

Nocturnal pulse rate correlated with ambulatory blood pressure and target organ damage in patients with chronic kidney disease

The relationship between resting pulse rate (PR) and the occurrence of hypertension and cardiovascular (CV) mortality has been described in the general population. Few studies have examined the relationship between ambulatory PR, ambulatory blood pressure (BP), and target organ damage (TOD) in patients with chronic kidney disease (CKD). A total of 1509 patients with CKD were recruited in our hospital. Ambulatory blood pressure monitoring (ABPM) over a 24-hours period was performed and referenced with clinical data in this cross-sectional study. TOD was measured by estimated glomerular filtration rate (eGFR), left ventricular hypertrophy (LVH), and carotid intima-media thickness (cIMT). Univariate and multivariate analyses were used to evaluate the relationship between PR, BP, and TOD. The percentage of male patients was 58.3% with a mean age of 44.6 ± 16.2 years. Nocturnal PR rather than 24-hours PR or daytime PR was an independent risk factor for clinical hypertension, 24-hours hypertension, BP dipper state, poor renal function, and LVH. In addition, the authors found that nighttime PR >74 beats/min (bpm) group was independently associated with clinical hypertension, 24-hours hypertension, day and night hypertension, nondipping BP, lower eGFR, and LVH when compared with nighttime PR <64 bpm group. Furthermore, 1:1 propensity score matching between PR ≤ 74 bpm group and PR >74 bpm group was performed. Multivariate analyses indicated nighttime PR >74 bpm remained independently associated with clinical hypertension, daytime and nighttime hypertension, and LVH. An increased nocturnal PR is associated with TOD, higher BP, and nondipping BP in patients with CKD.

TABLE 1 Baseline characteristics of patients with CKD, stratified by tertiles of nighttime average PR

Variables	Total (N = 1509)	Nighttime average pulse rate (bpm)		
		T1 <64 (n = 503)	T2 64-74 (n = 503)	T3 >74 (n = 503)
Age (years)	44.7 ± 16.1	41.9 ± 16.9	44.8 ± 15.4*	47.2 ± 15.8***#
Sex (M/F, %)	58.3/41.7	62.3/37.7	55.8/44.2*	56.9/43.1
Current smoker, n (%)	18.9%	18.9%	19.4%	18.5%
Alcohol intake, n (%)	8.9%	7.5%	9.4%	9.7%
DM, n (%)	18.7%	11.0%	17.5%*	24.2%***#
BMI (kg/m ²)	23.2 ± 3.9	23.2 ± 3.8	23.4 ± 4.1	23.0 ± 3.8
Proteinuria (g/24 h)	1.6 (0.5-4.1)	1.3 (0.4-4.5)	1.6 (0.5-3.3)	2.0 (0.8-4.6)***#
Hemoglobin (G/L)	111 ± 29	123 ± 25	113 ± 28**	98 ± 28***#
Serum albumin (G/L)	33.9 ± 8.1	33.7 ± 9.0	34.0 ± 7.8	33.1 ± 7.4
Serum glucose (mmol/L)	5.5 ± 2.1	4.9 ± 1.3	5.3 ± 2.2*	5.5 ± 2.1**
CHOL (mg/dL)	5.8 ± 3.9	6.1 ± 3.0	5.7 ± 5.5	5.5 ± 2.6
LDL-C (mmol/L)	3.6 ± 2.1	3.9 ± 2.3	3.4 ± 1.8**	3.5 ± 2.0**
Total calcium level (mmol/L)	2.2 ± 0.2	2.2 ± 0.2	2.2 ± 0.2	2.1 ± 0.3***#
Phosphate level (mmol/L)	1.5 ± 0.5	1.3 ± 0.3	1.4 ± 0.4	1.7 ± 0.6***#
iPTH (pg/mL)	87.5 (39.6-264.5)	52.8 (31.1-110.3)	79.1 (40.6-236.2)**	174.5 (59.8-397.0) ***#
Serum creatinine (mmol/L)	179 (85-611)	107.4 (73.0-239.5)	165.1 (82.0-540.5)**	505.5 (146.0-913.2) ***#
BUN (mmol/L)	10.4 (5.7-20.6)	6.9 (4.9-13.8)	9.0 (5.5-19.9)**	17.5 (9.0-26.7) ***#
eGFR (mL/min/1.73 m ²)	33.0 (7.2-88.9)	70.7 (21.6-107.0)	36.8 (8.4-91.6)**	9.4 (4.7-43.0) ***#
eGFR <60 (mL/min/1.73 m ²)	48.5%	28.8%	46.1%**	70.5%***#
LVMI (g/m ^{2.7})	51.4 ± 17.0	47.5 ± 16.4	50.0 ± 18.7*	57.1 ± 18.1***#
LVH (%)	54.2%	41.7%	53.2%**	67.8% ***#
cIMT (cm)	0.74 ± 0.26	0.70 ± 0.46	0.73 ± 0.28	0.76 ± 0.29
Abnormal CIMT	24.1%	18.8%	27.1%	26.1%
RAS blockade	871 (57.7%)	318 (63.2%)	305 (60.6%)	248 (49.3%)***#
Calcium-channel blocker	498 (33.0%)	111 (22.1%)	156 (31.0%)**	231 (45.9%)***#
α-blocker	110 (7.3%)	27 (5.4%)	35 (7.0%)	48 (9.5%)*

BMI, body mass index; DM, diabetes mellitus; BUN, blood urea nitrogen; CHOL, total cholesterol; cIMT, carotid intima-media thickness; eGFR, estimated glomerular filtration rate; iPTH, intact parathyroid hormone; LDL-C, low-density lipoprotein cholesterol; LVH, left ventricular hypertrophy; LVMI, left ventricular mass index; RAS blockade, renin-angiotensin system blockade.

*Indicates $P < 0.05$.

**Indicates $P < 0.01$ when compared with tertile 1.

#Indicates $P < 0.05$.

***Indicates $P < 0.01$ when compared with tertile 2.

Prevalence of cardiovascular disease risk factors: A community-based cross-sectional study in a peri-urban community of Kathmandu, Nepal

A B S T R A C T

Background: As a low-income country, Nepal is experiencing cardiovascular diseases as an emerging health problem. However, studies are lacking on the risk factors of cardiovascular diseases in peri-urban communities; where the socio-demographical transition is in progress. Therefore, this study aimed to identify the prevalence and socio-demographic distribution of cardiovascular disease risk factors in one of the peri-urban communities in Kathmandu, Nepal.

Methods: We conducted a cross-sectional study in Sitapaila Village Development Committee, Kathmandu from February 2014 to February 2015. Altogether, 347 adults from 18 to 70 years of age were selected randomly. Data were collected through modified WHO STEPS questionnaire for non-communicable disease (NCD) risk factors survey and analyzed in SPSS V.16.0 software.

Results: Mean age of the participant was 42.5 ± 13.2 years. Majority of them were female (n = 206; 59.4%), one-third (34%) represented Brahman and Chetri, and over a quarter (29.1%) did not attend school. Cardiovascular disease risk factors included smoking (17.6%), alcohol consumption (29.4%), insufficient fruit and vegetables intake (98%), insufficient physical activity (21.0%), obesity (15.3%), hypertension (34.4%), diabetes (10.5%), and high triglyceride levels (10.8%). They were significantly associated with different socio-demographic characteristics: smoking with gender, age groups and education level; alcohol consumption was with gender, age groups, ethnicity and occupation; insufficient physical activity with gender, age groups and occupation; hypertension with gender, age groups, ethnicity, education level and occupation.

Conclusion: A high prevalence of cardiovascular disease risk factors and their disproportional distribution among the study population indicated an inevitable risk of cardiovascular events in near future.

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Table 1

Distribution of socio-demographic characteristics by gender.

Socio-demographic characteristics		Gender		Total No (%)	P Value
		Male No. (%)	Female No. (%)		
Age group (in years)	<30 years	26(18.4)	39(18.9)	65(18.7)	0.508
	30–39 years	31(22.0)	54(26.2)	85(24.5)	
	40–49 years	40(28.4)	47(22.8)	87(25.1)	
	50–59 years	24(17.0)	44(21.4)	68(19.6)	
	≥60 years	20(14.2)	22(10.7)	42(12.1)	
Caste/Ethnic groups	Brahman	54(38.3)	64(31.1)	118(34.0)	0.536
	Chetri	34(24.1)	58(28.2)	92(26.5)	
	Newar	35(24.8)	49(23.8)	84(24.2)	
	Janajati	12(8.5)	26(12.6)	38(11)	
	Dalit and others	6(4.3)	9(4.4)	15(4.3)	
Marital status	Unmarried	24(17.0)	16(7.8)	40(11.5)	<0.001
	Married	117(83.0)	171(83.0)	288(83)	
	Separated and widow	0(0)	19(9.2)	19(5.5)	
Education level	No formal education	16(11.3)	85(41.3)	101(29.1)	<0.001
	Primary	18(12.8)	32(15.5)	50(14.4)	
	Secondary	31(22.0)	33(16.0)	64(18.4)	
	Higher secondary	30(21.3)	31(15.0)	61(17.6)	
	Bachelor and Higher	46(32.6)	25(12.1)	71(20.5)	
Occupation	Government job	14(9.9)	6(2.9)	20(5.8)	<0.001
	Non-governmental job	27(19.1)	24(11.7)	51(14.7)	
	Self-employed	52(36.9)	42(20.4)	94(27.1)	
	Students	11(7.8)	12(5.8)	23(6.6)	
	Homemaker	12(8.5)	115(55.8)	127(36.6)	
	Others(Retired, unemployed)	25(17.7)	7(3.4)	32(9.2)	

Table 3

Distribution of anthropometric, clinical and biochemical characteristics.

Characteristics	N	Total Mean(SD)	Male Mean(SD)	Female Mean(SD)	P* value
BMI (kg/m ²)	347	26.2(5.1)	25.4(5.3)	26.6(5.1)	0.03
Waist-C (cm)	347	85(11)	85.2(10.6)	84.9(11.2)	0.77
Hip-C (cm)	347	91.3(8.6)	89.5(7.3)	92.4(9.2)	0.002
WHR	347	0.93(0.08)	0.95(0.085)	0.92(0.07)	<0.001
SBP (mmHg)	347	122.6(16.9)	124.5(16.1)	121.2(17.4)	0.07
DBP(mmHg)	347	81.1(9.9)	82.6(10.3)	80 (19.5)	0.017
FBS (mg/dl)	296	92(24.5)	92.4(19)	91.7(27.3)	0.819
TG (mg/dl)	296	136.9(67.3)	150.8(75.2)	127(60)	0.004
Cholesterol (mg/dl)	296	167.9(31.5)	170.5(31.1)	166.2(31.8)	0.26
HDL (mg/dl)	296	42.5(6.5)	41.8(6.4)	43(6.5)	0.11
LDL (mg/dl)	296	98(26.4)	98.5(27)	97.6(26)	0.78

Note: BMI, Body Mass Index; Waist-C, Waist Circumference; Hip-C, Hip Circumference; WHR, Waist Hip Ratio; SBP, Systolic Blood Pressure; DBP, Diastolic Blood Pressure; FBS, Fasting Blood Sugar; TG, Triglycerides; HDL, High Density Lipoprotein; LDL, Low Density Lipoprotein. *P value from Student's t test.