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Research Paper

Risk Assessment of Chronic Kidney Disease

Medical Science

KEYWORDS : eGFR, CKD, Hypertension, Diabetes Mellitus.

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ABSTRACT

Hypertension and Diabetes Mellitus are the common noncommunicable diseases which causes Chronic Kidney Disease. Aim of the study was to identify subjects with Chronic Kidney Disease (CKD). Adults on treatment for Diabetes or Hypertension or both for 5 or more years were selected for the study. Tools used for data collection were demographic proforma, serum creatinine, Glucometer Random Blood Sugar (GRBS), and blood pressure. Glomerular Filtration Rate (eGFR) was estimated by using Modification of Diet in Renal Disease (MDRD) equation. Out of 103 participants, 47.6%, 19.4% and 33% of them were Hypertensive, Diabetic and Both Hypertensive & Diabetics respectively. Chronic Kidney Disease stages I, II, III &IV were found in 33% (34), 57.30% (59), 8.70% (09) & 1% (1) of the subjects respectively.

INTRODUCTION

Chronic Kidney Disease (CKD) is becoming a major global health problem. Prevalence of CKD is estimated to be 8-16% worldwide [1]. In India the approximate prevalence of CKD is 800 per million populations (pmp), and the incidence of End-Stage Renal Disease (ESRD) is 150-200 pmp and the most common cause of CKD is diabetic nephropathy [2]

India has the largest number of Diabetics in the world with a prevalence of 3.8% in rural and 11.8% in urban adults. The prevalence of hypertension has been reported to range between 20-40% in urban adults and 12-17% among rural adults. It is estimated that 25-40% of diabetic and hypertensive patients are likely to develop CKD [3]

MATERIALS AND METHODS

STUDY POPULATION

A descriptive survey was conducted over a period of six months from July – December2013. Adults on treatment for Diabetes or Hypertension or both for 5 or more years were selected for the study. The objective of the study was to identify subjects with Chronic Kidney Disease among the adults in the age group of 30years and above with Hypertension, Diabetes Mellitus or both. Sample size was 103 and selected through purposive sampling.

DATA COLLECTION

The study protocol titled "Reference range of estimated Glomerular Filtration Rate and its implication in Disease Management Program for Chronic Kidney Disease, Udupi District, India" was approved by the Institutional Ethics Committee (IEC). IEC number is 184/2011. The present study is part of the above study. Written informed consent was taken from all the subjects. The study was conducted at Udyavara, Malpe, Alevoor, Kadekar gram panchayat area of Udupi district, Karnataka state of India. Respondents were selected based on the sampling criteria, who visited the local clinic of the selected area. Standardized method (Jaffe) was used to check serum creatinine.

Tools used for data collection were demographic proforma, serum creatinine, blood sugar and blood pressure. Blood pressure was checked in sitting position in right arm by using the sphygmomanometer and Glucometer Random Blood Sugar (GRBS) was tested using the Acu Check glucometer. GFR was estimated by using MDRD equation for Caucasians. Advised the subjects with stage IV CKD to consult the nephrologists for further management.

STATISTICAL ANALYSIS

Statistical analyses were performed using SPSS version 16.0. Categorical variables like age, gender, disease status were described using frequencies and percentages. eGFR was calculated using the Abbreviated MDRD Study Equation.

$$e\ GFR = 186 \times (sCr)^{-1.154} \times (age)^{-0.203}$$

Where sCr is raised by power of -1.154, where age is raised by power of -0.203 .

Modifiers

Female: Multiply GFR by 0.742

Annotation

Where GFR=Glomerular filtration rate ml/min/1.73 m2 , Where sCr is Serum Creatinine in mg/dl, age in years.

RESULTS

Total 103 subjects were studies. The sample characteristics like age, gender, disease status were tabulated in table 1.

Table1. Sample characteristics in frequency (f) and percentage (%)

n= 103

Variables	Age (in years)	f %
Age	30-40 41-50 51 & above	2 (1.9) 14(13.6) 87(84.5)

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Variables	Age (in years)	f %
Gender	Male Female	52(50.5) 51(49.5)
Disease status	Hypertension (HTN) Diabetes Mellitus (DM) Both HTN & DM	49(47.6) 20(19.4) 34(33)

The data presented in table 1 show that 84.5% (87) of them belongs to the age group of 51 and above, 50.5% (52) of them were females, and 47.6% (49) of them were hypertensive.

Variables Groups		f	%
SBP (mm of Hg) n=83	110-140	42	(50.60)
	141- 220	41	(49.40)
DBP (mm of Hg) n=83	60-90	67	(80.72)
	91-110	16	(19.28)
GRBS (mg/dl) n=54	89-150	22	(40.74)
	151-200	17	(31.48)
HTN duration (in years) n=83	201-400	15	(27.78)
	5-10	53	(75.90)
(DM) duration (in years) n=54	11-15	11	(13.25)
	>15	9	(10.35)
	5-10	42	(77.78)
	11-15	5	(09.26)
	>15	7	(12.96)

Table 2 – Duration and Distribution of Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) and GRBS in frequency (f) and percentage (%)

The data presented in table 2 shows that Most (49.40%) of them were having systolic blood pressure 141-220mm of Hg, 19.28% of them were having diastolic blood pressure range 91-110 mm of Hg and 27.78% of them were having GRBS 201-400mg/dl.. Most of them belongs to duration of illness of 5-10 years in Hypertensive 75.90% (53) and Diabetics 77.78 % (42).

Table3. Stages of Chronic Kidney Disease of samples in terms of frequency and percentage

Variables	CKD stages			
	I f (%)	II f (%)	III f (%)	IV f (%)
HTN (n= 49)	14 (28.58)	30 (61.22)	5 (10.2)	0
DM (n=20)	6 (30)	13 (65)	1 (05)	0
Both HTN, DM (n=34)	14 (41.18)	16 (47.06)	3 (08.82)	1 (02.94)
HTN, DM and both (n=103)	34 (33)	59 (57.3)	09 (8.7)	1 (1)

The table 3 shows that 61.22% (30), 65% (13) and 47.06% (16) of them belong to stage II Chronic Kidney Disease among Hypertensive, Diabetics and both Hypertensive and Diabetics respectively. About 33% (34), 57.30% (59), 8.70% (09) & 1% (1) of them belong to I, II, III, IV stage of Chronic Kidney Disease respectively.

DISCUSSION

The study is compared with similar studies. The prevalence of CKD stage III, IV in the present study was 8.74 and 0.97 respectively. Study done in India by Ajay K Singh et.al shows prevalence of CKD stages 3 and 4 was 4.3%, 0.8% respectively [4].

In the present study 5% of the diabetics belong to CKD stage 3. A study done by Richard Haynes et. al in United Kingdom shows that 12% of the diabetic nephropathy patients progressed to end stage renal failure [5]. A study done by Morgan E games and et.al. in USA on identification of incident CKD stage 3 show that 17.2% of Diabetes Mellitus people were found to have CKD stage III [6].

The present study showed that 0.97% (1) of the subjects was having CKD stage IV. Study done by Celine Foote on impact of estimated GFR reporting on late referral rates and practice patterns for End Stage Kidney Disease patients shows that eGFR reporting was useful in reducing the late referral. The late referral rates were 25.8% and 21.85% in the pre and post eGFR reporting respectively. In hypertensive and diabetic patients the early referral rate was increased to 0.5% and 8.2% respectively [7].

CONCLUSION

Most of the subject's blood pressure and blood sugar was not under control. So providing awareness on control of Hypertension and Diabetes Mellitus is important. This study helped to sensitize the subjects on their stage of Chronic Kidney Disease.

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