Prevalence of Diabetes Mellitus, Hypertension and Proteinuria in a Rural area of Bangladesh

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Abstract

The prevalence of kidney disease, particularly diabetic and hypertensive kidney disease is increasing rapidly throughout the world.

This study was designed to detect the prevalence of diabetes, hypertension and proteinuria in a rural area of Bangladesh as these are the most common causes of CKD. Result of this study may give some idea about the prevalence of these three conditions as a whole among the rural population of Bangladesh.

In this prospective cross sectional study, 1240 adult subjects were screened for proteinuria (dipstick protein 1+), high blood pressure (BP 140/90 or antihypertensive treatment), and diabetes (WHO criteria).

The mean age was 37.1–10.9 years, 48 % were female, and 88.7 % were married . Prevalence of diabetes was about 4.9%, of them 49 % self reported and 51 % detected during the survey. Among self reported cases only 48% were on regular treatment. Prevalence of hypertension was 19.3%, of them 35% were self-reported, 65% detected during the survey. Regarding proteinuria, total 16.4% cases were found to have proteinuria of different grades (1+in 11.2% ,2+ in 4.4% ,3 + in 0.8%). Among them 62.4% had hypertension , 24.8% had diabetes and 17.4% had combined diabetes and Hypertension.

All these three conditions were found to be significantly higher in middle aged and elderly (40 years and above). Participants (both male and female) with single or multiple risk factors had significantly low eGFR compared to their normal counterpart. As the majority of the people remain undiagnosed it will increase the burden of CKD and on the other hand prevalence of this three conditions will help to define strategies that can identify early enough those subjects who are at risk of developing renal failure later in life.

Introduction

Chronic kidney disease (CKD) is becoming a major public health problem worldwide [1] .
The current burden of disease might be due to a change of the underlying aetiopathogenesis of CKD.
Glomerulonephritis was the one of the leading causes of kidney disease several decades ago[2].
Nowadays, infections have become a less important cause for kidney disease, at least in the western world[3].
Moreover, current evidence suggests that hypertension and diabetes are the two major causes of kidney disease worldwide[4]

Objectives

- This study was designed to detect the prevalence of diabetes, hypertension and proteinuria in a rural area of Bangladesh as these are the most common causes of CKD.
- Result of this study may give some idea about the prevalence of these three conditions as a whole among the rural population of Bangladesh.

Methods

- This present study was a cross sectional study.
- The study was carried out at rural area of Bhabakhali union of Mymensingh Sadar in Mymensingh District.
- Adult populations residing in the above mentioned area for at least 6 months were the study population.
- Inclusion criteria: Persons with following characteristics were included in the study, age ranging from 18 – 65 years of either sex

Methods (Cont.)

- Exclusion criteria:
  Persons with following characteristics were excluded from the study:
  - Persons with age <18 years or >65 years,
  - febrile illness, severe cardiac or respiratory failure,
  - previously known kidney disease,
  - urinary tract infection , pregnant women, menstruating women,
  - persons declining consent.
- A total of 1240 individuals who had completed data collection were entered into the study.
- The demographic variables included in the study were age, sex, marital status, religion, occupation, socioeconomic status, monthly income.
- The clinical variable was hypertension.
- The risk factors were Body Mass Index (BMI), smoking habit, hypertension, diabetes mellitus.
- Data pertaining to biochemical investigations such as urine for albumin, serum creatinine and random serum glucose were also recorded.
- Blood pressure (BP) was measured twice in the right or left arm using a calibrated sphygmomanometer at heart level.
- Diabetes mellitus was defined as symptoms of hyperglycemia and a random plasma glucose ≥11.1 mmol/l is defined as any time of day without regard to time since last meal .
- Urinary protein excretion >300 mg/L as evidenced by + or more in dipsticks test indicates proteinuria .
- Spot urine sample was collected in test tubes labeled with individual registration number for each participants and dipstick test was done on the spot using Albustix reagent strips for urinalysis.

Results

Fig 1: One thousand two hundred forty residents (of which 650 were males and 590 were females ,aged between 18 and 65 years), after giving informed consent and with complete data ,were enrolled into this study .

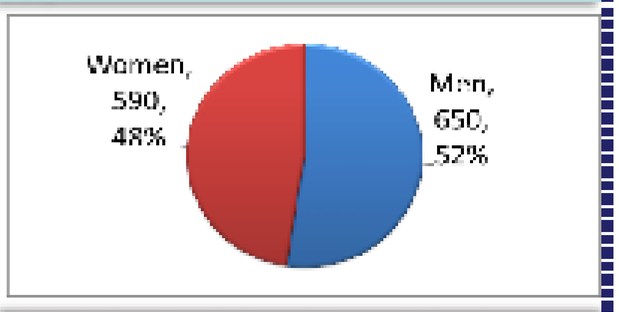

Table 1: Age distribution of the participants.
The mean age of the participants was 37.1 – 10.9 years and the lowest and highest ages were 18 and 65 years, respectively

Age (years)	Frequency	Percentage
≤30	340	27.4
31 – 40	496	40.0
41 – 50	248	20.0
51 – 60	108	8.7
> 60	48	3.9
Total	1240	100

Table 2: Distribution of participants by Urinary albumin (n = 1240)

Urine albumin	Frequency	Percentage
Nil/Trace	1037	83.6
+	139	11.2
++	54	4.4
+++	10	0.8

Fig 2: Distribution of participants by occupation

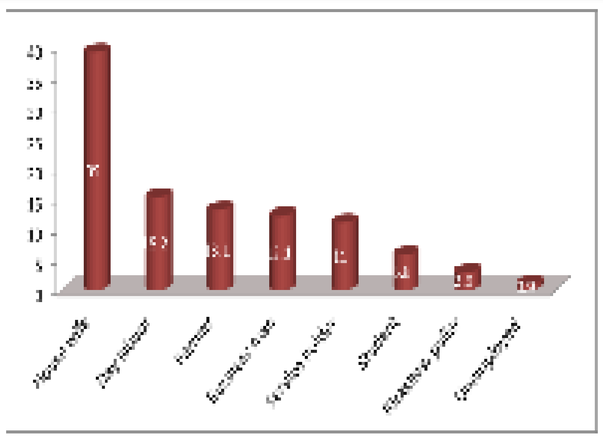

Fig 3: Distribution of risk factors like Diabetes, HTN & Smoking

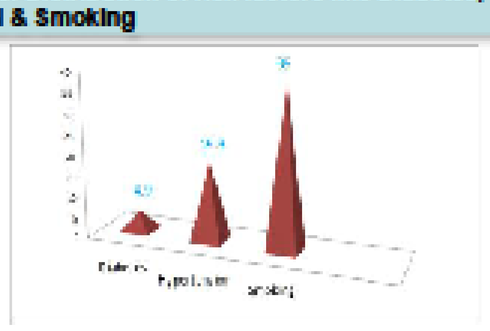

Table 3. Comparison of risk factors participants with and without CKD using MDRD equation

Modifiable risk factors	Group		p-value
	CKD (n = 242)	Normal (n = 998)	
Overweight & obese (≥25 kg/m²)	50(20.7)	142(14.2)	0.013
Smoking	113(46.7)	371(37.2)	0.006
DM (self-reported + RBS >11.1 mg/dl)	60(24.8)	20(2.0)	<0.001
HTN (self-reported + newly-diagnosed)	151(62.4)	88(8.8)	<0.001
Combined DM & HTN	42(17.4)	7(0.7)	<0.001

Discussion

In this prospective cross sectional study 1240 adult subjects were included. The mean age was 37.1 ± 10.9 years, 48 % were female , and 88.7 % were married . Prevalence of diabetes was about 4.9% , of them 49 % self reported and 51 % detected during the survey. Among self reported cases only 48% were on regular treatment . Prevalence of hypertension was 19.3%, of them 35% were self reported , 65% detected during the survey. Regarding proteinuria , total 16.4% cases were found to have proteinuria of different grades(1+in 11.2% ,2+ in 4.4% ,3 + in 0.8%).Among them 62.4% had hypertension , 24.8% had diabetes and 17.4% had combined diabetes and Hypertension. All these three conditions were found to be significantly higher in middle aged and elderly(40 years and above). Participants (both male and female) with single or multiple risk factors had significantly low eGFR compared to their normal counterpart.

Conclusion

Participants (both male and female) with single or multiple risk factors had significantly low eGFR compared to their normal counterpart. As the majority of the people remain undiagnosed it will increase the burden of CKD in developing country like Bangladesh. On the other hand prevalence of this three conditions will help to define strategies that can identify early enough those subjects who are at risk of developing renal failure later in life.

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