

Musculoskeletal Disorders Among Rifle Shooters: A Cross-Sectional Study

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Abstract: *Background:* Musculoskeletal disorders (MSDs) are a frequent health issue affecting athletes across various sports, including shooting. Rifle shooters are particularly susceptible due to repetitive static postures and prolonged holding of the rifle. *Aim:* To identify the level of functional disability due to musculoskeletal disorders among rifle shooters. *Methods:* A cross-sectional study was conducted with 102 rifle shooters aged 15–25 years in Tamil Nadu. Convenient sampling was used. Participants were screened using the Nordic Musculoskeletal Questionnaire (NMQ). Functional disability was assessed with the Shoulder Pain and Disability Index (SPADI), Neck Disability Index (NDI), and Modified Oswestry Low Back Pain Disability Questionnaire (OLBPDI). Data were analyzed statistically to compare pain intensity across sites. *Results:* Among participants with mild pain, 43.75% reported shoulder pain, 35.7% had low back pain, and 12.5% had neck pain. For those with moderate pain, low back pain was most common (53.8%), followed by shoulder pain (13.8%) and neck pain (9.2%). A statistically significant variation was observed in pain severity across different sites ($p < 0.05$). *Conclusion:* Rifle shooters experience significant functional disability due to musculoskeletal pain, with the shoulder and lower back being the most affected regions. These findings emphasize the need for targeted preventive and rehabilitative strategies.

Keywords: Musculoskeletal disorders, Rifle shooters, Shoulder pain, Low back pain, Neck pain.

INTRODUCTION

Musculoskeletal disorders (MSDs) affect muscles, tendons, joints, and nerves, often leading to pain, functional disability, and reduced performance. Rifle shooting involves prolonged static posture and repetitive load-bearing on the shoulders and spine, predisposing shooters to MSDs. Despite the growing participation in shooting sports, research on the prevalence of MSDs in rifle shooters is limited. This study aims to assess the functional disability caused by MSDs among rifle shooters.

METHODS

- **Design:** Cross-sectional study
- **Setting:** Tamil Nadu, India

- **Participants:** 102 rifle shooters, aged 15–25 years, both genders
- **Sampling:** Convenient sampling
- **Inclusion criteria:** Regular practice and matches
- **Exclusion criteria:** Other sports players, chronic injuries, pre-existing MSDs
- **Tools:** Nordic Musculoskeletal Questionnaire (NMQ), Shoulder Pain and Disability Index (SPADI), Neck Disability Index (NDI), Modified Oswestry Low Back Pain Disability Questionnaire (OLBPDI)
- **Analysis:** Chi-square test and descriptive statistics

RESULTS

The mean age of participants was 20.7 ± 1.6 years, with 61.8% males and 38.2% females. Prevalence of MSDs: Shoulder pain (15.6%), neck pain (7.8%), low back pain (42.1%), and multiple sites (15.7%). Intensity analysis revealed shoulder pain was most common among mild cases (43.7%), whereas low back pain dominated moderate cases (53.8%). Severe pain was reported only for low back pain (12.5%). Chi-square test confirmed a statistically significant variation across pain sites ($p < 0.05$).

Tables and Figures

Table 1: Demographic distribution of Gender

Variable	Category	n (%)
Gender	Male	63 (61.8%)
Gender	Female	39 (38.2%)

Table 2: Prevalence of Shoulder pain, Low back pain, Neck pain and Combination study

Site of Pain	n	%
Shoulder Pain	16	15.6%
Neck Pain	8	7.8%
Low Back Pain	43	42.1%
Shoulder + Neck Pain	3	2.9%
Neck + Low Back Pain	3	2.9%
Shoulder + Low Back Pain	5	4.9%
Shoulder + Neck + Low Back Pain	5	4.9%
None	19	18.6%

Table 3: Intensity of Pain among Rifle Shooters

Site of Pain	Intensity (%)
Shoulder	20.92
Neck	33.7
Low Back Pain	33.7

Table 4: Comparison of pain severity across different musculoskeletal pain sites

Site of Pain	Mild	Moderate	Severe	p-value
Neck	2 (12.5)	6 (9.2)	0	0.01*
Shoulder	7 (43.75)	9 (13.8)	0	
Low back pain	6 (37.5)	35 (53.8)	2 (100)	
Neck + Shoulder	0	3 (4.6)	0	
Neck + Low back pain	0	3 (4.6)	0	
Shoulder + LBP	0	5 (7.6)	0	
Combination of all three	1 (6.25)	4 (6.1)	0	
Total	16 (100)	65 (100)	2 (100)	

DISCUSSION

This study highlights the high prevalence of musculoskeletal pain among rifle shooters, particularly in the shoulder and lower back. Similar findings were reported in previous studies linking shooting posture with spinal and shoulder strain. Functional disability from MSDs can affect both performance and daily activities. Occupational therapy interventions, including posture correction, ergonomic training, and strengthening programs, may reduce the risk and severity of MSDs.

CONCLUSION

Musculoskeletal disorders significantly impact rifle shooters, with the lower back and shoulder being the most affected regions. Preventive occupational therapy strategies are essential to reduce functional disability and enhance performance.

Limitations

- Limited demographic variables considered
- Cross-sectional design cannot establish causality
- Restricted to shooters in Tamil Nadu
- Did not assess long-term outcomes

DECLARATION: The authors have no conflict of interest

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