eGFR USING CKD- EPI, MDRD AND COCKCROFT- GAULT AND GLYCAEMIC CONTROL AMONG TYPE 2 DIABETICS IN AN OUT- PATIENT CLINIC IN NIGERIA

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INTRODUCTION

Diabetic nephropathy remains a major cause of morbidity and mortality for persons with either T1DM or T2DM[1]. Presently, diabetes is the leading single cause of ESRD[1]. Globally, most patients with diabetes are in developing countries that do not have the resources or health infrastructure to provide universal renal replacement therapy. The ADA recommends screening for diabetic nephropathy with estimated glomerular filtration rate (eGFR) at least once a year[1]. Normal GFR is 80- 130mm/min/1.73m^2

OBJECTIVES

The aims of this study were to determine the correlation between glycated haemoglobin and eGFR by CKD-EPI among Type 2 diabetics

To assess the validity and reliability of CKD- EPI, MDRD and Cockcroft- Gault equations in diagnosing diabetic nephropathy

MATERIALS AND METHODS

A retrospective analytical study was carried out in the Endocrine and Metabolic outpatient clinic in Delta State University Teaching Hospital, a tertiary hospital in Delta State, Nigeria. 150 patients who had been to the clinic between March 2013 and March 2015 were selected. Data were collected using a standardized questionnaire which included biodata and laboratory parameters at last clinic visits. Inclusion criteria included type 2 diabetics seen in the clinics in the last 24 months. Exclusion criteria included known CKD or DM nephropathy patients, very ill patients. Estimated GFR was calculated using the MDRD, CKD-EPI and Cockroft- Gault formulae. Data was analysed using the Statistical Package for Social Sciences (SPSS) version 20

RESULTS

150 patients participated in the study. 79 (52.7%) were females and 71 (47.3%) males. The mean age group was 58.9 (11.3) years. The average duration of time passed since diagnosis of diabetes mellitus was 7.9 (7.0) years. The mean FBS was 129.3 (49) mg/dl, HbA1c was 8.3 (2.6)%, PCV 34.5 (5.9%). Mean CKD- EPI was 86.9 (24.7), MDRD 87.6 (27.9), Cockcroft- Gault 79.3 (30.7). Figure 1 shows the age distribution against sex. Table 1 shows the clinical characteristics of the subjects. Figure 2 shows a negative correlation between HbA1c and eGFR CKD-EPI with correlation coefficient -0.13 ($p < 0.001$)

Table 2 shows CKD- EPI has a sensitivity of 80%, specificity 62.9%, accuracy of 64%. MDRD has a sensitivity of 90%, specificity of 57.9%, accuracy of 60%. Cockroft- Gault has a sensitivity of 90%, specificity 44.3%, accuracy of 47.3%.

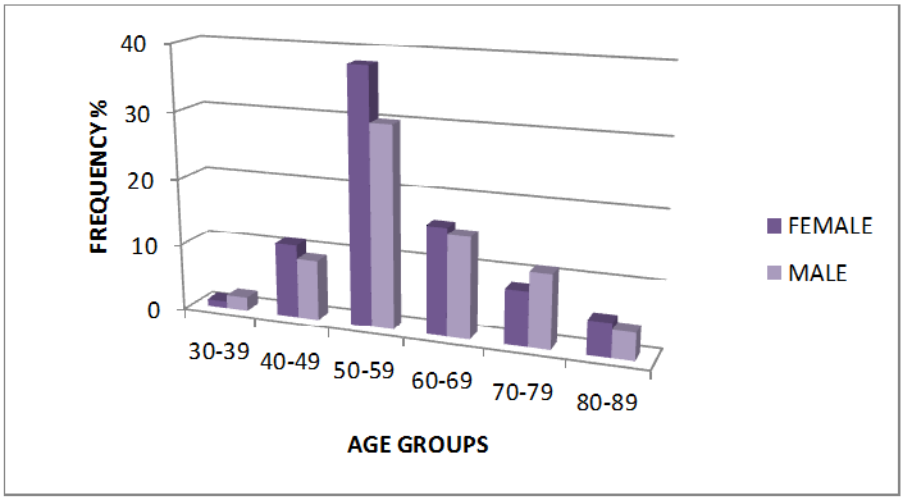

Figure 1 AGE GROUP AGAINST SEX

TABLE 1 CLINICAL DATA

VARIABLES	CATEGORIES	FREQUENCY	PERCENTAGE%
SEX	MALE	71	47.3
	FEMALE	79	52.7
BMI	UNDERWEIGHT	26	17.3
	NORMAL	52	34.7
	OVERWEIGHT	50	33.3
	OBESE	22	14.7
YEARS AFTER DM DIAGNOSIS	< 5 YEARS	41	27.3
	5-10 YEARS	51	34
	>10 YEARS	58	38.7
HbA1C	≤ 7	73	48.7
	>7	77	51.3

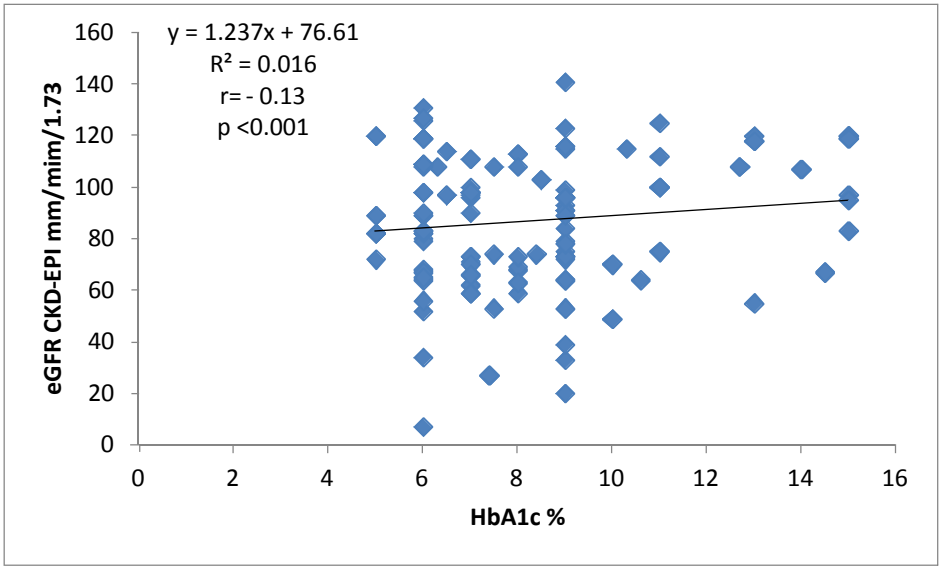

FIGURE 2 RELATIONSHIP BETWEEN HbA1C and CKD- EPI eGFR

TABLE 2 Assessment of validity and reliability of CKD EPI, MDRD and COCKCROFT-GAULT eGFR in DM nephropathy screening

VALIDITY	CKD EPI	MDRD	COCKCROFT
SENSITIVITY	80	90	90
SPECIFICITY	62.9	57.9	44.3
POSITIVE PREDICTIVE VALUE	13.3	13.2	10.3
NEGATIVE PREDICTIVE VALUE	97.8	98.8	98.4
FALSE POSITIVE VALUE	37.1	42	55.7
ACCURACY	64	60	47.3

DISCUSSION

These results are comparable to reports by Michels[2] et al (2010) where CKD – EPI had the highest accuracy. However its different from findings from Rognant[3] et al (2011) where the CKD- EPI faired similar or worse than MDRD among their patients. The differences could be as a result of the differences between African, European and American diabetic patients

CONCLUSION

Diabetic nephropathy remains a challenge for diabetes care. Early diagnosis is key. Different formulae are available to estimate glomerular filtration rate. eGFR increases as glycaemic control improves in type 2 diabetics. CKD- EPI has the highest accuracy though it also has the lowest sensitivity

REFERENCES

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