A Comprehensive Comparative Study among Jammu Women Police Personnel between the Subjects with Metabolic Syndrome and without Metabolic Syndrome on the Basis of Demographic, Anthropometric and Clinical Parameters

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ABSTRACT

Background: Police officers are civil servants meant for peace preservation, citizen protection, and promotion of violence reduction. Pre-employment examination of police officers includes intellectual, cognitive and personality assessment, physical examination, laboratory tests and social evaluation. In this study, we will compare subjects with MetS and without MetS among female police personnel on the basis of demographic parameters, anthropometric parameters and clinical parameters related to dyslipidemia, hypertension and overweight/ obesity.

Materials and methods: The present study was conducted to find the prevalence of metabolic syndrome as per lipid parameters among female police personnel of J&K Police. It was carried out in Post Graduate Department of Physiology, Government Medical College Jammu from 2019 to 2020.

Results: We observe that there is a significant difference between the groups with respect to age, duration of service, weight, BMI, WC, Hip circumference, WHR, SBP, BSF, TG, HDL, TC/ HDL and LDL/HDL.

Conclusion: The present study on women police of Jammu demonstrated that metabolic syndrome is comprised of endocrine metabolic disturbances characterised by Type-2 Diabetes Mellitus due to insulin resistance and impaired glucose regulation, hypertension, obesity and altered lipid profile consisting of elevated levels of triglyceride (TG) and low levels of high-density lipoprotein cholesterol [HDL-C].

Keywords: Metabolic syndrome, Lipid parameters, hypertension, diabetes

INTRODUCTION

Police officers are civil servants meant for peace preservation, citizen protection, and promotion of violence reduction. Pre-employment examination of police officers includes intellectual, cognitive and personality assessment, physical examination, laboratory tests and social evaluation. Earlier studies have reported that mortality of policemen is on higher side compared to general population, the reason might be intensive work load, continuous vigil and consistent exposure to maintain risky law and order situation that may ultimately lead to develop MetS.[1] A specific diagnostic criteria for MetS in Indian population have been reframed and are listed as follows: I) Waist Circumference: more than 90 cms in Indian men and more than 80 cms in Indian women. II) High triglycerides: Equal to or more than 150 mg/dl. III) Low HDL cholesterol: Less than 40mg/dl for men, less than 50 mg/dl for women. IV) High arterial blood pressure: equal to or greater than 130 mmHg systolic blood pressure and equal to

or greater than 85 mmHg diastolic blood pressure. V) High fasting blood glucose (FBG): 100mg/dl .[2] Police officers have been found to be at high risk for MetS.[3] The Buffalo Cardio Metabolic occupational Police stress study reported a significant association between stress and MetS among a small sample of female officers.[4] In CARDIA longitudinal study on young adults, women in high demand/low control (high strain) jobs had a significantly increased risk of incident MetS over 5 years.[5] In this study, we will compare subjects with MetS and without MetS among female police personnel on the basis of demographic parameters, anthropometric parameters and clinical parameters related to dyslipidemia, hypertension and overweight/obesity.

MATERIALS AND METHODS

The present study on the comparison of the lipid parameters among female police personnel with metabolic syndrome and without metabolic syndrome was conducted in the Post Graduate Department of Physiology, Government Medical College, Jammu from 2019 to 2020. A total of 101 women subjects from female battalion of J&K Police were included in the study as per the laid down inclusion and exclusion criteria. These subjects were actively involved in law and order duties. The study

was under taken after approval by the institutional Ethical committee

Inclusion Criteria

Healthy premenopausal (25-45) year old female police personnel having minimum 2 years of active service to their credit

Exclusion Criteria

Subjects were excluded from study are:-
Pregnant;
Suffering from chronic disease;
Taking hormone replacement therapy;
Taking medication that effect Vitamin D metabolism e.g. Phenytoin;
Post-menopausal (natural or Surgical)

An SSP rank senior officer was requested to allow the female police personnel to participate in this study. After getting the written permission the aim and purpose of the study was obtained from those who volunteered to be a part of the study. They were requested to report in batches of 10 to 12 after light dinner and overnight fast. Their physical parameters were recorded and their blood samples were collected by the investigator herself. After noting their detailed history which included their working pattern, history of any drug intake, any significant past or present illness, history of radiation, menstrual history, obstetric history, and methodology of tests was explained to the subjects

RESULTS

In this section we will describe the results in tabular and graphical form

Table 1 Showing age Distribution and prevalence of subjects with and without MetS

Age (years)	No. with Met-syndrome/ total no. of subjects	Prevalence(95% C I)
21-25	0/10	0
26-30	2/19	10.52 (2.9 – 31.4)
31-35	3/34	8.82(3.1 – 22.9)
36-40	9/25	36 (20.3 – 55.5)
41-45	6/13	46.15 (23.2 – 70.9)
Total	**20/101**	**19.80 (13.2 – 28.6)**

We observe that out of 101 subjects, 20 subjects were found to have MetS with a prevalence of 19.80 (13.2-28.6)

Table 2: Prevalence of met-syndrome according to duration of service

Duration of service (in completed years)	No. with Met-syndrome/ total no. of subjects	Prevalence (95% C I)
1-5	0/18	0
6-10	4/41	9.75 (4.86 – 22.5)
11-15	9/26	34.61 (19.4 – 53.8)
16-20	0/3	0
21-25	7/13	53.80 (29.1 – 76.8)

We observe that out of 20 MetS subjects, majority of subjects had the (21-25) years as length of service with a prevalence of 53.80 (29.1-76.8)

Table 3: Comparison of various clinical parameters between subjects with MetS and without MetS

Parameters		With Met-syndrome	Without Met-syndrome	χ (Chi-Square)	P-value	Crude odds Ratio (95%C I)
BMI	>30	5	4	7.95	0.005	6.42 (1.54-26.71)
	≤30	15	77			
WC	≥88	19	21	31.99	<0.001	54.29(6.84-430.7)
	<88	1	60			
WHR	≥85	19	31	20.65	<0.001	30.65(3.91-240.5)
	<85	1	50			
SBP	≥130	11	10	7.95	<0.001	8.86(2.88-26.12)
	<130	9	71			
DSP	≥85	6	6	5.81	0.015	5.35 (1.51-19.02)
	<85	14	75			
BSF	≥110	3	2	3.02	0.08	6.97 (1.08-44.97)
	<110	17	79			
TG	≥150	10	7	16.76	<0.001	10.57(3.28-34.04)
	<150	10	74			
HDL	<50	18	49	6.25	0.012	5.89 (1.28-27.09)
	≥50	2	32			
Cholesterol	≥200	5	11	0.83	0.36	2.12(0.64-7.0)
	<200	15	70			

We observe that there is a significant difference between the subjects with MetS and without MetS with respect to BMI, WC, WHR, SBP, DSP, TG and HDL. This essentially informs that these significant parameters play the pivotal role in the development of MetS, hence they may be treated as risk factors

Table 4: Descriptive statistics and comparative summary of the subjects studied

Parameter	Mean value in Subjects with MetS (N=20)	Mean value in Subjects without MetS (N=81)	t-Test	P Value	95% C I of the mean difference
AGE	37.85	32.66	3.90	<0.001	2.55-7.82
DUR. OF SERVICE	15.55	9.64	4.05	<0.001	3.01-8.79
WT.	77.05	65.35	4.655	<0.001	6.71-16.7
HT	165.07	164.54	0.457	0.649	-1.74-2.79
BMI	28.26	24.17	4.525	<0.001	2.30-5.88
WAIST CIR.	93.95	81.29	5.721.	<0.001	8.27-17.4
HEP CIR.	101.60	92.96	2.991	0.004	2.91-14.37
WAIST-HEP RATIO	0.92	0.85	4.741	<0.001	0.04-0.10
BP SYSTOLIC	128.10	113.40	4.412	<0.001	8.08-21.3
BP DISYSTOLIC	81.40	73.96	2.168	0.078	-0.44-8.32
BLOOD SUGSR (F)	96.95	87.53	3.317	0.001	3.78-15.5
CHOLESTEROL	184.95	167.92	2.673	0.009	4.39-29.6
TRYGLYCERIDE	154.35	103.46	5.478	<0.001	32.45-69.31
HDL	44.25	47.97	-2.285	0.024	-6.96-0.49
LDL	109.83	99.24	1.796	0.075	-1.11-22.27
VLDL	29.02	20.69	4.294	0.006	4.48-12.17
TC /HDL	4.17	3.53	3.780	<0.001	0.30-0.98
LDL/HDL	2.47	2.08	2.569	0.012	0.09-0.69
VIT. D	15.08	16.15	-0.362	0.799	-6.21-4.23

The above table displays the comparison of demographic parameters, anthropometric parameters, lipid parameters and diabetes between subjects with MetS and without MetS on the basis of descriptive statistics and relevant statistical tests wherein we observe that there is a significant difference between the groups with respect to age, duration of service, weight, BMI, WC, Hip circumference, WHR, SBP, BSF, TG, HDL, TC/HDL and LDL/HDL

Descriptive statistics and comparative summary of the subjects studied
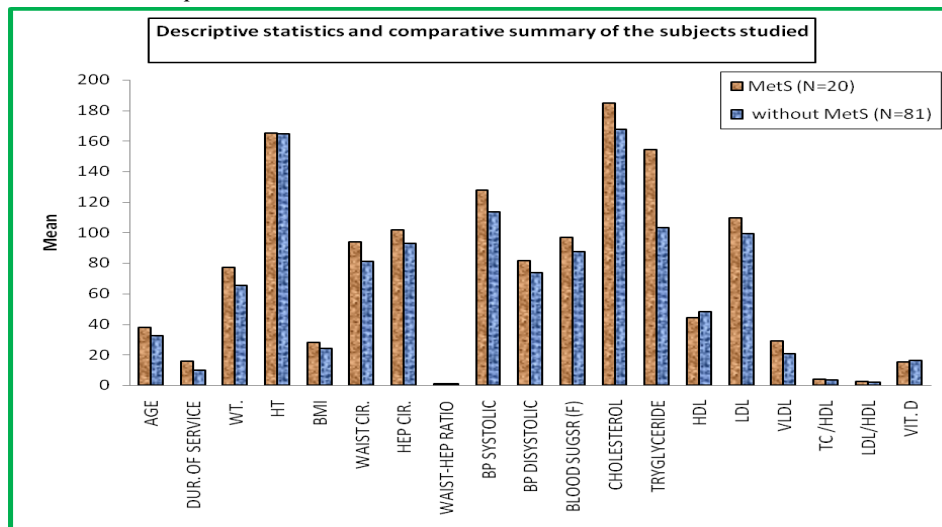
DISCUSSION

In the presents study we have comprehensively compared demographic and clinical parameters between the subjects with MetS and without MetS. We observed that out of 101 subjects, 20 subjects were found to have MetS with a prevalence of 19.80 (13.2-28.6) and 80 subjects were normal because they did not fulfill the MetS criteria. Majority of the study population was in the age group of 31-35 years (Table-1). Maximum number of subjects with MetS was falling in the age interval 41-45 years accounting for (46%). The next highest prevalence was found in the age group of 36-40 years (36%). There was no case of MetS found in the age group of 21-25 years. Contemporary to the literature, our results are in tune with the results reported by numerous authors.[6-8] For instance, Thayill et al reported the prevalence of MetS among police personnel as 17.5% in their study.[7] Some authors have reported the very different prevalence of MetS among women police personnel, the reason for varying prevalence might be attributed to different sample sizes and diverse geographical locations.[9,10] We observed that out of 20 MetS subjects, majority of subjects had the (21-25) years of length of service with a prevalence of 53.80 (29.1-76.8). In the present study, we observed that there is a significant difference in the proportion of patients with abnormal clinical parameters (BMI, WC, WHR, SBP, DSP, TG and

HDL) among subjects with MetS and without MetS. This essentially informs that these significant parameters play a pivotal role in the development of MetS, hence they may be treated as risk factors. High BMI is strongly associated with increased risk of MetS in police officers.[11] Our study also resulted in statistically significant association between MetS and BMI with p value <0.005. Most individuals with the MetS are either overweight or obese, which suggests that obesity in conjunction with genetic aspects of susceptibility may link the components of the metabolic syndrome (Despres J et al., 1992).[12] In a Western study by Ramey SL et al., (2011) among police officers the average BMI was 28.6 (+ 49Kg/m2) which is quite close to our study.[13] In the present study, we observed that WC and WHR are significantly abnormal among subjects with MetS compared to subjects without MetS which is in consonance by a study due to (Alghamdi et al., 2017).[14] In contrast, values lower than our results have been reported by(Zhang et al., 2019) and (Bannigida et al., 2019).[15,16] It is known that higher abdominal waist circumferences and the severity of a metabolic risk is associated by working longer in a sedentary position.[17]In the present study, we observed that out of 101 subjects; 21 had (>130 mmHg) systolic blood pressure and of them 11 had MetS and 10 did not had MetS and the difference was statistically significant. And 12 patients

had (>85mmHg) diastolic blood pressure with a prevalence of 11.9% which is comparable to studies by (Aggarwal S et al., 2015) and (Johns F et al., 2012).[18,19] In our study, the prevalence of hypertension (>130/85) among female policemen was 25% which is consistent with numerous studies.[20-22] Due to gradual awareness about this syndrome, the diagnostic criteria and its associated risks remained a subject matter of debate among clinicians. In the present study, among our MetS female police personnel, 3 were found to have elevated fasting blood glucose levels. However, there was an insignificant association between metabolic syndrome and blood glucose fasting levels with p value=0.08. In (2004) Decry et al explored a significant relation between NCEPs defined metabolic syndrome and (insulin resistance and central adiposity), authors observed that there is a close relationship between visceral adiposity and metabolic syndrome, however, independent of IR and abdominal SCF area which means that development of metabolic syndrome is essentially triggered by visceral adiposity. The so called "Asian Indian Phenotype" refers to certain unique clinical and biochemical abnormalities in Indians which include increased insulin resistance, greater abdominal adiposity i.e., higher waist circumference despite lower body mass index, lower adiponectin and higher high sensitive C-reactive protein levels.[23] This phenotype makes Asian Indians more prone to diabetes and premature coronary artery disease. we analyzed lipid parameters among both groups and found that association of elevated triglycerides, low HDL with metabolic syndrome was statistically highly significant with a p-value of <0.001*. In the present study, we also made a comparison of demographic parameters, anthropometric parameters, lipid parameters and diabetes between subjects with MetS and without MetS on the basis of descriptive statistics and relevant statistical tests wherein we found that there is a significant difference between the groups with respect to age, duration of service, weight, BMI, WC, Hip circumference, WHR, SBP, BSF, TG, HDL, TC/HDL and LDL/HDL. These results corroborate well with the findings of numerous authors which indicate strong association between abnormal BMI and occurrence of hypertension and dyslipidemia among adults.[24-26] In another study by Wenzel et al. the prevalence of hypertension was reported as three times higher among obese air force personnel in Brazil; the rate of excess weight was twice higher than that of normal weight.[24]

CONCLUSION

The present study on women police of Jammu demonstrated that metabolic syndrome is comprised of endocrine metabolic disturbances characterised by Type-2 Diabetes Mellitus due to insulin resistance and impaired glucose regulation, hypertension, obesity and altered lipid profile consisting of elevated levels of triglyceride (TG) and low levels of high-density lipoprotein cholesterol [HDL-C]. We investigated the role of duration of service and found that majority of subjects had the (21-25) years as length of service with a prevalence of 53.80 (29.1-76.8). However, large sample prospective studies are needed to establish whether duration of employment has or not strong association with abnormal BMI, dyslipidemia and hypertension among workers.

Ethical Approval: Approved

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