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Cardiovascular Risk Factors in Police Officers

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Abstract: *The cardiovascular risk factors on police officers in Rivers State were studied to ascertain the possible risk of cardiovascular disease among the police officers. 150 police officers (85 male and 65 females) with the age range of 20 – 49 years were used from four police stations. The research was carried out by assessing cardiovascular indices such as Body Mass Index (BMI), blood pressure, fasting blood sugar and total plasma cholesterol in these subjects. In blood pressure determination, an analogue table blood pressure or mercury blood pressure monitor with Littman stethoscope was used. In obesity, bathroom scale was used in measuring the weight while a meter rule was used to determine the height. To determine the blood glucose level, cotton wool, methylated spirit, blood lancet and a digital glucometer monitor with strip was used. In determination of total cholesterol, pipette, test tube and automated spectrophotometer was used. The mean values of the cardiovascular indices investigated were, BMI 24.33±0.21kg/m2 for male and 23.83±2.08kg/m2 for female, systolic and diastolic pressures; 136.47±2.07mmHg and 92.52±1.64mmHg for male and 5.09±1.91mmol/L for female. Fasting blood sugar; 5.34±0.23mmol/L for male and 5.48±1.91mmol/L for female. Total plasma cholesterol; 4.95±0.20mmol/L for male and 5.09±1.6mmol/L. From the above results, it was observed that all the subjects have values slightly above the normal range. Hence at the end of the research, it was found that police officers used for this study may be at risk for cardiovascular diseases.*

Keywords: *cardiovascular indices, risk factors, BMI, cholesterol, blood pressure, fasting blood sugar.*

I. Introduction

The physical health, psychological well-being, safety and efficiency at work are important features for any police agency to consider, when one considers the monetary and human cost of fatigue officers, it is essential to first promote scientific awareness and subsequent plausible intervention. The rate of officers dying from police accidents has surpassed the rate of officers dying from homicide(Franke*et al*., 2010). Fatigue or tired police officers are a danger to themselves as well as the public they serve. Little is known of a long term impart of shift work and extended work hours on police officers, and direct detailed exposure assessment of work/shift hours has yet been done.If blood sugar level drops very low, a potential fetal condition called hypoglycemia develops. Symptoms may include lethargy, impaired mental functioning, irritability, shaking, twitching, and weakness in arm and leg muscles, pale complexion, sweating, loss of consciousness etc (Sigal*et al*, 2014, Bhupathiraju*et al*., 2011, Ford, 2005). A BMI Value from 25.0-29.9 are considered over weight. It is generally defined as having more body fat than is optimally healthy, being overweight is a common condition; especially where food supplies are plentiful and lifestyles are sedentary (Derek, 2005) and it increases your chances of developing disease (WHO, 2006, Bridget and Fuster 2010).

People are considered obese when their body mass index (BMI) is above 30kg/ m^2. Obesity increases the likelihood of various disease, particularly heart disease, type-2-diabetes, and cancer. (Gadzik, 2006). Interventions that reduce high blood pressure, cholesterol, and glucose might address about half of excess risk of coronary heart disease and three-quarters of excess risk of stroke associated with high BMI (Klein*et al*., 2004). Maintenance of optimum bodyweight is needed for the full benefits.

II. Materials & Method

Study Area And Population

The subjects involved in the research were volunteer police officers from three Police posts in the city of Port Harcourt, Nigeria. (Moscow road police station, central police station, Choba, and Ozuoba police station). Seven departments wereinvolved, which are joint working

committee(JWC),investigation,beat,mobile,administration,counter and traffic all in Port Harcourt city local government area of Rivers State. Blood samples were collected from 150 police officers between the ages of 20-47years.

Ethical Consideration

Ethical consent and approval was dully sought and received from the University ethical committee before embarking on the research. The volunteers' consent was also received and were made to fully understand the procedures involved in the research before the commencement of the research as well.

All participants were duly informed and consented to take part in the study. The study design and information collected were approved by the ethical Committee of the Universityof Port Harcourt and the Rivers state commissioner of police.

Biochemical Parameters

A venous blood sample was drawn from the arm of each subject in sitting position by antecubital vein puncture, after an overnight 8-hour fast. The blood samples were transferred to the core Laboratory, "Chimedics laboratory centre" (CLC) in tank containing ice packs to maintain a suitable temperature. They were centrifuged within maximum 4 hours after extraction and then immediately analyzed. Blood collection was made with lancet for glucose test with the use of glucometer. The Laboratory applies strict internal and external standard quality control techniques.

The laboratory tests performed included fasting plasma glucose (FPG, mg/dl), triglycerides (TG, mg/dl)), total cholesterol (TC, mg/dl), low-density lipoprotein cholesterol (LDL-C, mg/dl), high-density lipoprotein Cholesterol (HDL-C, mg/dl) and other biomarkers.

Automated Spectrophotometer

This machine was used for lipid profile analysis, blood samples stored in the refrigerator in an EDTA container (ethyl diamine tetra acetic acid) and centrifuged.Two test tubes A and B were placed on a test tube rank.Test tube A contains cholesterol control which was introduced with 500ml of micropipette. Test tube B contains plasma which was extracted from blood after centrifuged.50ml of standard solution was introduced into test tube A; 50ml of standard solution was introduced into test tube B and then incubated for 10mins in the automated spectrophotometer which gave a change in color to pink the reading was taken.

Body Mass Index and Blood Pressure Determination

Body mass index (BMI) was determined from the values of their weight and height using the equation: BMI=weight/ $(\text{height})^2$=kg/m^2.Blood pressure was determined with the use of sphygmomanometer and stethoscope in mmHg.

III. Statistical Analysis

Data were analysis using SPSS version 20. ANOVA with Post hoc tests were done in multiple comparison. All results were presented in mean + sem.

IV. Discussion

The laboratory tests for evaluating cardiovascular risk factors are lipid profile test which involves total plasma cholesterol test like low density lipoprotein, high density lipoprotein, triglycerol, cholesterol, fasting blood sugar test, blood pressure and body mass index

It was found out that nearly half of excess risk for heart disease and one-quarters of excess risk for stroke due to high BMI (body mass index) were caused through three metabolic risk factors: blood pressure, cholesterol, blood sugar level and glucose. The most important cause was blood pressure, especially for stroke, accounting for two-thirds of the excess risk for female officers. Compared with having healthy weight, being overweight or obese was associated with an increased risk of coronary heart disease and stroke, with obesity having a larger effect than overweight.

Our results for the overall association between BMI and heart disease are consistent with those in mobile and JWC (joint working committee) especially females. Previous studies mostly analyzed all mediators combined, and did not assess the role of other combinations of cause. (Azadbakht*et al*, 2005, WHO, 2006, Wang*et al*., 2006). Analysis of 150 subjects reported that 43% of excess risk of heart disease for female was mediated through blood pressure and total plasma cholesterol, compared with 36% for male in our analysis (both effects reported for 2 kg/m2 higher BMI for females to male).

Our finding that both overweight and obesity were associated with increased risk in heart disease and stroke which differed fromHooper*et al.,* (2012), who recorded no effects for overweight on either cardiovascular disease mortality in one subject, or on all-cause mortality in our analysis.

It was further observed that metabolic factors mediate a larger proportion of the excess risk for obsessed individuals than do those for overweight individuals. About 15.4% females are prevalence for obesity, 7.1% males are prevalence of obesity and this prevalence is more in females in administration unit. This finding suggests that clinical and public health interventions that control of glucose, blood pressure, and cholesterol, can

largely (heart disease) or fully (in stroke) address the excess risk of coronary heart disease and stroke in overweight individuals (Micha and Mozaffarian2010, Norhammar*et al*., 2004)

Diabetic subjects also benefit from interventions on mediators but will continue to have significantly raised risk if their diets are not properly checked and controlled. From the result obtained, Females are of high risk factors of 36% prevalence for diabetes mellitus, Males have about 16% prevalence of diabetes mellitus. Females are of high prevalence for diabetes than males than males.

V. Conclusion

The prevalence of cardiovascular risk factors in police officers can be controlled and this is based on the individual determination to healthy living, putting off bad feeding habit like alcohol intake, smoking and drug abuse involving in regular exercise, and medical checkups. Taking good food like, food rich in all essential nutrients and also creating out time for rest in their daily routine.

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[16]. Table 1: Anthropometric Data and Biochemical Parameters of Police Officers

All values were presented as mean ± sem.

S/N	AGE GROUP	NO. OF SUBJECTS	BMI (Kg/m^2)	Systolic B.P (mmHg)	Diastolic B.P (mmHg)	FBS mmol/L	HDL mmol/L	CHOL mmol/L	TRIG mmol/L	LDL mmol/L
1	20-24	23	22.95±0.33	134.78±2.56	88.91±2.31	5.63±0.45	2.47±0.31	5.13±0.27	1.31±0.12	2.32±0.25
2	25-29	53	22.91±0.26	131.42±2.48	89.70±2.23	5.38±0.27	1.76±0.15	4.93±0.18	1.39±0.11	2.82±0.19
3	30-34	27	21.76±0.40	139.26±2.87	101.67±2.87	5.51±0.41	2.47±0.41	4.84±0.40	1.44±0.13	2.46±0.40
4	35-39	22	21.86±0.42	130.00±5.36	91.59±3.08	5.61±0.48	2.95±0.60	5.32±0.38	1.29±0.11	2.82±0.37
5	40-44	23	27.00±0.39	134.35±4.31	97.17±2.35	4.86±0.37	2.25±0.30	4.99±0.29	1.13±0.12	2.83±0.36
6	45-49	2	29.00±0.00	135.00±1.47	90.00±5.90	5.85±0.07	1.65±0.07	4.60±0.94	1.90±0.03	4.00±0.35
TOTAL		150	235±0.16	133.63±1.58	93.16±1.23	5.40±0.16	2.25±0.14	5.01±0.13	1.34±0.05	2.69±0.13

Table 2: The Mean Cardiovascular Parameters of Police Officers in Port Harcourt According To Sex and Age Group.

S/N	Age Group	Sex	No. Of Subjects	Bmi (Kg/M^2)	Systolic B.P (Mmhg)	Diastolic B.P (Mmhg)	Fbs Mmol/L	Hdl Mmol/L	Chol Mmol/L	Trig Mmol/L	Ldl Mmol/L
1	20-24	Male	11	26.27±0.47	139.09±2.92	90.00±2.70	5.16±0.80	2.2±0.40	4.75±0.33	1.35±0.16	2.2±0.30
		Female	12	22.67±0.47	130.83±3.88	87.92±3.77	6.05±0.47	2.72±0.46	5.48±.40	1.28±0.18	2.43±0.40
2	25-29	Male	25	23.07±0.31	132.86±3.35	86.93±3.19	5.72±0.40	1.94±0.23	4.85±0.27	1.46±0.17	2.68±0.27
		Female	28	22.72±0.43	129.80±3.74	92.80±3.04	4.99±0.33	1.57±0.19	5.03±0.24	1.31±0.12	2.97±0.27
3	30-34	Male	14	22.54±0.69	143.08±4.95	101.15±3.68	5.54±0.55	2.62±0.57	4.48±0.52	1.28±0.19	2.32±0.54
		Female	13	21.04±0.35	135.71±6.20	102.14±4.50	5.49±0.61	2.33±0.60	5.18±0.62	1.59±0.16	2.58±0.61
4	35-39	Male	7	22.2±0.74	137.33±7.02	92.67±4.08	5.07±0.51	3.23±0.73	5.4±0.52	1.29±0.15	2.43±0.46
		Female	15	21.14±0.74	114.29±2.97	89.29±4.42	6.76±0.98	2.34±1.07	5.14±0.53	1.29±0.14	3.64±0.51
5	40-44	Male	6	27.47±0.34	134.71±4.73	97.94±2.85	4.91±0.49	2.68±0.35	5.02±0.36	1.22±0.14	2.62±0.38
		Female	17	29.5±0.96	133.33±10.54	95.00±4.28	4.72±0.37	1.03±0.23	4.88±0.54	0.89±0.19	3.42±0.87
6	45-49	Male	1	26.00±00	140.00±00	70.00±00	5.60±00	1.90±00	7.80±00	1.80±00	5.20±00
		Female	1	28.00±00	130.00±00	110.00±00	6.10±00	1.40±00	1.40±00	2.00±00	2.80±00
Total		**Male**	**85**	**24.33±0.21**	**136.47±2.07**	**92.52±1.64**	**5.34±0.23**	**2.45±0.20**	**4.95±0.17**	**1.34±0.08**	**2.54±0.17**
		Female	**65**	**23.83±2.08**	**129.92±19.09**	**94±14.95**	**5.48±1.91**	**1.98±1.7**	**5.09±1.6**	**1.33±0.58**	2.9±1.66

All values were presented as mean ± sem.

Table 3. Data showing Risk Factors according To Their Age and Departments for Male Subjects

S/N	Department	No. Of Subjects	Age	Body Mass Index		Systolic B.P.		Diastolic B.P		Fasting Blood Surgar	
				Kg/M^2	No. Of Subjects With High Risk	Mmhg	No. Of Subjects With High Risk	Mmhg	No. Of Subjects With High Risk	Mmol/L	No. Of Subjects With High Risk
1	Jwc	20	24.15±0.33	30.50±0.34	3	137.00±2.25	5	92.50±2.16	6	5.97±0.60	5
2	Mobile	20	28.05±0.18	29.80±0.35	1	131.50±4.35	6	83.70±4.03	5	5.07±0.36	2
3	Admin	5	30.80±0.49	31.62±1.27	2	126.71±7.84	4	85.99±5.35	3	4.860.45±	1
4	Beat	10	33.50±0.40	22.50±0.58	0	143.50±7.89	4	101.5±5.06	5	6.08±0.63	2
5	Traffic	10	37.10±0.35	21.40±0.59	0	134.00±9.12	3	93.00±5.17	3	5.03±0.45	0
6	Counter	10	40.00±0.21	21.70±0.58	0	135.00±4.01	2	96.00±371	4	5.13±0.76	1
7	Investigation	10	42.80±0.39	21.40±0.54	0	137.00±7.35	3	94.50±4.68	5	4.37±0.43	0
S/N	Department	No. Of Subjects	Age	High Density Lipoprotein		Cholesterol		Triglycerol		Low Denstiy Lipoprotein	
				Mmol/L	Of With Subjects High Risk	Mmol/L	Of With Subjects High Risk	Mmol/L	Of With Subjects High Risk	Mmol/L	Of With Subjects High Risk
1	Jwc	20	24.15±0.33	1.73±0.25	5	4.86±0.23	0	1.37±0.12	1	2.48±0.28	0
2	Mobile	20	28.05±	2.39±0.	9	4.62±0.3	2	1.52±0	3	2.65±0	1

			0.18	29		9		.23		.32	
3	Admin	5	30.80±0.49	2.21±0.33	2	4.58±0.44	1	1.01±0.12	0	2.47±0.41	1
4	Beat	10	33.50±0.40	2.34±0.66	3	4.35±0.44	1	1.22±0.24	1	1.94±0.50	0
5	Traffic	10	37.10±0.35	3.18±0.84	5	5.65±0.76	4	1.48±0.20	1	2.58±0.59	1
6	Counter	10	40.00±0.21	3.10±0.80	5	5.36±0.42	1	1.15±0.18	0	3.13±0.59	1
7	Investigation	10	42.80±0.39	2.95±0.43	6	4.94±0.54	1	1.29±0.18	0	2.26±0.44	0

All values were presented as mean ± sem.

Table 4. Data showing Risk Factors according To Their Age and Departments for Female Subjects

	DEPARTMENT	**NO. OF SUBJECTS**	**AGE**	**BODY MASS INDEX**		**SYSTOLIC B.P.**		**DIASTOLIC B.P**		**FASTING BLOOD SURGAR**	
				Kg/m²	**NO. OF SUBJECTS WITH HIGH RISK**	**mmHg**	**NO. OF SUBJECTS WITH HIGH RISK**	**mmHg**	**NO. OF SUBJECTS WITH HIGH RISK**	**mmol/L**	**NO. OF SUBJECTS WITH HIGH RISK**
1	JWC	5	22.60±0.24	29.60±0.68	1	134±4.30	2	85±4.47	3	6.10±.0.34	0
2	MOBILE	5	23.40±0.24	22.00±0.71	0	123.00±7.00	1	88.00±6.63	3	5.30±0.58	0
3	ADMIN	20	25.80±0.30	30.30±0.42	6	130.75±4.33	8	95.50±3.46	15	5.67±0.41	0
4	BEAT	5	28.40±0.24	21.20±1.32	1	126.00±5.34	1	80.00±3.16	1	3.28±0.38	0
5	TRAFFIC	10	30.90±0.41	21.55±0.42	0	136.00±8.36	4	99.50±5.89	7	5.76±0.82	2
6	COUNTER	10	34.20±0.36	20.90±0.50	0	126.50±6.15	4	97.00±4.78	8	5.30±0.55	1
7	INVESTIGATION	10	40.60±0 82	31.20±0.87	2	129.00±6.40	3	97.00±3.35	9	5.85±0.67	2
S/N	**DEPARTMENT**	**NO. OF SUBJECTS**	**AGE**	**HIGH DENSITY LIPOPROTEIN**		**CHOLESTEROL**		**TRIGLYCEROL**		**LOW DENSTIY LIPOPROTEIN**	
				mmol/L	**NO. OF SUBJECTS WITH HIGH RISK**	**mmol/L**	**NO. OF SUBJECTS WITH HIGH RISK**	**mmol/L**	**NO. OF SUBJECTS WITH HIGH RISK**	**mmol/L**	**NO. OF SUBJECTS WITH HIGH RISK**
1	JWC	5	22.60±0.24	5.68±0.88	2	2.52±0.79	1	0.94±0.23	0	2.72±0.41	0
2	MOBILE	5	23.40±0.24	4.94±0.30	1	1.86±0.38	0	1.56±0.29	1	2.00±0.32	0
3	ADMIN	20	25.80±0.30	5.25±0.26	1	3.14±0.30	1	1.27±0.11	0	1.92±0.33	0
4	BEAT	5	28.40±0.24	4.48±0.25	1	2.34±0.51	0	1.50±0.40	1	1.42±0.59	0
5	TRAFFIC	10	30.90±0.41	4.71±0.62	2	3.02±0.69	2	1.61±0.20	1	1.49±0.31	1
6	COUNTER	10	34.20±0.36	5.75±0.76	5	2.71±0.68	3	1.42±0.15	0	3.49±0.93	2
7	INVESTIGATION	10	40.60±0 82	4.55±0.48	0	3.46±0.53	1	1.09±0.17	0	0.95±0.18	1

All values were presented as mean ± sem.