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Prevalence of Shoulder Abnormalities among Police Forces Carrying Heavy Ammunition and Its Impact on Work Performance

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DECLARATIONS

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ABSTRACT

Background: Police officers often carry heavy ammunition, protective gear, and equipment for extended periods. This prolonged physical burden places significant stress on their shoulders, increasing the risk of developing musculoskeletal disorders, chronic pain, and reduced mobility. **Objective:** To determine the prevalence of shoulder abnormalities among police forces carrying heavy ammunition and its impact on work performance. **Methodology:** In this cross-sectional study, different agencies and police departments of Faisalabad, including Kotwali Road, Civil Lines and Jail Road. From February to August 2024, policemen's shoulder discomfort was examined in single-blinded, randomized clinical trials. About 200 full-time police officers from several agencies satisfied the study's age, health, and participation criteria. Policemen with previous bone or muscular issues and shoulder injuries, having implants, including orthopedic hardware, chronic disorders like diabetes, degenerative diseases that exacerbate shoulder discomfort and dysfunction, were excluded. A group practiced proprioceptive neuromuscular facilitation exercises and another group practiced myofascial release. The Shoulder Pain and Disability Index measured pain severity and impairment, while the Oxford Shoulder Score measured shoulder function and quality of life. Goniometers measured the shoulder range of motion. Three data points occurred before, during, and after therapy. Descriptive statistics showed prevalence and participant profiles. Compared group results and evaluated interventions using paired t-tests and ANOVA. The study covered informed consent, ethics committee approval, confidentiality, and participation. **Results:** About 30% of police reported mild-to-moderate shoulder aches. The Shoulder Pain and Disability Index scores showed significant impairment, hurting job performance and satisfaction. The Oxford Shoulder Score found that shoulder pain reduced function and quality of life. MFR and PNF reduced pain and improved function, although neuromuscular facilitation improved shoulder ROM and disability ratings more. **Conclusion:** Myofascial release and proprioceptive neuromuscular facilitation reduce shoulder pain and enhance function, but neuromuscular facilitation is more significant. Management of shoulder pain at work improves policemen's lives and productivity.

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INTRODUCTION

The shoulder is one of the most affected areas by musculoskeletal issues in police officers. This may be affected by deformities, injuries, and chronic pain which result from repetitive motions, excessive use, poor ergonomics or workplace accidents. The bones, muscles, tendons, and ligaments of a complex shoulder joint are stable and flexible. Injuries to these parts can cause pain and movement issues. Carrying weapons and gear can injure officers' shoulders and rotator cuffs. Jobs that require repeated motions, heavy lifting, or protracted postures cause musculoskeletal issues. Police's heavy-duty belts, body armor, and firearms can strain muscles. Depending on position, equipment, and service time, 30% to 70% of police officers experience musculoskeletal disorders (MSD), including shoulder pain.¹

Health and job performance concerns may increase absenteeism and productivity. Noncombat musculoskeletal injuries (MSKI) may account for nearly 60% of soldiers' limited duty days and 65% of soldiers who cannot deploy for medical reasons. Injuries primarily affect readiness through increased limited duty days, decreased deployability rates, and increased medical separation rates. MSKIs are also responsible for exorbitant medical costs to the U.S. Thirty work-related injuries (31%) occurred with an injury rate of 31 injuries per 100 FTE worked within the firearms unit of the UK police department in the previous year. Fifty percent of officers took no time off for recovery. Twenty-nine per cent of injuries were classified as severe and the mechanisms of more severe injuries were linked to occupational demands.³

Police officers belong to a category of workers who are exposed daily to violence, with a heavy workload and the risk of death. The police officers have rest activity and sometimes are exposed to intense, physically demanding, stressful conditions. This situation can lead to chronic diseases such as depression, stress, and MSD.⁴ Besides this, a police job might induce or worsen pre-existing conditions due to unexpected movements. Officers may react fast during an arrest or brawl, straining their shoulders and tendons. This may aggravate acute or chronic diseases. Sitting for lengthy durations, like during surveillance or patrol, might exhaust muscles.⁵ The MSK problems remain the most frequent

reason why individuals are absent from work, including those with work-related musculoskeletal disorders (WRMSD) and those with chronic MSK problems.⁶ For these reasons, police shoulder pain research is vital to occupational health. This inquiry examines policemen's shoulder pain from heavy equipment. Few studies have examined police officers' equipment-related shoulder strain. We analyzed shoulder pain prevalence and its implications on police officers' daily lives to fill this gap. The current study quantified symptoms and their effects on daily life using the Shoulder Pain and Disability Index (SPADI) and the Oxford Shoulder score (OSS).

Due to several reasons, this population's shoulder discomfort is important. It helped design injury prevention and intervention strategies. Equipment or weight distribution modifications reduced shoulder strain. Promoting police health and safety policy. Light gear improved officers' performance and well-being. Naz et al. (2022) linked MSD to ergonomics and fitness. The study also evaluated police work's physical demands and equipment ergonomics. This study also examined how these findings affected occupational health practices and future research, including the need for greater sample sizes and studies on different age groups or law enforcement positions.⁷ This study concluded that policemen's shoulder soreness is common and requires specific treatment and research. By creating law enforcement health and safety initiatives, data will increase public safety.

METHODOLOGY

This cross-sectional study examined policemen's heavy equipment shoulder pain. The six-month data gathering volunteers came from DHQ, Allied, and Madinah Teaching, three major hospitals in Faisalabad. Department heads and IRBs gained ethical permission for data collection. Initial research included 200 police officers from six large urban police departments. 150 cops were convenience-sampled. The qualified were male police officers, 25–55 years old, with two years of service and normal gear. Patients with other shoulder problems, recent surgery, and neurological disorders are excluded. The police had heavy weapons and gear, while B had less. Structured questionnaires collected demographic and occupational data. The SPADI and OSS

measured shoulder pain prevalence, severity, and impact on everyday life and work. Baseline, mid-point (two weeks), and post-treatment data were collected. Per step, we measured shoulder discomfort and range of motion. Descriptive statistics summarized the data in SPSS version 20, and chi-square and independent t-tests compared the two groups. Policemen's shoulder discomfort prevalence and impact were evaluated to guide occupational health practices. The trial recruited active 25 to 40 years old, who are less likely to develop musculoskeletal problems. All study participants were males. Participants had to labor in their locations to acquire real-world and occupational pressure data. Two years of professional experience were required. Policemen with previous bone or muscular issues and shoulder injuries, having implants, including orthopedic hardware, chronic disorders like diabetes, degenerative diseases that exacerbate shoulder discomfort and dysfunction, were excluded.

Comprehensive screening identified research participants, their age, years of service, equipment type, and that no serious shoulder injuries were screening factors. The study recruited 150 cops who satisfied these requirements. Participants learned the study's objectives, methods, and benefits following selection. They consented in writing. The consent process informed participants of their rights, including the right to leave the study without penalty. Participants consented to SPADI and OSS. The SPADI is a popular shoulder pain and disability assessment instrument. Disability and pain subscales have 13. Participants assessed their pain and disability from 0 (no discomfort) to 10 (worst). The OSS is another self-reported shoulder function and quality of life assessment. It has 12 0–4 items; higher scores imply stronger shoulder function. OSS evaluates dressing, lifting, and carrying.

Data collection reassured participants that all hospital exams were private and taken care of privately. All participants used the identical grading scales and data collection instructions. The data was trustworthy due to uniformity. The SPADI and OSS were baseline, midline, and post-treatment. We tracked shoulder pain and function for a complete therapy study. To eliminate bias, training physiotherapists blinded to group assignments collected all data. This ignorance ensured fair assessments. Using SPSS 20, SPADI

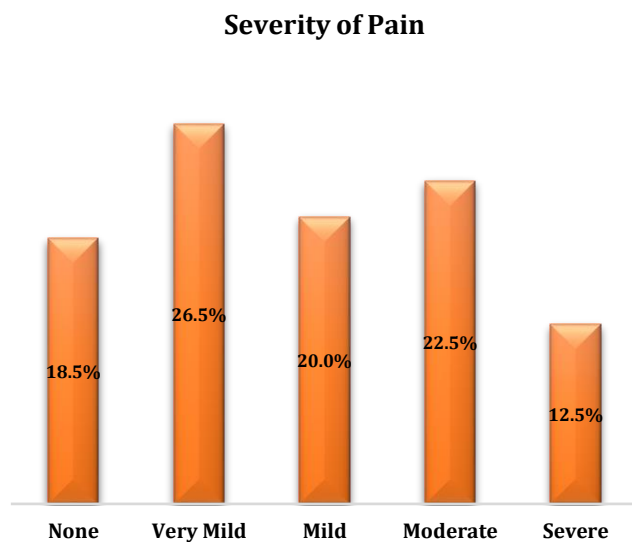
and OSS data were analyzed. Statistics showed demographics and outcomes use chi-square and independent t-tests to compare groups. A statistical analysis investigated intervention efficacy and group differences. SPADI shoulder pain intensity and disability assessments are widespread. The pain and disability subscales have 5 and 8 items. Participants' pain and disability scale was 0–10 (worst pain/severe disability). Composite evaluations increased discomfort and disability.⁸ Twelve items and five response categories assess shoulder pain and function. From 0 to 48, higher scores indicate better shoulder function.⁹ While volunteers completed questionnaires quietly, researchers addressed questions.

RESULTS

Participants frequently had shoulder pain. Out of 200 officers, 124 (62%) felt shoulder pain. Service rank and year affected shoulder pain. Police subgroup shoulder pain prevalence is in Table 1. Police officers had high shoulder pain, as shown above. SPADI and OSS rated shoulder pain's daily impact. Shoulder pain was detrimental to policemen's personal and professional lives. Participants experienced problems lifting, exercising, and using service arms. Figure 2 shows mild, moderate, and severe daily activity. The bar chart shows that most % of participants had minimal difficulty with wearing clothes appears to

Table 1: Rank and service duration of policemen

	Sub-group	Number of Patients	Shoulder Pain f(%)
Rank	Officer	80	50(62.5)
	Sergeant	60	35(58.3)
	Lieutenant	30	18(60)
	Captain	20	12(60)
Service duration (years)	2-5	50	35(70)
	6-10	60	40(66.7)
	11-15	40	22(55)
	16-20	30	15(50)
	>20	20	12(60)

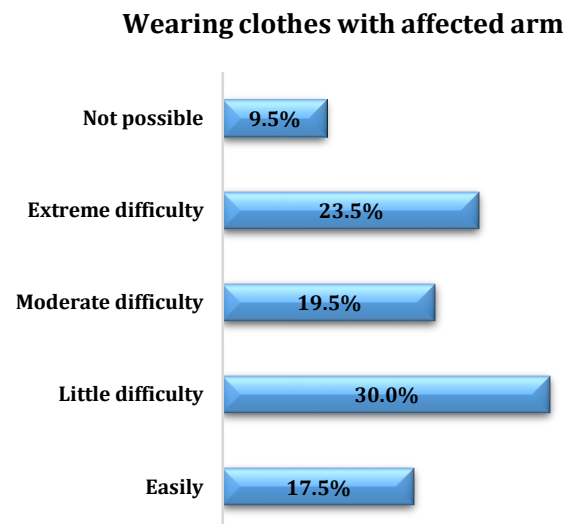
Figure 1: Prevalence of shoulder pain

be 30%, while only 9.5% said wearing clothes was impossible for them to do.

DISCUSSION

About 62% of cops have shoulder pain, which hurts their daily work. The physical challenges of a police job may explain this extraordinary incident's low rate. SPADI and OSS scores show that many officers can handle shoulder pain without affecting everyday tasks. Coping methods, physical conditioning, and supportive work settings help police handle pain. Our study provided an in-depth investigation of shoulder discomfort, revealing that 30% of police officers experienced mild-to-moderate shoulder pain, which significantly impaired their job performance and quality of life. Unlike, this research actively explored therapeutic solutions, demonstrating that both Proprioceptive Neuromuscular Facilitation (PNF) and Myofascial Release (MFR) effectively reduced shoulder pain, with PNF showing superior improvements in range of motion and disability, in contrast Fiaz MW et al also reported a moderate prevalence of 33.6% shoulder abnormality among traffic police wardens, but it did not offer any intervention or detailed analysis of its impact on function or quality of life.

Fiaz et al. (2018) only highlighted shoulder pain prevalence. This study collects SPADI and OSS data, like earlier research. Shakeel et al. (2022) and Phadke et al. have shown that these methods are accurate for evaluating shoulder pain and its implications on everyday living.^{10,11} Consistency in earlier studies supports this study. In a cross-

Figure 2: Impact of shoulder pain on daily activities

Sectional survey, Ghanea Ahmad et al. (2018) collected data from 384 subjects, which was also collected through a convenient sampling. Technique. He concluded that among 384, 263 (69%) had upper extremity pain, including the shoulder, which was also prevalent in our study, and 206(54%) had radiating pain to the other regions.¹² They showed a 3-point degree of pain on the visual analogue scale (VAS). This study's mild shoulder soreness prevalence and impact may be related to numerous factors. First, police fitness may matter. The officers' considerable physical training may assist them in enduring musculoskeletal discomfort. Police gear may also alleviate shoulder strain. Modern police gear, especially ergonomics, may reduce prevalence rates compared to older studies. The police force's corporate culture may support early musculoskeletal disorder reporting and treatment, preventing shoulder pain. A proactive approach to shoulder pain therapy may lessen its everyday impact.¹³

These findings indicate similarities and variations with previous studies. Ramstrand and Larsen discovered higher shoulder pain in Swedish police personnel, suggesting region-specific employment demands and equipment use.¹⁴ Due to their heavy gear and rigorous activity, military personnel have a higher rate of musculoskeletal discomfort, notably shoulder pain, according to Lentz et al. (2019).¹⁵ However, Holmes et al. and Monnier found similar prevalence rates, suggesting that shoulder pain is a common occupational health concern in law enforcement. Consistent findings across studies and populations indicate the necessity to address this issue in policing. This

study promotes police musculoskeletal disorder research. Holmes et al. found 58% shoulder pain, matching this study's 62%.¹⁶ Monnier found that shoulder soreness hindered law enforcement officers' work and daily lives.¹⁷ Larsen et al. suggest that unfamiliarity with the job may aggravate musculoskeletal issues in new officers. The current study found higher rates among younger officers (2–5 years).¹⁸ However, more experienced police may have adjusted or been trained to fulfill these needs.

Ohlendorf et al. (2023) found that 30% of individuals had significant daily life implications due to shoulder pain. Naz et al. (2022) identified similar patterns, underlining the necessity for management to mitigate these consequences. Mona GG et al. conducted a review in which one study on ergonomic hazards showed that musculoskeletal disorders can result from driving long distances and lifting heavy objects.¹⁸ Major faults plagued the study. Limitations on resources limited the research scope in Pakistan, which resulted in a literature gap, sample size, and length. Data gaps may result from participants' busy work schedules, making daily data collection difficult. Lack of shoulder pain discussion reduced data accuracy and completeness. Addressing these limits may improve future research reliability and generalizability.

CONCLUSION

The study found that Myofascial release and PNF reduce shoulder pain and enhance function, but PNF acts better. Management of shoulder pain at work improves policemen's lives and productivity. To explain shoulder pain, future studies should investigate equipment type and duration and employ larger samples.

DECLARATIONS

Consent to participate: Written consent had been obtained from patients. All methods were performed following the relevant guidelines and regulations.

Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.

Competing interests: None

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Authors' contributions: All authors read and approved the final manuscript.

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