

Role of Lipid Parameters among Women Police Personnel of Jammu: A Comparative Observational Study among Subjects with Metabolic Syndrome and Without Metabolic Syndrome

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ABSTRACT

Background: There are few studies that have explicitly studied the role of lipid parameters in developing MetS. In this present study, we will find out the prevalence of patients with respect to abnormal lipid parameters among study subjects and then a possible association between lipid parameters and metabolic syndrome will be evaluated.

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 from a total of 17 subjects with TG ≥ 150 mg/dl, 10 subjects had MetS and out of 84 subjects with TG < 150 mg/dl, only 10 subjects were found to have MetS. We observe that out of total 20 subjects with MetS, 10 subjects were having triglycerides levels more than 150 mg/dl and 10 were having levels less than 150mg/dl. Clearly, there is a high significant association between MetS and triglycerides (p -value <0.001). We observe that out of 67 subjects with HDL <50 , 18 subjects were found to have MetS and out of 34 subjects with HDL ≥ 50 , only 2 had MetS. We observe that 18 subjects out of total 20 with metabolic syndrome had HDL cholesterol levels less than 50 mg/dl.

Conclusion: The present study revealed that the prevalence of MetS is higher among patients with low HDL-C and high triglyceride levels. Therefore, primarily evaluation of lipid parameters may help health care providers to identify and recognize patients who are at high risk of developing MetS.

Keywords: Metabolic syndrome, Lipid parameters, HDL-C, TG

INTRODUCTION

Metabolic syndrome (MetS) is a clinical manifestation characterized by the co-occurrence of metabolic risk factors for both type 2 diabetes mellitus and cardiovascular disease. Even though there are diverse definitions of MetS but fundamentally all of them require the fulfillment of at least 3 of the following 5 traits: ^{1, 2}

1. Blood Pressure of $>130/85$ mmHg,
2. Waist Circumference of > 88 cm,
3. High Density Lipid levels of >1.295 mmol/l (50 mg/dl),
4. Triglyceride level of > 150 mg/dl,
5. Fasting Plasma Glucose level of > 110 mg/dl ⁴

The prevalence of MS in different countries varied from 17% to 37%.³⁻⁶ MS is associated with increased risk of morbidity and mortality of various diseases.^{7,8} It has

been reported that 5.5% of all-cause of mortality and 9.4% of cardiovascular mortality are attributable to MetS.⁹ 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.⁶ In this paper, we will find out the prevalence of patients with respect to abnormal lipid parameters among study subjects and then a possible association between lipid parameters and metabolic syndrome will be evaluated.

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

RESULTS

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

Table 1: Prevalence of patients with abnormal lipid parameters among studied subjects

Parameter	No. of abnormal subjects/ Total no. of subjects studied	Prevalence (95% C I)
Triglycerides (>150 mg/dl)	17/101	16.8 (10.78- 25.3)
HDL- Cholesterol(<50mg/dl)	67/101	66.3 (56.7- 74.8)
Cholesterol(≥200mg/dl)	16/101	15.84 (10.12-26.01)

We observe that out of 101 subjects, 17 subjects had Triglycerides (>150 mg/dl), thus placing a prevalence of 16.8 (10.78-25.3), 67 subjects had HDL-Cholesterol

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

(<50mg/dl) with a prevalence of 66.3 (56.7-74.8) and 16 women had cholesterol (≥200mg/dl) with a prevalence of 15.84 (10.12-26.01)

Table 2: Prevalence of met-syndrome according to Triglyceride

Triglyceride	No. with Met-syndrome/total no. of subjects	Prevalence (95% C I)
<150 (Normal)	10/84	11.9 (6.6-20.5)
≥150 (Abnormal)	10/17	58.82 (36.01-78.4)

Out of (17) subjects with elevated triglyceride ≥150 (Abnormal), 10 were found to have metabolic syndrome, thus placing a prevalence as 58.82(36.01-78.4)

and evidently out of 84 subjects with normal triglycerides, 10 subjects had MetS with a prevalence 11.9(6.6-20.5).

Table 3: Prevalence of met-syndrome according to HDL-C

HDL	No. with Met-syndrome/total no. of subjects	Prevalence (95% C I)
≥50 (Normal)	2/34	5.88 (1.63-19.09)
<50 (Abnormal)	18/67	26.86 (17.72- 38.52)

We observe that 67 subjects were found to have abnormal levels of HDL-C in our study population of 101. Prevalence of MetS in subjects having low levels of HDL-C was 26.86% (17.72-38.52) with 18

subjects found to have abnormal HDL-C out of total 67. Only 2 subjects have MetS out of 34 who have normal levels of HDL giving prevalence of 5.88(1.63-19.09).

Table 4: Prevalence of met-syndrome according to Cholesterol

Cholesterol	No. with Met-syndrome/total no. of subjects	Prevalence(95% C I)
<200 (Desirable)	15/85	17.64 (11.0- 27.09)
≥200<220(Border line)	2/12	16.67 (4.7- 44.8)
≥220 (High)	3/4	75 (30.7- 95.4)

We observe that prevalence of MetS among subjects with high cholesterol was 75 (30.7-95.4) with 3 out of 4 subjects having MetS. In the subjects having border

line triglyceride levels, the prevalence was 16.67 (4.7-44.8) and among the subjects who have normal triglyceride the prevalence was 17.64(11.0-27.09).

Table 5: Association between triglycerides and Met-syndrome

Triglycerides	With Met-syndrome	Without Met-syndrome	Yates corrected χ^2 (Chi-Square)	P-value	Crude odds Ratio (95% C I)
≥150	10	7	16.76	<0.001	10.57(3.28-34.04)
<150	10	74			

We observe that from a total of 17 subjects with TG ≥150mg/dl, 10 subjects had MetS and out of 84 subjects with TG <150mg/dl, only 10 subjects were found to have MetS. We observe that out of total 20 subjects with MetS, 10 subjects were having

triglycerides levels more than 150 mg/dl and 10 were having levels less than 150mg/dl. Clearly, there is a high significant association between MetS and triglycerides (p-value<0.001).

Table 6: Association between HDL-C and Met-syndrome

HDL	With Met-syndrome	Without Met-syndrome	χ^2 (Chi-Square)	P-value	Crude odds Ratio (95% C I)
<50	18	49	6.25	0.012	5.89 (1.28-27.09)
≥50	2	32			

We observe that out of 67 subjects with HDL<50, 18 subjects were found to have MetS and out of 34 subjects with HDL ≥50, only 2 had MetS. We observe that 18 subjects out of total 20 with metabolic syndrome had HDL cholesterol levels less

than 50 mg/dl. Only 2 subjects with MetS had optimal levels of more than 50mg/dl. Evidently, a significant association between HDL cholesterol and metabolic syndrome was observed in our subjects (p value=0.012).

Table 7: Association between cholesterol and MetS

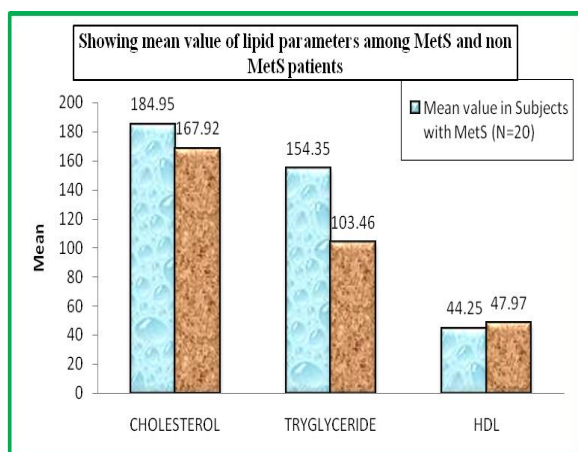
Cholesterol	With Met-syndrome	Without Met-syndrome	Yates corrected χ^2 (Chi-Square)	P-value	Crude odds Ratio (95% C I)
≥200	5	11	0.83	0.36	2.12 (0.64-7.0)
<200	15	70			

We observe that out of 16 subjects with Sr. cholesterol ≥200 mg/dl, 5 subjects had MetS and out of 85 subjects with

cholesterol <200 mg/dl, 15 subjects had MetS. However, the association was statistically insignificant.

Table 8: Showing mean value of lipid parameters among MetS and non-MetS patients

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
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	-7.45



DISCUSSION

In the present study on the prevalence of metabolic syndrome in relation to lipid parameters among women police personnel of J&K police, we included 101 women individual who meet the inclusion criteria. We thoroughly analyzed patients' data on the basis of the objective of the study. In the present study, we observed that out of 101 subjects, 17 subjects had Triglycerides (>150 mg/dl), thus placing a prevalence of 16.8 (10.78- 25.3), 67 subjects had HDL-Cholesterol (<50 mg/dl) with a prevalence of 66.3 (56.7-74.8) and 16 women had cholesterol (≥ 200 mg/dl) with a prevalence of 15.84 (10.12-26.01). It is well known that elevated levels of triglycerides are associated with atherogenesis. We observed that out of (17) subjects with elevated triglyceride ≥ 150 (Abnormal), 10 were found to have metabolic syndrome, thus placing a prevalence as 58.82(36.01-78.4) and evidently out of 84 subjects with normal triglycerides, 10 subjects had MetS with a prevalence 11.9(6.6-20.5). The association between elevated triglycerides and metabolic syndrome was statistically highly significant with a p-value of $<0.001^*$. Similar results were found in study done by (Garbarino et al., 2015).¹⁰ In the present study, we observed that out of 101 women, 67 subjects were found to have abnormal levels of HDL (<50 mg/dl), and of them 18 subjects had MetS, which gives rise its prevalence as 26.86% (17.72-38.52). Thirty four (34) subject out of 101 subjects had normal (≥ 50 mg/dl), and of them only 2

subjects had MetS with a prevalence of 5.88(1.63-19.09). Evidently, a significant association between HDL cholesterol and metabolic syndrome was observed in our subjects with a p value=0.012. The principal role of HDL cholesterol is cardio protective, it brings about by uptake and transport of cholesterol from peripheral tissues to the liver through a process known as reverse cholesterol transport (Badimon JJ et al., 1990).¹¹ Isolated low levels of HDL Cholesterol are associated with increased risk of coronary artery disease (CAD) irrespective of age, BP, obesity and total cholesterol levels (Blaton, 2007).¹² Reduce HDL levels among MetS subjects observed in our study are supported by (T.S. Ravikumar et al., 2017) and Misra A et al., 2009).^{13,14} Low HDL is very common among Asian Indians and corroborated also by various studies across south Asia. In the present study, we observed that prevalence of MetS among subjects having high cholesterol (≥ 220 mg/dl) was 75 (30.7-95.4) with 3 out of 4 subjects having MetS. In the subjects having border line triglyceride levels, the prevalence was 16.67 (4.7-44.8) and among the subjects who have normal triglyceride the prevalence was 17.64(11.0-27.09). We observed that out of 16 subjects with Sr. cholesterol ≥ 200 (mg/dl), 5 subjects had MetS and out of 85 subjects with cholesterol <200 (mg/dl), 15 subjects had MetS. However, the association was statistically insignificant. Therefore, low HDL cholesterol and high triglyceride levels are the most prevalent risk factors to be associated with MetS which is similar to what Costa et al reported. Different professions are associated with varying levels of physical activity (Leischik R et al., 2015).¹⁵ Police officers working conditions include job related hazards as the threat of bodily injury or death, intense physical stress and unpredictable emergencies in their daily work, which is associated with high health risk (Mona GG et al., 2019).¹⁶ All these factors can influence the development of MetS. However, it has been reported that the presence of

hypertriglyceridemia, low HDL-C concentrations are closely associated with insulin resistance and plausibly never occurs as isolated disorders because insulin affects TG and HDL-C metabolism.¹⁷

CONCLUSION

The present study revealed that the prevalence of MetS is higher among patients with low HDL-C and high triglyceride levels. Therefore, primarily evaluation of lipid parameters may help health care providers to identify and recognize patients who are at high risk of developing MetS. We recommend enhanced prospective population-based studies to investigate the role of lifestyle interventions in maintaining the lipid metabolism and thereby controlling MetS.

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