



# Kidney Parameters And Age Structure Among Southeast Nigerians.

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## Abstract

Kidney parameters viz: length, breadth, thickness and volume were measured by trans-abdominal ultrasound among randomly selected 120 subjects from Southeast Nigeria. The subjects were both sexes aged between 15 and 70 years. Results showed that in all age groups the length of the kidney is longer in the age range of 31 – 40 years, thereafter the kidney length begin to decline. A positive correlation was established between age and kidney length up to the age of 40 years.

**Key words: Kidney size, age, ultrasound.**

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The gross structural viability of the kidney has been known to be related to its function. Hence significant deviations from kidney normograms would be expected to affect the excretion of metabolic wastes and the production of erythropoietin, prostaglandins and renin necessary for homeostasis of the internal milieu. Kidney size and function can be affected by age.

(Meyer & Bellucci, 1986). Miletic et al (1998) mentioned pathological conditions affecting kidney size and function to include congenital abnormalities and some systemic diseases such as hypertension and diabetes.

One way of monitoring the gross structural viability of the kidney is by measuring the sizes of the kidney. Ultrasonography as a means of measuring the kidney sizes has the advantage of being comparatively inexpensive, non-invasive, portable and requires minimal patient preparation.

Established normograms for the kidney among Caucasians have been well documented. McLachlan & Wasserman (1981), Mcninn (1994) and Miletic et al.(1998) reported values for Caucasians. Comparative values for Nigerian blacks are rather scanty or not available in literature. This study aims at determining kidney sizes among healthy adult Nigerians of Southeast extraction. It is expected to provide a

baseline data with which to monitor deviations from established normograms.

## MATERIALS AND METHOD

This is an ultrasound based study carried out by researchers from Abia State University Medical School at a referral radio imaging centre in Enugu, that has the South East geopolitical entity as its catchment area. The study took place between April 2000 and February 2001.

## Subjects

One hundred and twenty (120) apparently health Nigerians of both sexes were randomly selected into the study. The age of study population was between 15-70 yrs. Subjects with elevated blood pressure above 140/90 mmHg, or already on antihypertensive therapy were excluded. Also excluded were patients with and evidence of renal disease or obstructive uropathy. Also excluded were those with systemic diseases associated with nephropathy.

## Experimentation

Kidney parameters: length, breadth and thickness were measured by abdominal ultrasonography. The measurements were made by the same observer using the same instrument in order to eliminate inter-observer errors. The instrument used was a multi-purpose Philip Sterling Scanner with a



3.5MHz transducer – a frequency used for deep structures.

Subjects ages were recorded and compared with kidney parameters.

### RESULTS

Of the 120 subjects 67 (56%) were males while 53 (44%) were females.

**Table 1: Mean values of kidney parameters**

Parameters	Right Kidney		Left kidney	
	length (mm)	Breath (mm)	length (mm)	Thickness (mm)
Length	102.95	0.94	106.55	0.82
Breath	56.00	0.48	59.30	0.67
Thickness	38.28	0.57	41.97	0.63

The overall mean values of the kidney parameter are presented in Table 1. Differences were observed between the values of the left and right kidneys with the left kidney showing higher values in all the recorded parameters.

According to the age group categories Table 2 showed that the length of the left kidney in female is more than the right kidney and from the age group 51-60 years, the kidney begins to decrease. The pattern of increase or decrease in the left kidney showed no consistency with regards to the breath and thickness. However, there was a consistent increase in kidney length started decreasing. The trend was similar in the relationship between age and the right kidney in females (Table 3). The pattern of relationship in males (Table 4 & 5) showed a similar trend to that of females except for the observed lower values.

**Table 2: Relationship between age and left kidney in females. (n = 120)**

Age (years)	length (mm)	Breath (mm)	Thickness (mm)
15-20	108	49	42
21-30	106	60	42
31-40	107	61	43
41-50	104	56	38
51-60	99	61	44

**Table 3: Relationship between age and right kidney in females. (n = 120)**

Age (years)	length (mm)	Breath (mm)	Thickness (mm)
15-20	95	54	36
21-30	103	60	39
31-40	102	59	37
41-50	103	57	35
51-60	97	57	36

**Table 4: Relationship between age and right kidney in males. (n = 120)**

Age (years)	length (mm)	Breath (mm)	Thickness (mm)
15-20	103	59	40
21-30	104	60	40
31-40	105	59	39
41-50	106	62	36
51-60	102	62	42
61-70	89	59	39

**Table 5: Relationship between age and left kidney in males. (n = 120)**

Age (years)	length (mm)	Breath (mm)	Thickness (mm)
15-20	106	61	40
21-30	105	60	42
31-40	113	58	42
41-50	105	60	43
51-60	109	58	45
61-70	106	55	43

### DISCUSSION

The present study has established a mean kidney length of 104.75mm, breadth 57.7mm and thickness 40.13mm. Compared with Caucasian values (Mcnin,1994), the observed parameters for Nigerian blacks tend to be smaller. These racial differences in the parameters could be explained by genetic and environmental differences.

Values for males are generally higher than for females of the same age range indicating sex difference as observed by Mileteic(1998). Haughsvedt &Lundberg (1980) measuring kidney length in boys and girls could not establish any difference in the parameters suggesting that the observed differences may be seen only in adults.

The results show a positive correlation when both male and female values are pooled together between the

subject age and kidney (Mclachlan & Wasserman, 1981). Mcninn (1994) recorded that after middle age the kidney length diminished by approximately 0.5cm per decade. Miletic et al. (1998) also reported that in addition this decrease tends to accelerate from 60 years. Meyer and Bellucci (1986) suggested that this observation could be due to increased glomerular sclerosis and arteriolar vascular changes.

While this study has established values for Southeast Nigeria, there is need for multicentre studies to establish a broad based Nigerian figure.

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