was contrary to a prospective study on the association between alcohol consumption and CRF in the U.S (Shaetmer, Kurth, Giynn, Buring & Gaziene 2000) The study prospectively evaluated an association between

alcohol consumption and the development of CRF in a cohort study for a period of 14 years of alcohol consumption. 95% of the population was found to have elevated creatinine and reduced glomerular filtration rate ( $p < 0.01$ ). Smoking was also found to increase the risk of developing CRF i.e. it causes microalbuminuria and reduced glomerular filtration rate. As expected, self-efficacy was a significant predictor of performance that is consistent with HAPA i.e. patient with hypertension and diabetes should have strict BIP and glycaemic control, life style modification and medication compliance are all in initiatives to prevent outcome expectancies (CRF).

These relationships between self-efficacy and outcome expectancy are needed by an individual before behavior change.

Schwarzer (2007) identified that there are some barriers and opportunities which affect individual actions. This was confirmed in the literature that cost of analysis, noncompliance with medication, lack of life style modifications, non-accessibility of health care services. (Alebiosu et al 2006) Due to the nature of this study, social support was not identified.

The incidence rates per year were as follows

2010 42.4/100,000

2011 28.4/100,000

2012 29.2/100,000

## **SUMMARY AND CONCLUSION**

This retrospective study described the incidence of chronic renal failure among diabetic and hypertensive patients in the University College Hospital between January 2010 and December 2012. 288 patients were identified, 176 males & 112 females.

The findings from the study revealed that both hypertension and diabetes were significantly related to chronic renal failure (CRF) but individuals with diabetes had a significantly greater likelihood of developing CRF ( $r = 0.74$ ).

There was no significant difference between development of CRF and both age and gender. This retrospective study could not conclude which BIP or sugar level was safe to prevent CRF or delay progression to CRF. However the BIP that would prevent renal failure is currently being examined in

the European paediatric multicenter study (Mitsnesfes, Leun & Enery 2006).

Prevention of chronic renal failure is a desirable goal, but without international help to bolster prevention and therapy, this terrifying prevalence will persist. Therefore it is necessary to make the following recommendation which were based on the data collected.

The most efficient way to reduce the burden of CRF is to prevent and treat its risk factors. Screening individuals at high risk for CRF (e.g., people older than 50 years; people with a history of diabetes mellitus, hypertension, cardiovascular disease; or people who have a family history of CRF) may prevent or delay kidney failure. There should be sustained efforts from government, non-governmental agencies, international societies and pharmaceutical industry and philanthropic bodies. The health needs of the people should be placed above politics. Developing prevention programmes and training of rural health workers.

The government should provide a circumscribed chronic dialysis programme and increase the availability of transplantation at a subsidized price (both living donor and cadaver) strategies should be developed to screen for and manage diabetes and hypertension at the primary health care level in an effort to decrease the incidence of CRF. Improvement in social and economic circumstances of citizens which eventually lead to improvement in health status.

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## ***Incidence Of Chronic Renal Failure Among Diabetic And Hypertensive Patients At The University College Hospital, Ibadan, Nigeria.***

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