

Original Article

Prevalence of shoulder pain and impingement syndrome in professional photographers.

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Abstract

Background: Shoulder pain is the third most common musculoskeletal complaint in healthcare, with an annual incidence ranging from 0.9% to 2.5% and a point prevalence of 18-26%. Its diagnosis remains challenging, and treatments are often ineffective. Subacromial impingement syndrome (SIS) is a frequent cause of shoulder pain, commonly linked to poor body posture and muscle imbalance. Professional photographers are frequently exposed to awkward postures and poor ergonomics over prolonged periods. This study aimed to investigate the prevalence of shoulder pain and SIS among professional photographers.

Methodology: A cross-sectional study was conducted among professional photographers from 34 studios in Lahore, Pakistan. A total of 190 participants were recruited over three months (June–August 2023) using non-probability convenience sampling, considering various socio-demographic factors. Data were collected using the DASH questionnaire to assess disability, the Visual Analog Scale (VAS) to measure pain intensity, and the Hawkins-Kennedy test for shoulder impingement.

Results: The findings demonstrated a significant association between shoulder pain and SIS in professional photographers. According to VAS, 23 (12%) photographers reported no pain, 91 (48%) mild pain, 41 (22%) moderate pain, and 32 (17%) severe pain. The Hawkins-Kennedy test was positive in 54 (28%) and negative in 136 (72%) participants, showing an inverse correlation with DASH and VAS scores.

Conclusion: There is a positive correlation between shoulder pain and disability among professional photographers, primarily due to repetitive and prolonged shoulder abduction and elevation. These factors contribute to reduced work efficiency and musculoskeletal complications in this population.

Keywords

Subacromial Impingement Syndrome, Shoulder Pain, Extrinsic Risk Factors, Body Posture, Muscle Imbalance.



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Introduction

Sustainability is a critical priority in everyday life, encompassing healthcare systems and public well-being. Traditionally linked to environmental concerns, sustainability now extends to safeguarding the health of patients, healthcare professionals, and communities, promoting systems that preserve overall well-being¹.

Shoulder pain ranks as the third most common musculoskeletal complaint in primary care after low back and knee pain². Beyond discomfort, shoulder pain often results in functional limitations that affect social, professional, recreational, and athletic activities, and may be associated with psychological distress and diminished quality of life³. The societal burden of shoulder pain is considerable; a Swedish cost-estimation study reported an average patient expense of €4139, with sick leave accounting for nearly 80% of total costs⁴.

Rotator cuff tendinopathy and subacromial impingement syndrome (SIS) are common clinical diagnoses in patients presenting with shoulder problems. SIS is a significant cause of rotator cuff pathology, characterized by pain and functional limitations, especially during overhead movements⁵. The subacromial space, bordered by the acromioclavicular joint superiorly, humeral head inferiorly, anterior acromion edge, and coracoacromial ligament, is the anatomical site where degeneration leads to impingement, accounting for 44-65% of shoulder pain complaints⁶.

The pathomechanics and biomechanical etiology of SIS are multifactorial and remain under debate⁷. Extrinsic factors include altered glenohumeral and scapular kinematics, alignment, muscle extensibility and performance, ergonomics, sport-specific activities, and anatomical variations. Intrinsic factors involve changes in tendon biology, mechanical properties, morphology, and vascularity contributing to rotator cuff degeneration⁸. Occupations involving frequent overhead movements such as carpenters, painters, hairdressers, and athletes are known to be at higher risk. Photographers, due to sustained

awkward postures during shoots, are also vulnerable to SIS⁹.

A 2023 longitudinal study involving 585 sculptors reported a high prevalence of musculoskeletal discomfort, particularly in the lower and upper limbs, with 67.6% affected¹⁰. Similarly, a 2022 Chinese study of 50 elite mobile-gaming athletes found over 90% experienced eyestrain, and more than 30% reported headaches and rhinitis-like symptoms related to prolonged sitting and static postures¹¹.

Clinical evaluation of SIS involves physical examination using special tests such as Hawkins-Kennedy, Neer's, and Jobes tests. The Hawkins-Kennedy test is recognized for its high sensitivity in detecting SIS¹². While plain radiographs often reveal minimal findings in rotator cuff injuries, they remain a valuable initial diagnostic tool for shoulder pain and impingement¹³. Ultrasound is widely used to screen for rotator cuff pathology due to its accessibility and efficacy¹⁴. Treatment options include physiotherapy, which has shown effectiveness alongside injectable therapies¹⁵.

This study was specifically designed to assess the association between shoulder impingement syndrome and professional photographers, who frequently maintain prolonged improper postures and disturbed shoulder angles during their work¹⁶. This sustained positioning places stress on the cervical and shoulder musculature, increasing the risk of SIS. Further research is warranted to explore the prevalence of SIS across diverse socio-demographic profiles and occupational activities.

Methodology

Study Design

This cross-sectional study was conducted to investigate upper limb musculoskeletal disorders among professional photographers in Lahore. A quantitative approach was employed to assess the prevalence and severity of upper limb disability and pain using validated tools and clinical tests. The study design was selected for its suitability in identifying associations and estimating the burden

of health conditions within a specific population subgroup.

Ethics

The study was approved by the Research Ethics and Support Committee at the University of Management and Technology (UMT), Lahore (Reference no: RF-119-223). Prior to participation, all subjects provided written informed consent after being briefed about the study's aims, procedures, risks, and benefits. Participant anonymity and data confidentiality were strictly maintained throughout the research process.

Setting

Data collection took place over three months (June to August 2023) at 34 professional photography studios located in Lahore, Pakistan. These settings were chosen for their relevance to the target occupational group and allowed access to participants in their professional environments.

Participants

A total of 190 professional photographers were recruited through non-probability convenience sampling. This method was chosen due to its practicality, time efficiency, and ease of access to a specific occupational subgroup that fulfilled the inclusion criteria. Eligible participants were photographers aged 20 to 40 years, with at least two years of professional experience, working in Lahore, and actively engaged in photography for at least five hours per day and five days per week. The sample size was based on similar cross-sectional studies in the literature assessing musculoskeletal health among healthcare professionals, which demonstrated reliability and validity of findings¹⁷. Exclusion criteria included novice photographers, individuals with existing upper limb trauma, recent surgery, and diagnosed comorbidities such as osteoarthritis or diabetes.

Variables

The primary outcome variables included upper limb disability, self-reported pain intensity, and clinical signs of impingement. Independent variables comprised demographic data, work duration, and work-related exposure. Disability of

the arm, shoulder, and hand was measured using the DASH questionnaire^{18–21}, pain intensity using the Visual Analogue Scale (VAS)^{22–23}, and impingement signs via the Hawkins Kennedy test²⁴.

Data Sources/Measurement

Data were collected using a combination of standardized questionnaires and clinical assessments recorded on structured data collection forms.

- **Disabilities of the Arm, Shoulder, and Hand (DASH):** The DASH is a 30-item self-report instrument that assesses difficulty in physical function, severity of symptoms, and psychosocial impact of upper limb disorders. Items are rated on a 5-point Likert scale and converted to a 0–100 score, with higher scores indicating greater disability. Missing data were handled according to standard DASH scoring protocols^{18–21}.
- **Visual Analogue Scale (VAS):** The VAS was used to measure subjective pain intensity. Participants marked their pain on a 10 cm horizontal line, where 0 indicated 'no pain' and 10 denoted 'worst imaginable pain'. This method is recognized for its sensitivity and ease of use in clinical and epidemiological research^{22–23}.
- **Hawkins Kennedy Test:** This orthopedic test was used to clinically detect subacromial impingement. The participant's shoulder was flexed to 90 degrees, and the elbow bent at 90 degrees. The arm was then internally rotated. A positive test was determined by the presence of pain, suggestive of supraspinatus tendon or subacromial space pathology²⁴.

Bias

To reduce selection bias, multiple studios were included across different localities in Lahore, and efforts were made to ensure demographic and workload variation among participants. However, the use of convenience sampling may limit generalizability. Information bias was minimized by using validated instruments and standardized procedures for clinical assessments.

Study Size

The study included 190 participants, determined based on the precedent of similar studies investigating musculoskeletal disorders in occupational settings. This sample size was considered sufficient to detect meaningful patterns and associations with acceptable power for statistical analysis.

Quantitative Variables

Quantitative variables included age, years of experience, number of working hours per day, number of working days per week, VAS pain scores, and DASH disability scores. These were treated as continuous or categorical variables as appropriate for analysis.

Statistical Methods

Data analysis was performed using SPSS version 21. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to summarize socio-demographic characteristics and study variables. One-way ANOVA was applied to evaluate differences in VAS and DASH scores across subgroups. An independent samples t-test was used to compare Hawkins Kennedy test outcomes between groups. Additionally, Pearson correlation analysis was conducted to assess linear relationships between continuous variables.

Results

Participants

A total of 190 professional photographers were included in the study. The sample predominantly comprised male participants (69%), with the largest age group being 25–30 years, accounting for 79% of the total. In terms of work experience, 62% of the participants reported having more than two years of professional experience. Most participants worked more than five hours per day (54%) and five days per week (58%). Additionally, 64% reported not using a tripod during their work, and 67% stated they carried their professional bags on the right shoulder. When examining camera equipment, 62% of participants used cameras classified as moderate in size. Regarding body composition, 33% of photographers fell within the BMI range of 21.10–25.00 kg/m², indicating a

general trend toward normal weight categories among the group.

Descriptive Data

Descriptive analysis of the dataset revealed that a significant proportion of photographers experienced some degree of shoulder pain. Specifically, 87% reported shoulder pain on the Visual Analogue Scale (VAS), with mild pain being the most frequently reported level (48%), followed by moderate (22%) and severe pain (17%). Despite the high self-reported pain levels, signs of clinical shoulder impingement were relatively uncommon, as only 28% of participants tested positive on the Hawkins-Kennedy test, a standard diagnostic maneuver for impingement syndrome.

Functional impairment was also prevalent among the participants. According to the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire results, 52% of photographers reported some level of upper limb disability. Among them, mild disability was the most common (34%), while moderate and severe levels were reported by 12% and 4%, respectively. Only a small proportion (2%) indicated that they were unable to perform daily tasks due to their symptoms. These results underscore the burden of musculoskeletal discomfort and functional limitation in this occupational group.

Outcome Data

An assessment of the distribution characteristics of pain, impingement, and disability scores revealed distinct patterns. VAS scores had a mean of 4.57, but the distribution was markedly positively skewed (skewness = 7.76) with a kurtosis of 65.75, indicating a non-normal distribution with a concentration of low to moderate pain scores and a few high outliers. This suggests that pain experiences varied widely across individuals, with a tendency toward lower reported pain intensity but some extreme cases of high pain.

In contrast, the Hawkins-Kennedy scores demonstrated a mean of 1.71 and a 5% trimmed mean of 1.73, with a skewness of -0.96 and kurtosis of -1.08, suggesting a fairly symmetric and normal

distribution. These findings indicate that most participants showed minimal to no signs of impingement during clinical testing. The DASH scores also followed a normal distribution, with a mean of 2.17 and skewness and kurtosis values of 0.87 and 0.23, respectively. This reflects a relatively consistent level of reported functional disability across the sample, with fewer extreme values.

Main Results

The correlation analyses provided further insight into the relationships between pain, impingement, and disability. A statistically significant positive correlation was found between VAS and DASH scores ($r = 0.27$, $p < 0.01$), indicating that greater pain intensity was associated with higher levels of functional disability in the upper limb. Interestingly, a significant negative correlation was observed between VAS scores and Hawkins-Kennedy test results ($r = -0.36$, $p < 0.01$), suggesting that participants reporting higher levels of subjective

pain were less likely to demonstrate clinical signs of shoulder impingement. Furthermore, the Hawkins-Kennedy test scores also showed a significant negative correlation with DASH scores ($r = -0.47$, $p < 0.01$), implying that individuals with clinical signs of impingement tended to report lower levels of functional disability.

Together, these findings highlight a complex interplay between subjective pain perception, objective clinical signs, and functional outcomes. While pain and disability appear to be positively linked, the inverse relationships with impingement scores suggest that pain and clinical shoulder impingement may not always coexist. These differing patterns may reflect variations in the stage or nature of shoulder pathology among professional photographers, indicating the need for individualized assessment and management strategies.

Table 1: Baseline and sociodemographic characteristics of the participants.

Variables	N(%)
Age (years); Mean $\pm$ SD	1.30 $\pm$ 0.65
25–30	150 (79%)
31–35	27 (14%)
36–40	9 (5%)
41–45	4 (2%)
Weight (kg); Mean $\pm$ SD	2.01 $\pm$ 0.81
38–60	61 (32%)
61–75	65 (34%)
76–170	64 (34%)
Experience; Mean $\pm$ SD	1.61 $\pm$ 0.48
≤ 2 years	73 (38%)
> 2 years	117 (62%)
Working Hours/Day; Mean $\pm$ SD	1.54 $\pm$ 0.49
≤ 5 hours	85 (45%)
> 5 hours	103 (54%)
Working Days/Week; Mean $\pm$ SD	1.00 $\pm$ 0.00
5 days	110 (58%)
7 days	80 (42%)
Use of Tripod; Mean $\pm$ SD	1.64 $\pm$ 0.48
Yes	68 (36%)
No	122 (64%)
Camera Size; Mean $\pm$ SD	1.87 $\pm$ 0.60

Light	48 (25%)
Moderate	117 (62%)
Heavy	24 (13%)
Shoulder Carrying; Mean $\pm$ SD	1.33 $\pm$ 0.47
Right	127 (67%)
Left	63 (33%)
BMI (kg/m²); Mean $\pm$ SD	2.70 $\pm$ 1.07
10–19.50	33 (17%)
19.51–21.00	35 (18%)
21.10–25.00	63 (33%)
25.10–255.10	59 (31%)
Gender	
Male	131 (69%)
Female	59 (31%)

Table 2: Distribution of Pain Intensity, Shoulder Impingement Signs, and Upper Limb Disability Among Participants.

Variables	n (%)
VAS Pain Level	No Pain
	23 (12%)
	Mild Pain
	91 (48%)
Hawkins-Kennedy Impingement	Moderate Pain
	41 (22%)
	Severe Pain
	32 (17%)
DASH Disability Level	Positive
	54 (28%)
	Negative
	136 (72%)
	None
	90 (47%)
	Mild
	65 (34%)
	Moderate
	23 (12%)
	Severe
	8 (4%)
	Unable to Do
	4 (2%)

Table 3: Correlation of Pain, Impingement, and Disability Scores.

Variables	VAS	Hawkins-Kennedy	DASH
VAS	–	-0.36**	0.27**
Hawkins-Kennedy		–	-0.47**
DASH			–

*p<0.05 is considered statistically significant.

Discussion

The findings of this study demonstrate a high prevalence of shoulder pain but a relatively low prevalence of SIS among professional photographers, which in turn may limit their work efficacy. Photographers who work more than twenty hours per week frequently maintain awkward postures that deviate from optimal

ergonomic alignment. Consequently, these sustained positions increase their risk of experiencing shoulder pain, potentially restricting their future working hours.

As previously described, subacromial impingement syndrome occurs when subacromial tissues are compressed due to narrowing of the subacromial

space²⁵. This condition is a significant contributor to shoulder pain and disability. In this study, data was collected using the 30-item DASH questionnaire, Visual Analogue Scale (VAS) for pain intensity, and the Hawkins-Kennedy test for SIS identification. The DASH questionnaire evaluates physical function and symptoms related to upper limb musculoskeletal disorders.

The VAS results showed that 12% of photographers reported no pain, while mild, moderate, and severe pain were reported by 48%, 22%, and 17% of participants, respectively. This indicates that shoulder pain is a common symptom among photographers working extensive hours²⁶. Regarding the DASH scores, responses ranged from "no difficulty" (47%) to "unable to do" (2%), indicating that 53% of participants experienced functional impairments ranging from mild to severe. The Hawkins-Kennedy test, designed specifically to identify SIS²⁷, showed a negative correlation with DASH and VAS scores, explaining the low positivity rate despite the high prevalence of pain and disability. This inverse relationship suggests that pain and impingement might represent different stages or mechanisms of shoulder pathology in this population.

This study successfully highlights the association between SIS, shoulder pain, and functional disability in professional photographers exposed to frequent upper body strain due to their work postures. Comparable findings were reported in a 2023 study from India, which noted that professional photographers experienced a higher prevalence of musculoskeletal problems compared to freelance photographers, largely attributed to working environments, posture, and heavy equipment handling²⁸.

Another survey focusing on neck and shoulder stiffness among photographers reported that 86% of respondents experienced neck and shoulder issues as their primary complaints. Gender differences were observed, with women more commonly reporting neck and shoulder pain, while men reported lower back problems more frequently²⁹. Occupational musculoskeletal

disorders are a leading cause of morbidity among healthcare workers, affecting productivity and quality of work. A systematic review investigating musculoskeletal disorders among dentists, physiotherapists, and surgeons found that dentists and surgeons were more susceptible than physiotherapists³⁰.

A 2024 cross-sectional study conducted in Ouarzazate, Morocco, involving 120 healthcare practitioners, found an overall musculoskeletal disorder prevalence of 89.2%, with females reporting higher rates and lower back pain being the most common symptom¹⁷. Smartphone addiction, a growing global concern, has been linked to upper limb musculoskeletal problems. A 2021 study in Saudi Arabia involving 313 university students found that muscle and joint issues in the shoulder and hand/wrist were more prevalent among smartphone overusers³¹.

Psychological impacts of shoulder pain and disability were explored in another study, which showed that low pain and impairment levels correlated with higher resilience, self-efficacy, and recovery goals. Conversely, severe pain was associated with greater mental distress, including anxiety and depression³². A 2018 paper in the *Modern Rheumatology* journal found significant correlations between shoulder pain intensity and poor quality of life, particularly affecting both physical and emotional domains. Notably, shoulder pain severity alone was a risk factor for reduced physical quality of life^{33, 34}.

Conclusion

The Visual Analogue Scale indicated that only 20 out of 220 photographers reported no pain, while 200 experienced shoulder pain, predominantly mild. Hawkins-Kennedy test positivity was found in 28% of the sample. DASH questionnaire responses showed that 47% had no difficulty, 34% mild difficulty, 12% moderate, 4% severe, and 2% were unable to perform activities. Overall, 87% of photographers experienced shoulder pain and 52% reported upper limb disabilities, despite a relatively low prevalence of shoulder impingement. These results suggest a positive correlation

between pain and disability among professional photographers, regardless of the presence of shoulder impingement syndrome. Therefore, photographers who adopt variable postures and work extended hours are more prone to musculoskeletal problems.

Recommendations

Future research should focus on longitudinal tracking of professional photographers to better understand the progression of shoulder pain and impingement, which will aid in developing targeted treatment and physiotherapy strategies. Evaluations of body posture, equipment weight, and shooting angles during photo sessions are crucial. Comparisons among photographers from different specialties, such as wedding and wildlife photography, could provide further insights.

To mitigate risks, ergonomic training sessions focused on shoulder-friendly equipment handling and shooting techniques should be offered. Additionally, awareness campaigns emphasizing the importance of musculoskeletal health can have a lasting impact on this professional group.

Conflicts of Interest

The author(s) have no conflicts of interest.

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