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A cross-sectional study on the prevalence of cardiovascular risk factors in police personnel of Karimnagar mandal

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ABSTRACT

Introduction: Many studies showed that police officers complained about physical and mental health issues due to job stress. These work stresses lead to adopting unhealthy lifestyles and habits including the harmful use of alcohol and tobacco use which leads to high blood pressure, heart attacks, and other NCDs. **Methods:** This cross-sectional study included all male police personnel of all cadres from nine police stations of Karimnagar Mandal. WHO STEPS NCD survey questionnaires were used to collect basic soci-demographic information, clinical history, stress, and anthropometry for measurements of CVD risk factors. **Result:** 253 police personnel with a mean age of 41.09 years enrolled from all cadres. 152 (60%) of police personnel had multiple cardiovascular risk factors. Hypercholesterolemia (37.2%) followed by a sedentary lifestyle (30.8%), and diabetes mellitus (14.6%) were important findings in this study. This study has also revealed an important link between preceding conditions for developing cardiovascular diseases such as pre-hypertension in 42.7% and impaired fasting glucose level in 25.7% of police personnel. Half of the study police personnel had a family history of NCDs and it was not statistically significant with service experience. There was a strong association between years of experience and tobacco and alcohol use. Organizational and operational stress levels increased with the increase in years of experience in policing (p-value<0. 01). **Conclusion:** Smoking and alcohol consumption were more prevalent among Police personnel which need to be controlled. Physical inactivity was another important area. Their attitude towards controlling the risk factors and practicing healthy behavior to safeguard from cardiovascular diseases has to be strengthened. It can be done by conducting regular awareness camps, training sessions, and regular cardiac risk factor evaluations for all police personnel.

KEYWORDS: Police, CVD, risk factors, prevalence, Karimnagar, NCD, Occupation

INTRODUCTION:

Occupational circumstances and adverse environmental factors are important determinants of the health status of the population [1]. The working conditions of police personnel have many threats including injuries, intense physical and mental stress, and unpredictable emergencies [2]. Most non-communicable diseases are the result of four particular behaviors (tobacco use, physical inactivity, unhealthy diet, and the harmful use of alcohol) that lead to four key metabolic or physiological changes (raised blood pressure, overweight/obesity, raised blood glucose and raised cholesterol) [3].

Even though the socioeconomic status of police personnel has improved in the last decade, but they still have a higher prevalence of typical risk factors including tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol [4, 5]. These four modifiable behavioral risk factors are mainly responsible for the huge burden of non-communicable diseases worldwide and in India too. Non-Communicable diseases in India account for 63% of all deaths in 2016 of which 27% were attributed to CVDs. CVDs also account for 45% of deaths in the 40-69 year age group [6, 7]

Cardio Vascular Diseases (CVD) are one of the major NCDs of which many behavioral and metabolic risk factors are preventable [3]. Many studies showed that police officers complained about physical and mental health issues due to job stress. This work stresses lead to adopting unhealthy lifestyles and habits including the harmful use of alcohol and tobacco use which leads to high blood pressure, heart attacks, and mental stress [3, 4, 7]. Furthermore, researchers have shown that police officers are also exposed to chronic non-traumatic stress arising from the demands of their work environment. For example, police officers face pressures from supervisors, the court, the media, and the public that can increase the stress- related problems such as insomnia [8, 9].

Despite having many work-related problems, police personnel have many advantages over the common population. For example, they have routine physical activity programs and discipline of following orders as a part of their job profile which helps to initiate and implement preventive measures among them easier and effectively.

As cardiovascular diseases are the major leading causes of illness and death in India then it is very important to understand various risk factors prevalent among regional centers of the police department. This would sensitize them for taking proper preventive actions. This study was planned to estimate the prevalence of cardiovascular risk factors and sensitize the police to take healthy measures for the prevention of CVDs in Karimnagar Mandal.

METHODOLOGY:

This cross-sectional study included all male police personnel of all cadres in all nine police stations of Karimnagar Mandal. Because of administrative and logistics issues, female police personnel was not included in the study. The institutional Ethical Committee, PIMS, Karimnagar, and permission from the Superintendent of Police, Karimnagar were obtained. Oral informed consent was taken from study participants after explaining the objectives and methods of the study.

Data Collection: a pre-designed and pre-tested questionnaire was used which was adapted from the WHO-STEPS project [10]. It included a collection of basic sociodemographic information, clinical history, stress measurement, and anthropometric measurements as per WHO STEPS instructions. Obesity was defined as per Asia Pacific Guidelines (WHO) [11].

Biochemical Laboratory Investigations: All study participants were instructed a week before to come on an empty stomach for estimation of FBS and Lipid profile. For the participant's convenience, the withdrawal of 5ml fasting blood samples was collected first. After breakfast, remaining of the questionnaire was filled up.

Withdrawal of blood was done by the lab technician from the Department of Biochemistry, Chalemeda Ananda Rao Institute of Medical Sciences. All blood samples were collected in a vacutainer and labeled meticulously. All samples were analyzed in the Central Laboratories of CAIMS General Hospital and PIMS hospital. Standard procedures were followed for the analysis of blood samples.

Statistical Analysis: Data entry was done using Microsoft excel 2021 and groups were formed based on the presence of different risk factors. The qualitative data association was determined using the Chi-Square test or Fisher Exact test wherever necessary and the P value of 0.05 or less was considered significant among the difference among the groups. Statistical analysis was done using SPSS version 20 IBM.

RESULTS:

Sociodemographic Characteristics:

Out of 278 regular male staff of Mandal, we could able to collect data and blood samples for 253 police personnel. The mean age was 41.09 years (±7.5 SD). Men aged 36 to 45 years (40%) were more compared to other age groups. The majority of Police personnel were Hindus (66%) followed by Hindus Muslims (23%) and Christians (8%). 41% had degree qualification followed by Intermediate (31%) and SSC (19%) as consecutive levels of education. Very few participants (9%) mostly of upper designation were having post-graduation as their qualification. Cadre-wise distribution was Police Constable (PC) cadre (63%), Head Constable (17%), Assistant Sub-Inspector (9%), Sub-Inspectors (8%), and Circle Inspectors (3%). Circle Inspectors were the highest rank and Police Constable was the lowest rank as per the designation of study participants. 40% of the study subjects had experience of 15-25 years and 25% of them had the experience of 5-15 years. 21% of the study participants had the experience of 25-35 years of experience. Recent recruiters who had experience of fewer than 5 years were 14%. Table 1

Prevalence of Cardiovascular Risk Factors:

The prevalence of the cardiovascular disease by a single parent is 27% and in 4% of the study participants, both parents suffered from or died of cardiovascular disease. A family history of diabetes was present in 21%.

The prevalence of smoking among the study participants was 19% and smokeless tobacco product usage is 10%. The most commonly used product is "Gutkha" next were "Khaini" and "Zarda". Harmful use of alcohol was 42%. Stress on Police personnel has been studied as Operational and Organizational stress and assessed on a 7-point scale. (51) In the present study, 17% of the study population did not feel any stress during their work. 40% of police felt moderate stress and 43% of them felt a lot of stress in handling the operational issues.

Organizational stress levels were less when compared to operational stress levels in the study population. 62% of the study population felt moderate stress in handling organizational issues, 17% of them felt a lot of stress and 23% of them did not feel any stress in organizational issues. The prevalence of sedentary in the study population was 31%, moderate physical activity was carried out by 42% and vigorous activities were carried out by 27% of the police personnel.

Clinical and Biochemical risk factors:

In our study, 56% of police personnel were in the normal range of Body Mass Index. 36% of them were Overweight and 7% of the Police personnel were obese. Out of 253 police personnel, 45% were normotensive, 43% were in the pre-hypertensive phase and 12% were in the Hypertensive stage. Grade I hypertension was recorded in 10% of study

Characteristics	Frequency (%)
Age (years)	
<25	23 (9)
26-35	46 (18)
36-45	102 (40)
46-55	71 (28)
>56	11 (4)
Religion	
Hindu	167 (66)
Muslim	57 (23)
Christian	21 (8)
Others	8 (3)
Educational Status	
Secondary	48 (19)
Intermediate	79 (31)
Degree	103 (41)
Post Graduate	23 (9)
Secondary	48 (19)
Cadre	
Police Constable	160 (63)
Head Constable	42 (17)
Assistant Sub-Inspector	22 (9)
Sub- Inspector	21 (8)
Circle- Inspector	8 (3)
Service Experience (years)	
< 5 years	36 (14)
5 to 15 years	64 (25)
15 to 25 years	100 (40)
> 25 years	53 (21)

Table 1: Socio-demographic characteristics of police personnel

subjects and Grade II hypertension was seen in 2%. The prevalence of diabetes was 15% including police personnel who were known diabetes and/or newly diagnosed during the study. Impaired glucose tolerance (IGT) was seen in 26% of the study population. And 18% of police personnels had hypercholestremia. Five personnel had a history of coronary artery disease. Many police personnel (n=152) had multiple risk factors. Table 2

Association of CVD risk factors with years of service experience:

Univariate analysis of the association of individual risk factors with the duration of service among police personnel revealed that the years of experience were significantly associated with many risk factors such as high blood pressure, diabetes, hypercholesterolemia, and sedentary lifestyle, $p<0.05$. The presence of multiple risks was also significantly associated with years of experience in police service. Table 3

DISCUSSION

We assessed the role and prevalence of various cardiovascular risk factors in police personnel in Karimnagar Mandal in South India. Our study had a high response rate from different cadres as it was a uniform group of people in an office setting, which ensured high-quality data collection and good rapport with police personnel.

One of the actionable findings was that police personnel had multiple cardiovascular risk factors. Hypercholesterolemia (37.2%), followed by a sedentary lifestyle (30.8%), and diabetes mellitus (14.6%) were important findings in this study. This study has also revealed an important link between preceding conditions for developing cardiovascular diseases, such as pre-hypertension in 42.7% of participants and an impaired fasting glucose level in 25% of police personnel. These are critical findings because, with proper preventive measures, the disease progression can be reversed at this earlier stage.

Family history is one of the non-modifiable risk factors for cardiovascular diseases. Half of the study's police personnel had a family history of NCDs, but it was not statistically significant with service experience. A history of definite MI or sudden death in the father or a first-degree male relative before 45 years of age or in the mother or a first-degree female relative before 55 years of age indicates high risk [12]. A family history of diabetes is significantly associated with cardiovascular disease. (58) The prevalence of a family history of diabetes among study participants is 21%, and in a study by Kumar et al., the family history also had strong significance [13].

The use of tobacco was 28.5% and the harmful use of alcohol was 42.5% among police personnel in this study. There is a strong association between years of experience and tobacco and alcohol use. Another study done in Nagpur City by FA Meshram, U Narlawar, and PM Durge showed

Risk Factors	**<5 Yrs** n=36	**5- 15 Yrs** n=64	**15-25 Yrs** n=100	**>25 Yrs** n=53	P value*
Presence of Family History of NCDs (n=131, 51.7%)					
Parental history of CVD (n=77)	10	18	27	22	p = 0.08
Parent with DM (n=54)	17	6	19	12	
Tobacco Use present (n=73, 28.9%)					p < 0.01
Smoking (n=48)	9	19	14	6	
Smokeless tobacco use (n=25)	13	7	3	2	
Harmful Use of Alcohol (n=107)	7	23	57	20	p < 0.001
Operational Stress present (n=211, 83.4%)					p = 0.028
Moderate (n=101)	20	25	32	24	
Lot of Stress (n=110)	3	30	57	20	
Organizational Stress present (n=196, 77.5%)					p < 0.001
Moderate (n=156)	20	39	63	34	
Lot of Stress (n=40)	2	11	22	5	
Physical Activity Levels					p = 0.002
Sedentary (n=78)	12	19	19	28	
Moderate (n=106)	13	24	51	18	
Vigorous (n=69)	11	21	30	7	
BMI Classification					p = 0.04
Underweight (n=2)	0	1	1	0	
Normal (n=142)	33	28	39	42	
Overweight (n=91)	03	31	49	8	
Obese (n=18)	0	4	11	3	
High Blood Pressure					p = 0.023
Normal (n=115)	16	32	37	30	
Pre-hypertension (n=108)	20	27	48	13	
Grade 1 HTN (n=25)	0	5	12	8	
Grade 2 HTN (n=5)	0	0	3	2	
Diabetes					p = 0.004
Normal (n=151)	31	46	51	23	
Impaired Fasting Glucose (IFG) (n=65)	5	12	28	20	
Diabetics (n=37)	0	6	21	10	
Hypercholesterolemia (n=94)	5	17	49	23	p < 0.001
Presence of Two or more risk factors (n=152)	12	40	77	23	p < 0.01

*Fisher Exact test

Table 3: Association of police service experience with cardiovascular risk factors among police personnels

Risk Factors	Prevalence No. (%)
Presence of Family History of NCDs (n=131)	
Parental history of CVD	77 (30.4)
Parent with DM	54 (21.3)
Tobacco Use present (n=73, 28.9%)	
Smoking	48 (19.0)
Smokeless tobacco use	25 (9.9)
Harmful Use of Alcohol (Yes)	107 (42.3)
Operational Stress present (n=211, 83.4%)	
Moderate	101 (39.9)
Lot of Stress	110 (43.5)
Organizational Stress present (n=196, 77.5%)	
Moderate	156 (61.7)
Lot of Stress	40 (15.8)
Physical Activity Levels	
Sedentary	78 (30.8)
Moderate	106 (41.9)
Vigorous	69 (27.3)
BMI Classification	
Underweight	2 (0.8)
Normal	142 (56.1)
Overweight	91 (36.0)
Obese	18 (7.1)
High Blood Pressure	
Normal	115 (45.5)
Pre-hypertension	108 (42.7)
Grade 1 HTN	25 (9.9)
Grade 2 HTN	5 (2.0)
Diabetes	
Normal (<110)	151 (59.7)
Impaired Fasting Glucose (IFG) (110-126)	65 (25.7)
Diabetics (>126)	37 (14.6)
Hypercholesterolemia (Present)	94 (37.2)

Table 2: Prevalence of Cardiovascular risk factors among police personnels

a prevalence of 54% tobacco use among police personnel [14]. In another study by Mahajan et al., the prevalence of smoking was 22% and tobacco chewing was 64% among police personnel in Mumbai [15].

WHO-ICMR, surveillance of cardiovascular risk factors in India showed a prevalence of smoking of 26.5% in an urban population [16]. Another study by Jayakrishnan Thayyil among police personnel in Calicut showed an alcohol prevalence of 52% [17]. A comparative study done between police officers and BARC employees in Mumbai by Mahajan et al. showed 21% alcohol consumption [15].

In the present study, 17% of the population did not feel any stress during their work. 40% of police felt moderate stress, and 43% of them felt a lot of stress in handling the operational issues. Organizational stress levels are lower when compared to operational stress levels in the study population. 62% of the study population felt moderate stress in handling organisational issues; 17% of them felt a lot of stress; and 23% of them did not feel any stress in handling organisational issues. Some studies have identified political pressure, lack of time for family, a negative public image, and a low salary as the primary causes of stress among police personnel [18, 19]. The study strongly indicates the relationship between stress and level of experience. Organizational stress levels increase with the increase in years of experience in policing (p-value=0. 0333). Operational stress levels show highly significant (P-value = 0.0001) increases associated with an increase in years of experience. A systemic review by Purba A and Demou E found that organisational stressors had significant associations with mental health outcomes, including lack of support, demand, job pressure, administrative/organizational pressure, and long working hours [20]. In a study by Kalpana Kohli et al., where they did a comparative study between trainees and serving police officials, it was found that stress, depression, and frustration levels are significantly higher in serving police officials than trainees [21].

In the present study, it has been observed that as years of experience increase in policing, physical inactivity is also increasing, and it is significantly wise and very strong. (p-value=0. 0023). Another study done at the Chennai Police made an observation about the lack of physical activity among the police. The results showed that they either sat or stood for long hours and walked less compared to the GP (p 0.05). [22] The IDSP-NCD risk factor survey found that more than 50% of the urban residents, 41.4% of peri-urban/slum residents, and 35% of rural residents had a sedentary lifestyle, while 25.4% of rural residents, 14.2% of peri-urban/slum residents, and 7.4% of urban residents were involved in vigorous physical activity [23].

In the present study, the association of years of experience in policing with increased levels of fasting blood glucose levels was analyzed, and the relation between these two variables is strongly significant (p-value = 0.0002). The

prevalence of metabolic syndrome, hypertension, type 2 diabetes, and individual cardiovascular abnormalities was higher among the police than the general population [22]. In another study by Kumar P et al., it was found that participants with an age of 50 years or more, hypertension, abdominal obesity, and family history of diabetes were 4.8, 1.5, 1.7, and 3.3 times more likely to have diabetes [24].

The present study reported a positive association of abdominal obesity with DM and IGT. A similar finding was noted in earlier studies among police and army personnel [25]. Hypercholesterolemia is one of the important biochemical parameters to assess cardiovascular risk. In a comparative study by Tharkar S et al., the mean levels of cholesterol in police personnel are higher when compared to the general population [22]. In another study by Atanu Saha, the cholesterol level in police personnel were higher than non-police personnel [26].

Although many studies had similar findings, this study revealed a statistically significant association between these risk factors and the service experience.

CONCLUSION:

Although most police personnel are aware of the risk factors and their harmful effects on cardiovascular disease risk, very few are adopting the correct behaviour to address the issue. Their attitude towards controlling the risk factors and practicing healthy behavior to safeguard from cardiovascular diseases has to be strengthened. It can be done by conducting regular awareness camps, training sessions, and regular cardiac risk factor evaluations for all police personnel.

Smoking and alcohol consumption were more prevalent among police personnel and needed to be controlled. Physical inactivity was another important area. More than 60% of police officers were not doing the required physical activity. Stress is inevitable for the police, but in our analysis, we found that operational stress was more prevalent than organizational stress. Logistics, infrastructure, and human resource deficits were stressing out most of the police personnel. Obesity is another important risk factor that needs a practical solution. 36 percent of the police in Karimnagar Mandal were overweight, and 7 percent were obese. Regular monitoring of the weight and BMI of all police personnel and advising them on proper physical activity are essential. Effective utilization of the ”Aarogya Bhadratha Scheme” for screening of NCDs by all police personnel over 40 years of age This scheme can be made mandatory for all police personnel above 35 years of age. Identification and deaddiction services should be done for police personnel who are addicted to alcohol and smoking.

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