International Journal of Research and Review
Vol. 9; Issue: 4; April 2022
Website: www.ijrrjournal.com
Original Research Article *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Prevalence of Metabolic Syndrome and its Association with Hypertension and Diabetes: An Observational Study on Women Police Personnel of Jammu

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DOI: https://doi.org/10.52403/ijrr.20220458

ABSTRACT

Background: Metabolic syndrome is comprised of endocrine metabolic disturbances characterized 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]. In this present study, we aimed to explicitly evaluate the prevalence of MetS and its association with diabetes and hypertension among J&K women police personnel.

Materials and Methods: The present study was conducted to find the prevalence of metabolic syndrome as per hypertension and diabetes 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. A total of 101 female 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: Systolic hypertension is one of the parameters found to have highly significant association with metabolic syndrome with p-value <0.001. Around 21 out of total 101 were found to have systolic hypertension. Among these 11 were having metabolic syndrome. A total of 12 subjects were found to have diastolic hypertension, with 6 having metabolic syndrome. Evidently, we also found a significant association of diastolic blood pressure with metabolic syndrome but BSF was insignificantly associated with MetS.

Conclusion: The present study demonstrated that the prevalence of metabolic syndrome among study subjects was around 20% and the most prevalent age group was (41-45) year. Although the prevalence of metabolic with diabetes was 60% but the association was insignificant. Although the prevalence of metabolic with diabetes was 60% but the association was insignificant. However, both systolic and diastolic blood pressures were significantly associated with MetS.

Keywords: Metabolic syndrome, SBP, DBP, BSF

INTRODUCTION

In any society police personnel play a significant role by maintaining law and order thus ensuring security and stability. Due to hectic engaged work schedule and consistent exposure to violence they are at high risk of health vulnerabilities. India is a country with diversified population differing with respect to social and cultural habits, varied occupation and income groups. With rapid industrialization, there is transition in economy and lifestyle. Erstwhile prevalence of non-communicable diseases was low, but today it is on the rise with wide ranges among the general population of India. Research has witnessed that police personnel have a high prevalence of

cardiovascular risk factors, including metabolic syndrome (MetS), hypertension, hyperlipidemia, cigarette smoking, and a sedentary lifestyle.[1,2] In fact, job as a law enforcement personnel has been proven to be a long-term predictor for adverse cardiovascular events.[3]Metabolic syndrome is comprised of endocrine metabolic disturbances characterized 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]. In this present study, we aimed to explicitly evaluate the prevalence of MetS and its association with diabetes and hypertension among J&K women police personnel.

MATERIALS AND METHODS

The present study was conducted to find the prevalence of metabolic syndrome as per hypertension and diabetes 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. A total of 101 female 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)

A 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, methodology of tests was explained to the subjects

RESULTS

In this section we will present the results of the study in tabular form

Table 1: Age wise distribution and prevalence of met-syndrome

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)**

Total number of subjects included in the study was 101 out of which 20 fulfilled the criterion of MetS. Of them majority of the study population was in the age group of 31-35 years (Table-1). Maximum number of subjects with MetS was between 41-45 years (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

Table 2: Prevalence of met-syndrome parameters in the studied subjects

Parameter	No. of abnormal subjects/ Total no. of subjects studied	Prevalence (95% C I)
Systolic blood pressure (>130 mmHg)	21/101	20.8 (14.02-29.8)
Diastolic blood pressure (>85mmHg)	12/101	11.9 (6.9-19.6)
Blood sugar (F)(>110mg/dl)	5/101	4.95 (2.13-11.1)

We observe that out of 101 subjects; 21 had (>130 mmHg) systolic blood pressure with a prevalence of 20.8%, 12 patients had (>85mmHg) diastolic blood pressure with a prevalence of 11.9% and 5 had (>110mg/dl) fasting blood sugar with a prevalence of 4.95%

Table 3: Prevalence of met-syndrome according to systolic blood pressure

Systolic blood pressure	No. with Met-syndrome/ total no. of subjects	Prevalence (95% C I)
≥130mmHg (Hypertensive)	11/21	52.38 (32.37-71.66)
<130mmHg (Normal)	9/80	11.25 (6.03-20.02)

We observe that out of 101 subjects, 20 met the criteria of MetS. 11 out of total 21 subjects having systolic blood pressure > 130 mmHg were found to have the requisite criteria of MetS with prevalence 52.38% (32.37-71.66) and out of 80 normotensive subjects having systolic BP < 130 only 9 were having other parameters of MetS with prevalence 11.25% (6.03-20.02).

Table 4: Prevalence of met-syndrome according to Diastolic blood pressure

Diastolic blood pressure	No. with Met-syndrome/ total no. of subjects	Prevalence (95% C I)
≥85mmHg (Hypertensive)	6/12	50 (25.38-74.62)
<85mmHg (Normal)	14/89	15.73 (9.6-24.7)

We observe that out of 12 hypertensive patients (diastolic BP: ≥85mmHg), 6 patients had MetS with a prevalence of 50% (25.38-74.62) the prevalence trend of diastolic blood pressure among the study population. Those having diastolic blood pressure <85 mmHg was numbered 89 out of which 14 were having MetS with prevalence 15.73% (9.6-24.7).

Table 5: Prevalence of met-syndrome according to Blood sugar fasting

Blood sugar fasting	No. with Met-syndrome/ total no. of subjects	Prevalence (95% C I)
≥110	3/5	60 (23.07-38.2)
<110	17/96	17.7 (11.36-26.54)

We observe that out of 101 subjects; 5 patients had BSF ≥110 and of them 3 had MetS giving prevalence of 60% (23.07-38.2). 17.7% prevalence of MetS was found among subjects with normal fasting blood sugar levels.

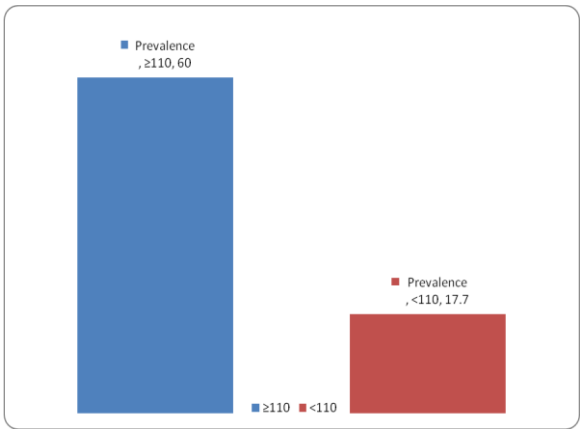

Table 6: Association between blood pressure systolic and Met-syndrome

Blood pressure systolic	With Met-syndrome	Without Met-syndrome	Yates corrected χ^2 (Chi-Square)	P-value	Crude odds Ratio (95%C I)
≥130	11	10	7.95	<0.001	8.86(2.88-26.12)
<130	9	71			

Systolic hypertension is one of the parameters found to have highly significant association with Metabolic Syndrome with p-value <0.001. 21 out of total 101 were found to have systolic hypertension. Among these 11 were having metabolic syndrome.

Table 7: Association between DBP and MetS.

Blood pressure diastolic	With Met-syndrome	Without Met-syndrome	Yates corrected χ^2 (Chi-Square)	P-value	Crude odds Ratio (95%C I)
≥85	6	6	5.81	0.015	5.35 (1.51-19.02)
<85	14	75			

With P-value=0.015 and odds of 5.81 a significant association was found between diastolic blood pressure and Metabolic Syndrome. Total of 12 subjects were found to have diastolic Hypertension, with 6 having Metabolic Syndrome and 6 without it.

Table 8: Association between blood sugar fasting and Met-syndrome

Blood sugar fasting	With Met-syndrome	Without Met-syndrome	Yates corrected χ^2 (Chi-Square)	P-value	Crude odds Ratio (95%C I)
≥110	3	2	3.02	0.08	6.97 (1.08-44.97)
<110	17	79			

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.

DISCUSSION

In the present study on the association of metabolic syndrome with diabetes mellitus and hypertension among women police personnel of J&K police, we included 101 subjects. A comprehensive assessment of various clinical parameters was made to draw a valid inference with regard to the objective of the study. We observed that out of 100 subjects; which 20 fulfilled the criterion of MetS. Of them majority of the study population was in the age group of 31-35 years (Table-1). Maximum number of subjects with MetS was between 41-45 years (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. Likewise to our results; several authors reported the comparable results with regard to the prevalence of MetS. [4,5]. However, unlike to our observation, some authors like; (Tharkar et al., 2008), (Almale et al., 2015) and (Sunil et al., 2018) have reported a whooping prevalence of MetS 57.3%, 62.3% and 64.55% in their studies respectively.[6-8] This variation may be attributed to varying sample size and different geographical regions. In the present study, we observed that out of 101 subjects; 21 had (>130 mmHg) systolic blood pressure with a prevalence of 20.8%, 12 patients had (>85mmHg) diastolic blood pressure with a prevalence of 11.9% and 5 had (>110mg/dl) fasting blood sugar with a prevalence of 4.95%. Hypertension high blood pressure is a classical feature of MetS and is included in all definitions of the syndrome. Systolic blood pressure (SBP) indicates the force of contraction of the heart and thus it represents the work done by the heart in overcoming the resistance in vessels (Ghai CL., 2013).[9] In our study, the prevalence of hypertension (>130/85) among female policemen was 25% which is consistent with numerous studies. [10-12]In contrast, higher prevalence of 58.5% was observed by (Shabana T et al., 2008), 56.5% by (Ravi Kumar T S et al., 2013) and 41.4% by (Thayyil et al., 2019).[13-15]Reason for such diverse results can be attributed to different geographical location and dietary habits of their test population. We found the percentage of female police personnel suffering from Systolic BP ≥ 130 mmHg to be 21% and among these the prevalence of MetS was found to be 52.38%. This figure is in accordance with the study by (Thayyil et al.,2012).[15] Clinically, greater importance is attached to diastolic blood pressure (DBP) because this much pressure is being exerted all the time during systole and diastole.[9] Among our subjects, the percentage suffering from diastolic BP≥85 mmHg was 12% comparable to studies by (Aggarwal S et al., 2015) and (Johns F et al., 2012).[16,17] The prevalence of MetS among these diastolic hypertensives was 50%. The low prevalence of hypertension seen in our study of female population may be attributed to the protective effect of endogenous oestrogen against atherosclerosis in premenopausal females (Saltiki K et al., 2008) and another factor being the regular physical activity as a part of their routine

schedule.[18] Fasting plasma Glucose (FPG) is a crucial component of MetS. It is estimated that a great majority (~75%) of patients with type 2 diabetes or impaired glucose tolerance (IGT) have MetS. The presence of the MetS in these populations relates to a higher prevalence of CVD compared with patients with type-2 diabetes or IGT without the syndrome. The prevalence of DM was found to be 5% among our study population. Our results are supported by (Ravi Kumar et al al., 2017), (Aggarwal S et al., 2015) and (Johns F et al., 2012). [14,16,17] Prevalence reported in southern India; 13.5% in Chennai, 12.4% in Bangalore, and 16.6% in Hyderabad (Ramachandran A et al., 2001). [19]Very high figures of diabetes were reported in studies by (Ramakrishna J et al., 2013) and (Tharkar S et al., 2008). [20, 21]Diabetes is a risk factor for CVD and stroke; it increases the risk of ischemic heart disease 2-4 times (Haffner SM et al., 1998).[22] 60% prevalence of MetS was found in subjects with increased FBS. Therefore, regular screening for DM and its risk factors will help identify the disease early and help in preventing or delaying the complications of diabetes in our subjects. In the present study we observed that systolic hypertension is one of the parameters found to have highly significant association with metabolic Syndrome with p-value <0.001. 21 out of total 101 were found to have systolic hypertension and of them 11 were having metabolic syndrome. Similarly, we found a significant association between diastolic blood pressure and metabolic syndrome with p-value of 0.015 and odds of 5.8. Out of a total of 12 subjects with diastolic Hypertension, 6 were having metabolic syndrome. Consistent to our study elevated BP and fasting blood glucose levels have been reported to be significant risk factors of Mets by a good corpus of scholars. [23-25]

CONCLUSION

The present study demonstrated that the prevalence of metabolic syndrome among study subjects was around 20% and the most prevalent age group was (41-45) year. Although the prevalence of metabolic with diabetes was 60% but the association was insignificant. However, both systolic and diastolic blood pressure were significantly associated with MetS. We recommend regular screening and health education programs need to be implemented. Counseling related to lifestyle modification, addiction control, and stress management are the need of the hour

Acknowledgement: None

Conflict of Interest: None

Source of Funding: None

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How to cite this article: Shahida Choudhary, Mrityunjay, Shazia Choudhary. Prevalence of metabolic syndrome and its association with hypertension and diabetes: an observational study on women police personnel of Jammu. *International Journal of Research and Review*. 2022; 9(4): 464-469.
DOI: *https://doi.org/10.52403/ijrr.20220458*

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