Prevalence and Risk Factors of Musculoskeletal Disorders Among Police Employees: A Survey Study

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ABSTRACT

Background: Musculoskeletal disorders are a widespread and increasing occupational health problems worldwide. The disorders that result from work related event are known as "work related musculoskeletal disorders" where workers experience discomfort in one or multiple body parts, pain in joints, tingling and swelling. MSDs are reported to significantly impact on quality of life, cause lost work time, increase work restriction, or disability. The police have high possibility of showing musculoskeletal pains due to rough physical activities, including duties, traffic control, driving, security, sports and drills, and handling heavy equipment, and are highly hospitalized or treated.

Aim and Objectives: To determine the prevalence and risk factors of Musculoskeletal disorders in Police Employees.

Methodology: The study was conducted among 100 police employees. The data was collected using Self - Administered Questionnaire, Nordic Musculoskeletal Questionnaire and Operational Police Stress Questionnaire.

Result and conclusion: The 12-month prevalence of musculoskeletal disorders among police employees was 72%. Neck pain (51%) was found to be most prevalent followed by lower back (45%). The occurrence of Musculoskeletal Disorders was associated with factors such as age, work experience, longer working hours per day, daily alcohol consumption, and prolonged seated posture. Additionally, the study identified various operational stressors among police employees, including shift work, working alone at night, high overtime demands, fatigue, and unhealthy eating habits at work. Thus, strategies should be implemented to manage shifts, provide support and resources, promote healthy lifestyles, and mitigate fatigue, ultimately fostering a healthier and more resilient workforce that benefits both individual officers and overall law enforcement effectiveness.

Keywords: Prevalence, Musculoskeletal Disorders, Risk Factors, Police Employees.

INTRODUCTION

Musculoskeletal disorders (MSDs) are injuries or pain in the body that affect bodily structures such as joints, ligaments, muscles, nerves, tendons and supporting blood vessels of the limbs, neck, and back [1]. The disorders cut across a range of inflammatory and degenerative conditions that affect these bodily structures with resultant ache, pain, or discomfort [2]. When musculoskeletal injuries are sustained from work, they are referred to as work-related musculoskeletal disorders (WMSDs) [3]. WMSDs are major causes of pain, disability, absenteeism, reduced productivity, and heavy financial cost among workers worldwide [4]. A number of intrinsic and extrinsic factors have been involved in the etiology of WMSDs. Excessive repetitions, awkward posture, and heavy lifting are major biomechanical risk factors of WMSDs [5]. Other factors such as physical activity level, psychosocial factors (stress), and absence of ergonomics viability may be linked with WMSD symptom and prevalence [6]. All of

the aforementioned are common occupational related risks. One of the occupations that can expose one to such MSDs is policing [7]. Policing is a high-stress occupation that is prone to a high level of traumatic and nontraumatic stressors [8]. Police employees have high possibility of musculoskeletal disorders owing to the nature of their work which involves activities such as traffic control, driving, security, sports and drills, and handling heavy equipment. Musculoskeletal disorders related to the occupation include sprains, tendinitis, bursitis, ligament injuries, entrapment neuropathies, and cartilage and bone damages [9]. In addition, the policemen are frequently exposed to emergency situations and exchange of day and night time work resulting in disturbance of the circadian rhythm which poses difficulty in maintaining a pattern of ordinary life like those of other occupations and warrants attention. We came across very few studies on MSDs in policemen in India. So, this study attempts to identify the risk factors and musculoskeletal disorders among police employees.

MATERIAL & METHODS
STUDY DESIGN
The study was conducted among 100 police employees, both male and female aged between 21-60 years. Police employees with more than 12 months of experience were included in this study. Subjects with any history of previous injury/surgery, any evidence of inflammatory disorder, infectious disease were excluded from the study. The aim and objectives of this study were clearly elucidated to the subjects, who were also assured of the concealment of their responses.

Data on subject's demographic variables such as age, gender, migratory status, language known, education level, marital status, size of family, number of children, rank in department, year of experience, working hours, number of days working per week, working shifts was collected.

RESEARCH SETTING
Data was collected from Police stations of Fatehgarh Sahib and Patiala District. The interview schedule method was used to collect the data.

Inclusion criteria
- Both male and female police employees were included.
- Subject who worked more than one year of experience as police employees were included.
- The age group between 21 to 60 years were included.

Exclusion criteria
- Any history of trauma of the spine.
- Any history of fracture, neurological disorder and psychological disorder.
- Any diagnosed case of local systemic infection, malignancy.

DEVELOPMENT OF QUESTIONNAIRE
The data was collected using self-administered questionnaire, Nordic Musculoskeletal questionnaire [10] and Operational Police Stress questionnaire [11]. Convenience sampling was used for the study. The questionnaire included informed consent for the voluntary participation of police employees. The questionnaire included total 25 multiple choice questions to evaluate the prevalence of the and risk factors of musculoskeletal disorders among police employees.

DATA ANALYSIS
The data was analysed using Statistical Package of Social Science (SPSS) windows version 26 and summarized using descriptive statistics of the bar chart, pie chart, frequency and percentage using tables.

RESULTS
Table 1 depicts 12-month Prevalence of Musculoskeletal Disorders among Police Employees. The prevalence of MSD was 72%.

Table 1: 12 Month Prevalence of Musculoskeletal disorders among police employees.

12 Month Prevalence ofMSDs	Absolute no. (n)	%
Yes	72	72
No	28	28
Total	100	100

Table 2 depicts the region wise prevalence of musculoskeletal disorders. Majority of the police employees experienced neck pain (51%), followed by lower back pain (45%).

Table 2: Region wise Prevalence of MSDs.

Region	Absolute no.	%
Neck	51	51.0
Shoulder	4	4.0
Lower back	45	45.0
One or both hips or thighs	1	1.0
One or Both knees	6	6.0
One or both Ankles/Feet	4	4.0

Table 3 presents the association of demographic characteristics with 12-month prevalence of work- related musculoskeletal disorder. The 12-month prevalence of work-related musculoskeletal disorder was higher in females 8(88.8%) then males 64(70.3%), and those age group of 51-60 years 18(81.8%), followed by 41-50 years 15(78.9%), 31-40 years 25(75.7%). Most respondents 9(90%) had 31-40 years of experience in job are more prone to MSDs. On further analysis marital status (X^2=10.39, p=0.001), number of children (X^2=8.67, p=0.013), year of experience (X^2=9.98, p=0.019), working hours per day (X^2=6.14, p=0.046), were found to be significantly associated with 12-month prevalence of MSDs.

Table 3: Association of Demographic characteristic with 12month prevalence of MSD.

Characteristics	12-month prevalence				
Age (years)	Yes n (%)	No n (%)	TotalN (%)	X^2	P value
21 - 30	14(53.8%)	12(46.1%)	26(100%)		
31 - 40	25(75.7%)	8(24.2%)	33(100%)		
41 - 50	15(78.9%)	4(21.0%)	19(100%)	5.988	0.112[NS]
51 - 60	18(81.8%)	4(18.1%)	22(100%)		
Gender					
Male	64(70.3%)	27(29.6%)	91(100%)		
Female	8(88.8%)	1(11.1%)	9(100%)	1.399	0.221[NS]
Migratory status					
Migrant	7(77.7%)	2(22.2%)	9(100%)		
Non migrant	65(71.4%)	26(28.5%)	91(100%)	0.164	0.686[NS]
Language known					
Punjabi	65(71.4%)	26(28.5%)	91(100%)		
Hindi	7(77.7%)	2(22.2%)	9(100%)	0.164	0.686[NS]
Level of education					
Primary	1(100%)	0(0%)	1(100%)		
Elementary	9(90%)	1(10%)	10(100%)		
High school	32(76.1%)	10(23.8%)	42(100%)	3.918	0.270[NS]
Graduationor more	30(63.8%)	17(36.1%)	47(100%)		
Marital status					
Single	8(42.1%)	11(57.8%)	19(100%)		
Married	64(79.0%)	17(20.9%)	81(100%)	10.398	0.001***
Size of family					
1-3	9(60%)	6(40%)	15(100%)		
4-6	57(73.0%)	21(26.9%)	78(100%)	1.769	0.413[NS]
7-10	6(85.7%)	1(14.2%)	7(100%)		
Number of children					
None	11(47.8%)	12(52.1%)	23(100%)		
1-2	43(79.6%)	11(20.3%)	54(100%)	8.673	0.013**
3-4	18(78.2%)	5(21.7%)	23(100%)		
Rank in department					
Lower subordinates	37(64.9%)	20(35.0%)	57(100%)		
Upper subordinates	35(81.3%)	8(18.6%)	43(100%)	3.303	0.069[NS]
Officer rank	0(0%)	0(0%)	0(0%)		
Year of experience					
1-10	19(54.2%)	16(45.7%)	35(100%)		
11-20	23(74.1%)	8(25.8%)	31(100%)	9.989	0.019**
21-30	21(87.5%)	3(12.5%)	24(100%)		
31-40	9(90%)	1(10%)	10(100%)		

Working hours					
8 hours	4(66.6%)	2(33.3%)	6(100%)		
8-12 hours	36(63.1%)	21(36.8%)	57(100%)	6.147	0.046*
12-16 hours	32(86.4%)	5(13.5%)	37(100%)		
Number of days working per week					
1-3	0(0%)	0(0%)	0(0%)		
4-5	1(33.3%)	2(66.6%)	3(100%)	2.294	0.130^{NS}
6-7	71(73.1%)	26(26.8%)	97(100%)		
Working shifts					
Day shift	13(81.2%)	3(18.7%)	16(100%)		
Night shift	2(100%)	0(0%)	2(100%)	1.709	0.426^{NS}
Both	57(69.5%)	25(30.4%)	82(100%)		
Body mass index					
Underweight	3(75%)	1(251%)	4(100%)		
Normal	30(63.8%)	17(36.1%)	47(100%)		
Pre obese	30(81.0%)	7(18.9%)	37(100%)	3.141	0.370^{NS}
Obese	9(75%)	3(25%)	12(100%)		

Table 4 presents the association of life style factors with 12-month prevalence of work-related musculoskeletal disorder. The 12-month prevalence of work-related musculoskeletal disorder was higher in police employees who consumed alcohol 39(86.6%), (X^2=8.73, p=0.003).

Table 4: Association of the life style factors and 12-month prevalence of MSDs.

Life style factors	12-month prevalence				
Habit of smoking	**Yes n (%)**	**No n (%)**	**Total N (%)**	X^2	**P value**
Yes	5(83.3%)	1(16.6%)	6(100%)	0.407	0.524^{NS}
Do you consume alcohol					
Yes	39(86.6%)	6(13.3%)	45(100%)	8.730	0.003**
Do you drive daily					
Yes	51(77.2%)	15(22.7%)	66(100%)	2.677	0.102^{NS}
Do you exercise regularly					
Yes	28(71.7%)	11(28.2%)	39(100%)	0.001	0.971^{NS}
Any sleep disorder					
Yes	9(81.8%)	2(18.1%)	11(100%)	0.591	0.442^{NS}

Table 5 presents association of the physical factors with 12-month prevalence of WMSDs. The risk of physical factors was higher in prolonged seated posture 27(81.8%) of the subjects. On further calculations the (x^2=2.355, p=0.125) was not found to be significant associated with 12-month prevalence.

Table 5: Association of the Physical Factors and 12-month prevalence of MSDs.

Physical factors	12-month prevalence				
Lifting and lowering ofheavy loads	**Yes n (%)**	**No n (%)**	**TotalN (%)**	X^2	**P value**
Yes	37(68.5%)	17(31.4%)	54(100%)	0.706	0.401^{NS}
Prolonged seated posture					
Yes	27(81.8%)	6(18.1%)	33(100%)	2.355	0.125^{NS}
Prolonged standing posture					
Yes	46(67.6%)	22(32.3%)	68(100%)	1.997	0.158^{NS}

Table 6: presents the association using operational police stress questionnaire to access the operational stressor associated with police general well-being with 12-month prevalence of work-related musculoskeletal disorder. On analysis police employees who had doing work in shifts had moderate stress 28(87.5%), (X^2=10.33, p=0.006), working alone at night had a lot of stress 10(90.9%), (X^2=8.86, p=0.012), over time demand had a lot of stress 14(93.3), (X^2=8.99, p=0.011), eating healthy at work had moderate stress 26(89.6%), (X^2=6.93, p=0.031), due to fatigue had moderate stress 40(83.3%), (X^2=6.21, p=0.045), were found to be significantly associated with 12-month prevalence of MSDs.

Table 6: The operational police stress questionnaire was used to access the operational stressor associated with police general well-being.

Characteristics	12-month prevalence				
Shift work	Yes n (%)	No n (%)	Total N (%)	x^2	P value
No stress at all	26(56.5%)	20(43.4%)	46(100%)		
Moderate stress	28(87.5%)	4(12.5%)	32(100%)	10.332	0.006*
A lot of stress	18(81.8%)	4(18.1%)	22(100%)		
Working alone at night					
No stress at all	33(60%)	22(40%)	55(100%)		
Moderate stress	29(85.2%)	5(14.7%)	34(100%)	8.860	0.012*
A lot of stress	10(90.9%)	1(9.0%)	11(100%)		
Over time demand					
No stress at all	18(54.5%)	15(45.4%)	33(100%)		
Moderate stress	40(76.9%)	12(23.0%)	52(100%)	8.998	0.011*
A lot of stress	14(93.3%)	1(6.6%)	15(100%)		
Risk of being injured on the job					
No stress at all	17(80.9%)	4(19.0%)	21(100%)		
Moderate stress	31(68.8%)	14(31.1%)	45(100%)	1.085	0.581NS
A lot of stress	24(70.5%)	10(29.4%)	34(100%)		
Work related activities on day off					
No stress at all	33(63.4%)	19(36.5%)	52(100%)		
Moderate stress	30(78.9%)	8(21.0%)	38(100%)	4.397	0.111NS
A lot of stress	9(90%)	1(10%)	10(100%)		
Traumatic events					
No stress at all	38(64.4%)	21(35.5%)	59(100%)		
Moderate stress	23(82.1%)	5(17.8%)	28(100%)	4.142	0.126NS
A lot of stress	11(84.6%)	2(15.3%)	13(100%)		
Manage your social life outside the work					
No stress at all	45(71.4%)	18(28.5%)	63(100%)		
Moderate stress	17(70.8%)	7(29.1%)	24(100%)	0.183	0.913NS
A lot of stress	10(76.9%)	3(23.0%)	13(100%)		
Not enough time available to spend with friends and family					
No stress at all	28(71.7%)	11(28.2%)	39(100%)		
Moderate stress	33(67.3%)	16(32.6%)	49(100%)	2.829	0.243NS
A lot of stress	11(91.6%)	1(8.3%)	12(100%)		
Paperwork					
No stress at all	36(65.4%)	19(34.5%)	55(100%)		
Moderate stress	28(77.7%)	8(22.2%)	36(100%)	3.038	0.219NS
A lot of stress	8(88.8%)	1(11.1%)	9(100%)		
Eating healthy at work					
No stress at all	45(64.2%)	25(35.7%)	70(100%)		
Moderate stress	26(89.6%)	3(10.3%)	29(100%)	6.939	0.031*
A lot of stress	1(100%)	0(0.0%)	1(100%)		
Finding time to stay in good physical condition					
No stress at all	45(65.2%)	24(34.7%)	69(100%)		
Moderate stress	22(84.6%)	4(15.3%)	26(100%)	5.571	0.062NS
A lot of stress	5(100%)	0(0%)	5(100%)		
Fatigue					
No stress at all	12(57.1%)	9(42.8%)	21(100%)		
Moderate stress	40(83.3%)	8(16.6%)	48(100%)	6.219	0.045*
A lot of stress	20(64.5%)	11(35.4%)	31(100%)		
Occupational related health issue					
No stress at all	26(60.4%)	17(39.5%)	43(100%)		
Moderate stress	42(82.3%)	9(17.6%)	51(100%)	5.634	0.060NS
A lot of stress	4(66.6%)	2(33.3%)	6(100%)		
Lack of understanding from family and friends about your work					
No stress at all	51(71.8%)	20(28.1%)	71(100%)		
Moderate stress	15(68.1%)	7(31.8%)	22(100%)	0.813	0.666NS
A lot of stress	6(85.7%)	1(14.2%)	7(100%)		
Making friends outside the job					
No stress at all	51(66.2%)	26(33.7%)	77(100%)		
Moderate stress	14(93.3%)	1(6.6%)	15(100%)	5.610	0.061NS
A lot of stress	7(87.5%)	1(12.5%)	8(100%)		
Upholding a higher image in public					
No stress at all	55(69.6%)	24(30.3%)	79(100%)		
Moderate stress	14(87.5%)	2(12.5%)	16(100%)	2.486	0.289NS
A lot of stress	3(60%)	2(40%)	5(100%)		
Negative comments from the public					
No stress at all	27(72.7%)	10(27.0%)	37(100%)		
Moderate stress	41(70.6%)	17(29.3%)	58(100%)	0.226	0.893NS
A lot of stress	4(80%)	1(20%)	5(100%)		

Limitation to your social life					
No stress at all	19(76%)	6(24%)	25(100%)		
Moderate stress	40(71.4%)	16(28.5%)	56(100%)	0.328	0.849[NS]
A lot of stress	13(68.4%)	6(31.5%)	19(100%)		
Feeling like you are always on the job					
No stress at all	16(80%)	4(20%)	20(100%)		
Moderate stress	33(63.4%)	19(36.5%)	52(100%)	3.944	0.139[NS]
A lot of stress	23(82.1%)	5(17.8%)	28(100%)		
Friends' family feel the effect of the stigma associated with your job					
No stress at all	34(65.3%)	18(34.6%)	52(100%)		
Moderate stress	28(82.3%)	6(17.6%)	34(100%)	2.939	0.230[NS]
A lot of stress	10(71.4%)	4(28.5%)	14(100%)		

DISCUSSION

This study examined musculoskeletal disorder prevalence among police employees. The 12-month prevalence was 72%, consistent with similar studies in Sao Paulo, Brazil (75%) [12] and Yobe State, Nigeria (81%) [13]. Neck pain was the most common issue (51%), followed by lower back pain (45%). The intricate structure of the neck makes it susceptible to strain and stress, leading to discomfort and pain. Additionally, poor posture, such as sitting for extended periods with a forward head position or slouching, can place excessive strain on the muscles and ligaments of the neck. This can result in muscle imbalances and tension, leading to the development of neck pain [14]. Females had a higher prevalence (88.8%) compared to males (70.3%), despite being the minority in the study. The 51-60 age group showed a higher prevalence (81.8%). Age contributes to an increased risk of musculoskeletal disorders due to several factors such as degenerative changes in the musculoskeletal system, and joint and tissue wear-and-tear leading to conditions like osteoarthritis [15]. However, no statistically significant differences were found in MSD prevalence based on age, gender, rank, education level, working shifts, or body mass index. Lifestyle factors like smoking, alcohol consumption, daily driving, exercise, and sleep disorders were examined, with daily alcohol consumption showing a significant association (86.6%) with 12-month MSD prevalence. Alcohol consumption can worsen discomfort and reduce quality of life in individuals with musculoskeletal disorders (MSDs). It can heighten pain sensitivity [16], delay tissue healing [17], and lead to muscle weakness, loss of muscle mass, and atrophy [18]. The study utilized the PSQ-Op questionnaire to assess operational stressors, revealing that shift work, night shifts, high overtime demands, fatigue, and poor eating habits were significantly linked to officers' well-being. Given the small sample size, caution is needed in generalizing the study's findings, emphasizing the importance of larger studies with robust statistical analysis. Police officers face various sources of stress that can significantly impact their well-being. Exposure to traumatic events, such as violence, accidents, and fatalities, can lead to stress and potentially contribute to the development of post-traumatic stress disorder (PTSD) symptoms [19]. The nature of police work itself, characterized by long hours, high workloads, time pressure, and the need for quick decision-making, can result in chronic stress [20]. Dealing with emotionally challenging situations, such as interacting with victims and witnesses, also takes a toll on police officers, leading to stress and emotional exhaustion [21].

CONCLUSION

The study revealed a higher prevalence of musculoskeletal disorders (MSDs) among police employees, primarily affecting the neck and lower back. Age, work experience, longer daily working hours, and daily alcohol consumption were linked to the occurrence of MSDs. To prevent and reduce MSDs, it iscrucial to incorporate ergonomic education into police training and improve working conditions. The study also identified operational stressors such as shift work, night shifts, high overtime demands, fatigue, and unhealthy eating habits. Strategies should be implemented to

manage shifts effectively, provide support and resources, promote healthy lifestyles, and address fatigue. These measures will contribute to a healthier and more resilient workforce, benefiting both individual officers and overall law enforcement effectiveness.

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