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Original Article

Comparison of Musculoskeletal Disorders in Defender and Striker Football Players in Fame and United Club Lahore

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ABSTRACT

Background: Football involves repeated running, acceleration, deceleration, directional changes, physical contact, jumping, landing, and position-specific demands that may influence musculoskeletal symptom patterns. Objective: To compare musculoskeletal symptoms between defender and striker football players from Fame Football Club and United Football Club, Lahore. Methods: This analytical cross-sectional study included 109 male football players aged 18–30 years, comprising 54 defenders and 55 strikers recruited through convenience sampling over six months. Selected Nordic Questionnaire items assessed seven-day musculoskeletal symptoms across nine anatomical regions. Data were analysed using SPSS version 21. Fisher's exact test, odds ratios (ORs), 95% confidence intervals (CIs), and Holm adjustment were applied. Results: Upper-back symptoms were significantly more frequent among defenders than strikers (35.2% vs 10.9%; OR 4.43, 95% CI 1.61–12.24; adjusted p=0.021). Hip symptoms were more frequent among strikers (49.1% vs 20.4%; OR 0.27, 95% CI 0.11–0.62; adjusted p=0.019), as were knee symptoms (54.5% vs 24.1%; OR 0.26, 95% CI 0.12–0.60; adjusted p=0.015). Other regional differences were non-significant. Conclusion: Musculoskeletal symptoms varied by anatomical region and playing position, supporting region-specific assessment. Keywords: Football; Musculoskeletal Symptoms; Defender; Striker; Sports Injuries; Nordic Questionnaire.

INTRODUCTION

Football, also referred to as association football or soccer, is played between two teams of 11 players and involves clearly differentiated tactical roles. Defenders are primarily responsible for protecting their own goal and interrupting opposition attacks, whereas forwards or strikers operate closer to the opposing goal and are principally involved in attacking movements and goal scoring. The global popularity and participation base of football have made it one of the most prominent competitive and recreational sports worldwide (1).

The widespread participation in football is accompanied by a substantial burden of injury. Musculoskeletal injuries may result in pain, restricted participation, loss of training time, absence from competition, rehabilitation requirements, and occasionally long-term functional consequences. Fractures represent one important category of injury in elite male football and may lead to clinically meaningful periods of absence from play (2). In other contact sports, protective equipment has been studied as one strategy for reducing injury incidence, although its effectiveness varies according to the anatomical region, mechanism of injury, and type of sporting exposure (3).

Large epidemiological investigations in contact football environments illustrate the broad anatomical distribution of sports injuries. Lawrence et al. documented thousands of injuries and concussions during professional American football seasons, with the knee, ankle, hamstring, shoulder, and head among commonly involved anatomical regions (4). Although American football and association football differ in rules, equipment, and contact characteristics, the findings emphasize that high-intensity competitive sport can produce substantial musculoskeletal morbidity across several body regions.

Within association football, injury incidence is influenced by competitive exposure and player characteristics. A systematic review by Pfirrmann et al. showed that match injury rates generally exceeded training injury rates among male professional adult and elite youth football players and that injury characteristics differed between competitive groups (5). Evidence from male football players also suggests that injury occurrence is associated with a combination of age, physical characteristics, playing exposure, previous injury, conditioning, and other player- and environment-related variables (6).

Football players themselves commonly identify physical contact, fatigue, environmental conditions, inadequate physical preparation, training load, and playing surfaces as factors that may increase injury risk (7). A systematic review of players' perceptions similarly identified reduced muscle strength, inadequate fitness, fatigue, excessive training, inadequate warm-up, and characteristics of playing surfaces as commonly perceived injury determinants (8). These observations are consistent with evidence from elite football teams showing that injury screening and prevention cannot be reduced to a single variable and instead require consideration of multiple interacting factors (9).

Playing position is one factor that may influence the type and magnitude of mechanical exposure during football. Experimental work examining interpersonal dynamics in football has shown that field location and tactical roles influence player behaviour during attacking and defending situations (10). Match analysis has likewise demonstrated positional differences in movement behaviour, physical activity, and physiological demands among defenders, midfielders, and forwards during 11-a-side football (11). These distinctions suggest that players occupying different positions may experience different patterns of tissue loading and musculoskeletal symptoms.

Musculoskeletal problems may also have consequences extending beyond the affected anatomical structure. Severe time-loss injuries in professional football players have been associated with symptoms of common mental disorders during subsequent follow-up, indicating that major injuries can influence both physical participation and broader athlete wellbeing (12). Cross-sectional evidence across several sporting disciplines further demonstrates that musculoskeletal injury affects multiple joints, muscle groups, and anatomical structures and constitutes an important component of athlete morbidity (13).

Football-specific epidemiological evidence has consistently identified the lower extremity as a major area of injury burden. A systematic review and meta-analysis of professional football injuries found that injuries involving the thigh, knee, ankle, and related structures accounted for a substantial proportion of the overall burden (14). Nevertheless, upper-body and spinal symptoms also occur, and an exclusive focus on lower-extremity injury may overlook clinically relevant problems affecting the neck, shoulder, upper back, elbow, and wrist.

Defenders and strikers are exposed to different tactical and physical situations. Defenders frequently participate in challenges, interceptions, aerial contests, rapid changes in body orientation, and physical contact, while strikers undertake repeated accelerations, high-speed running, cutting, goal-directed actions, and abrupt directional changes. It is therefore plausible that the anatomical distribution of musculoskeletal symptoms may differ by playing position rather than merely by total injury frequency.

The purpose of the present study was to compare musculoskeletal disorders and seven-day musculoskeletal symptoms between defender and striker football players from Fame Football Club and United Football Club in Lahore. The comparison focused on nine anatomical regions and was intended to identify whether distinct body-region patterns were evident between the two playing positions.

Literature Review

Lawrence et al. investigated the descriptive epidemiology of musculoskeletal injuries and concussions in professional football and identified 4,284 injuries and 301 concussions during the study period. Their findings demonstrated a substantial overall injury burden and indicated that the knee, ankle, hamstring, shoulder, and head were among commonly affected regions (4). The study supports anatomical-region-specific injury surveillance because the clinical implications of injury differ considerably according to the structure and body region involved.

Crema et al. investigated acute hamstring injuries in football players using magnetic resonance imaging and reported that the long head of the biceps femoris was the most frequently involved muscle. Injury patterns differed according to proximal or distal location and according to whether the myotendinous junction or other anatomical portions of the hamstring complex were affected. Proximal injuries involving the long head of the biceps femoris and semitendinosus demonstrated greater edema in some comparisons, while distal semitendinosus involvement was associated with greater tearing. These findings demonstrate that apparently similar football-related muscle injuries can differ substantially according to anatomical location and extent (15).

Pfirrmann et al. systematically reviewed injury incidence among male professional adult and elite youth football players and showed that match injuries occurred more frequently than training injuries in both populations. Training injuries were relatively more prominent among younger players than professional adults. The authors emphasized the importance of match-related injury prevention, rule enforcement, fair play, and appropriately designed training strategies for younger football players (5).

Hewett et al. examined mechanisms, prediction, and prevention of anterior cruciate ligament injuries and described different biomechanical injury-risk profiles based on landing-related variables. Variations in knee abduction moments and movement mechanics suggested that athletes do not share a single biomechanical risk pattern. These findings are relevant to football because landing, pivoting, cutting, and rapid deceleration are routine elements of match play and can place considerable load on the knee (16).

Calder et al. studied grade II syndesmosis injuries and distinguished between stable and dynamically unstable high ankle sprains. Clinical findings and magnetic resonance imaging characteristics were associated with instability and time required before return to sport. A positive squeeze test and injury involving selected ligament structures were associated with greater likelihood of instability, while recovery duration differed between injury subtypes. These observations highlight the clinical heterogeneity of ankle injuries and the importance of appropriate classification before rehabilitation and return-to-play decisions (17).

Waldén et al. followed anterior cruciate ligament injuries in men's professional football over a 15-year period and showed that match-related ACL injury incidence was substantially higher than training-related incidence. Although most players eventually returned to football training, longer-term return to the highest level of competition was less complete. The findings demonstrate that major knee injuries can have consequences extending well beyond initial medical recovery (18).

Lewis and Anderson reviewed Lisfranc injuries in athletes and emphasized the importance of the tarsometatarsal complex for midfoot stability. Instability following injury may impair foot mechanics and, in selected cases, require operative stabilization. The review illustrates that football-related foot pathology is not restricted to common lateral ankle sprains and can include clinically important midfoot injuries (19).

Soligard et al. documented injury and illness occurrence during the Rio de Janeiro 2016 Olympic Games. Among 11,274 participating athletes, more than one thousand injuries and several hundred illnesses were reported during the event. The findings demonstrate the substantial burden of injury and illness that can occur during a short period of elite sports competition and reinforce the need for organized surveillance and preventive strategies (20).

Elzinga and Chung reviewed finger injuries in football and rugby and described considerations related to protection, splinting, early return to sport, and the longer-term risks of reinjury, post-traumatic arthritis, reduced strength, and restricted range of motion. Although lower-extremity injuries dominate football epidemiology, their work demonstrates that upper-extremity injuries may also have important functional implications in contact sports (21).

Mez et al. evaluated chronic traumatic encephalopathy among deceased former American football players and reported neuropathological abnormalities across different levels of previous football participation. Behavioural, mood, cognitive, and dementia-related symptoms were reported in many individuals with neuropathologically confirmed disease. Although this evidence concerns neurological rather than musculoskeletal pathology and relates to American football, it illustrates the broader potential consequences of repetitive contact-sport exposure (22).

Van Dyk et al. investigated whether a comprehensive strength-testing protocol could predict hamstring injury among 413 professional football players. Over two seasons, 66 participants sustained hamstring injury. Only a limited number of isolated strength measures showed associations with injury, while age, body characteristics, and field position also contributed to risk. The study concluded that isolated strength testing had limited clinical value for predicting future hamstring injury and reinforced the multifactorial nature of sports-injury risk (23).

Local evidence is particularly important for understanding musculoskeletal problems among young athletes in Lahore. Tahir and Sohail investigated hamstring muscle strain among university athletes aged 18–25 years and reported a high frequency of hamstring strain, with some participants sustaining repeated injuries. Previous injury and insufficient coaching or preparation were identified as relevant considerations, providing contextual evidence for musculoskeletal problems in a population similar in age to the current sample (24).

Mack et al. investigated lower-extremity injuries in the National Football League and documented approximately 600 time-loss lower-extremity injuries per season across the study period. These injuries resulted in a substantial cumulative number of lost player days. Although the sporting code differs from association football, the findings highlight the considerable functional and organizational burden created by lower-extremity musculoskeletal injury (25).

Wang et al. systematically reviewed musculoskeletal injuries identified at the NFL Scouting Combine and examined their relationship with later professional outcomes. Previous Lisfranc injury, rotator cuff pathology, superior labrum anterior-posterior injury, ACL reconstruction, and full-thickness knee chondral lesions were among conditions associated in some studies with reduced subsequent professional participation. The findings demonstrate the importance of previous musculoskeletal injury when assessing future sporting capacity (26).

Knapik et al. described conservative management of stable high ankle injuries in professional football players. Syndesmotic injuries may require longer rehabilitation than typical lateral ankle sprains, and conservative management commonly progresses from protected weight bearing and immobilization to strengthening, running, and graded return to sport. These findings reinforce the clinical importance of differentiating ankle-injury subtypes (27).

Ekstrand et al. evaluated time before return to play for common injuries in professional football over a 16-year period. Most injuries were mild or moderate in terms of absence duration, while a smaller proportion resulted in severe and prolonged time loss. The findings demonstrate that injury frequency alone does not fully describe the burden of football injury; duration and impact on participation are also important (28).

Chung et al. investigated cervical injuries among collegiate football players and reported that most were new injuries, with direct contact representing an important mechanism. The overall occurrence of severe disabling cervical injury was low, but the study demonstrated that cervical symptoms and injuries remain relevant in contact-sport populations and may vary according to position and playing circumstances (29).

Khan et al. investigated ankle sprains among football players from different clubs in Lahore and documented a substantial burden of ankle pain and sprain-related symptoms. The study is particularly relevant to the present population because it provides local evidence that ankle problems are common among footballers in Lahore and may influence participation and function (30).

Kunugi et al. examined foot and ankle kinematics and dynamic postural stability during single-leg landings in male collegiate soccer players. Landing direction influenced rear-foot posture, ankle inversion or eversion, ground-reaction forces, and time to stabilization. The findings suggest a biomechanical pathway through which football-specific landing and directional-change movements could contribute to ankle or foot injury risk (31).

Prieto-González et al. investigated sports-related injuries among 480 adolescent athletes. Football showed one of the highest injury rates, and ankle, knee, shoulder, lumbar strain, and fracture were among reported problems. Several potentially modifiable factors were associated with injury, including inadequate warm-up, inappropriate training load, poor sporting facilities, insufficient physical preparation, lack of injury-prevention exercise, and inadequate equipment or supervision (32).

Swart et al. investigated non-contact injuries in a South African professional football team and demonstrated greater injury incidence during competition than training. Hamstring and groin injuries were prominent, and variation according to playing position was also reported. These findings support the concept that tactical role and movement demands may influence the anatomical distribution of football injury (33).

Szymski et al. evaluated injury rates and injury-prevention practices among football referees across professional, semi-professional, and amateur competition. Injury incidence was greater at lower competitive levels, and several recommended components of warm-up and conditioning, including balance, strengthening, and plyometric activities, were incompletely implemented. Although referees have different physical demands from players, the study reinforces the importance of structured preparation and prevention within football environments (34).

A separate investigation by Szymski et al. examined injury occurrence and injury-prevention strategies during an international amateur football competition. The overall injury incidence was 12.5 per 1,000 hours of football exposure and 43.5 per 1,000 hours of match exposure. Most injuries involved the lower extremity, while implementation of comprehensive injury-prevention exercises was incomplete. These findings provide useful context because the present sample was recruited from club football rather than a highly resourced professional league (35).

Buckley et al. investigated whether concussion was followed by an increased risk of lower-extremity musculoskeletal injury in National Football League players. Musculoskeletal injury occurred in 21.4% of concussed athletes and 26.4% of matched controls during the remainder of the season, with no statistically significant difference between groups. The findings show that biologically plausible injury relationships require direct empirical evaluation and cannot be assumed across populations (36).

Khan et al. examined resilience and anxiety among Pakistani football players participating or not participating in injury-prevention programmes. Differences were observed between groups, suggesting that psychological characteristics and preventive behaviour may interact with athlete health and sporting participation. These findings broaden the concept of injury prevention beyond biomechanical factors alone (37).

Murtaza et al. directly compared musculoskeletal disorders in defenders and strikers and therefore provide one of the closest comparators to the present study. Their Lahore-based investigation included 152 male football players and reported considerable musculoskeletal symptom involvement among strikers, including the shoulder, neck, knee, and hip or thigh regions. Their findings suggested position-related differences and provide a local basis for comparison with the anatomical patterns observed in the current research (38).

Sousa et al. prospectively examined injuries among amateur soccer players competing on artificial turf and demonstrated that meaningful injury burden occurs outside elite professional football. The findings support consideration of playing environment, competitive level, and exposure conditions when interpreting local club-based injury patterns (39). Wilke et al. examined prognostic factors related to muscle injury in elite football players and emphasized that injury risk cannot be adequately explained by a single motor or physical characteristic. The study supports an integrated approach to prevention incorporating athlete characteristics, training exposure, and contextual factors (40). Longo et al. reviewed musculoskeletal problems in soccer players and described a broad range of injuries involving muscles, tendons, ligaments, joints, and other anatomical structures. The review emphasized that injury occurrence depends on numerous interacting factors, including physical condition, injury history, competitive exposure, and playing characteristics (41).

Van Beijsterveldt et al. compared injury characteristics and risk between Dutch amateur and professional soccer players and demonstrated meaningful differences between playing levels. These findings indicate that evidence derived from professional athletes cannot automatically be generalized to amateur or local club populations, because exposure, fitness, medical support, and training practices may differ substantially (42).

O'Brien et al. assessed implementation of injury-prevention exercise programmes in professional youth soccer and compared current practice with the FIFA 11 framework. Important components of preventive training were incompletely delivered in some settings. The study highlights the role of coaches, physiotherapists, and conditioning personnel in ensuring that evidence-based preventive exercises are implemented consistently in routine football training (43).

Collectively, these studies demonstrate that football-related musculoskeletal problems are anatomically heterogeneous and influenced by interacting factors including playing position, match and training exposure, physical conditioning, previous injury, movement mechanics, playing surface, warm-up practices, psychological factors, and implementation of preventive programmes (5–9,23,31–43). Despite this body of evidence, comparatively limited information is available regarding region-specific differences between defenders and strikers in club football populations in Lahore. The current study was therefore designed to compare recent musculoskeletal symptoms between these two positions across nine anatomical regions.

MATERIALS AND METHODS

An analytical cross-sectional study was conducted at Fame Football Club and United Football Club in Lahore, Punjab, Pakistan. The study was completed over six months following approval of the research synopsis. The target population consisted of male football players who played as defenders or strikers at the participating clubs. Convenience sampling was used because eligible participants were recruited from players available within the two clubs during the study period. The target sample size was calculated using Rao sample-size software and was 109 participants, comprising 54 defenders and 55 strikers.

Eligible participants were male football players aged 18–30 years who played as defenders or strikers in either Fame Football Club or United Football Club, were functionally and physiologically active, and had at least two years of football-playing experience. The source eligibility criteria also required absence of a previous musculoskeletal injury history. Players with congenital anomalies, health conditions considered capable of compromising performance or contributing substantially to musculoskeletal problems, and participants with a history of surgery were excluded. The study focused principally on recent or acute musculoskeletal complaints rather than established chronic or severe musculoskeletal conditions.

Data were collected using selected items from the Nordic Questionnaire. The questionnaire consisted of demographic information and symptom-related questions. Demographic information included name, age, sex, and marital status. Six questions were used to assess injury or musculoskeletal trouble, with responses coded as 0 for "No" and 1 for "Yes." The questionnaire addressed nine anatomical regions: neck, shoulders, elbows, wrists or hands, upper back, lower back, hips or thighs, knees, and ankles or feet. The principal comparison used in the revised analysis was whether participants reported musculoskeletal trouble in each anatomical region during the preceding seven days. Duration of musculoskeletal trouble was also recorded.

Data collection commenced after ethical approval for the research process. Potential participants were informed about the study and those who met the eligibility criteria and were willing to participate completed the consent process. Researchers met participants individually and administered the demographic and musculoskeletal questionnaire during a single session. Completion of the questionnaire required approximately 20 minutes. Participants were provided with researcher contact information for study-related queries and were informed that they could withdraw from the research at any time without loss of benefit. Participant privacy was maintained and only study-relevant information was used for analysis.

Data were analysed using SPSS version 21, as explicitly reported in the source manuscript. Frequencies and percentages were used to describe categorical variables and symptom occurrence within each anatomical region. Because the primary seven-day symptom variables were binary and the study compared two independent positional groups, each anatomical region was analysed using a 2×2 contingency table. Fisher's exact test was used for region-specific between-group comparisons, particularly because several symptom counts were small. Odds ratios with 95% confidence intervals were calculated with defenders as the numerator group relative to strikers. Nine anatomical comparisons were conducted; therefore, Holm adjustment was applied to the region-specific *p* values to control the family-wise type I error rate. A two-sided adjusted p value <0.05 was considered statistically significant. The original data collection also recorded the reported duration of musculoskeletal trouble. Duration distributions were retained as descriptive information; however, between-group inferential analysis of symptom duration was not used in the revised interpretation because the source duration tables contained internally conflicting frequencies, percentages, and calculated means. No participant-level observations were reconstructed from these inconsistent aggregate summaries.

RESULTS

A total of 109 male football players were included in the study. All participants were aged between 18 and 30 years and were reported as unmarried. Of the 109 participants, 54 were defenders and 55 were strikers. The two playing-position groups therefore contributed nearly equal proportions of the analysed sample. Seven-day musculoskeletal symptom occurrence differed according to anatomical region. Neck symptoms were reported by 10 of 54 defenders (18.9%) and 8 of 55 strikers (14.5%). Shoulder symptoms were reported by 15 defenders (27.8%) and 15 strikers (27.3%). Elbow symptoms were present in 11 defenders (20.4%) compared with 6 strikers (10.9%), while wrist symptoms were reported by 7 defenders (13.0%) and 3 strikers (5.5%). These differences did not reach statistical significance after region-specific testing and multiple-comparison adjustment.

Upper-back symptoms showed a more pronounced positional difference. Nineteen of 54 defenders (35.2%) reported upper-back trouble during the preceding seven days compared with 6 of 55 strikers (10.9%). Defenders had 4.43 times the odds of upper-back symptoms relative to strikers (OR 4.43, 95% CI 1.61–12.24). The unadjusted Fisher's exact p value was 0.003, and the association remained statistically significant after Holm adjustment (p=0.021). Lower-back symptoms showed the opposite descriptive pattern but did not reach statistical significance. Five of 54 defenders (9.3%) reported lower-back symptoms compared with 11 of 55 strikers (20.0%), corresponding to an OR of 0.41 (95% CI 0.13–1.27; Fisher's exact p=0.175; Holm-adjusted p=1.000). Hip symptoms were substantially more frequent among strikers. Eleven of 54 defenders (20.4%) reported hip or thigh trouble compared with 27 of 55 strikers (49.1%). Defenders had approximately one-quarter of the odds of hip symptoms observed among strikers (OR 0.27, 95% CI 0.11–0.62; Fisher's exact p=0.002; Holm-adjusted p=0.019).

Knee symptoms demonstrated a similar pattern. Thirteen of 54 defenders (24.1%) reported knee symptoms compared with 30 of 55 strikers (54.5%). The odds of knee symptoms among defenders were substantially lower than among strikers (OR 0.26, 95% CI 0.12–0.60; Fisher's exact p=0.002; Holm-adjusted p=0.015). Ankle or foot symptoms were common in both playing positions. Twenty-six of 54 defenders (48.1%) and 30 of 55 strikers (54.5%) reported ankle symptoms during the preceding seven days. The positional difference was not statistically significant (OR 0.77, 95% CI 0.36–1.64; Fisher's exact p=0.567; Holm-adjusted p=1.000).

Table 1. Seven-Day Musculoskeletal Symptom Occurrence in Defenders and Strikers

Anatomical region	Defenders, n/N (%)	Strikers, n/N (%)	OR (95% CI)	Fisher's exact *p*
Neck	10/54 (18.9)	8/55 (14.5)	1.34 (0.48–3.69)	0.615
Shoulder	15/54 (27.8)	15/55 (27.3)	1.03 (0.44–2.38)	1.000
Elbow	11/54 (20.4)	6/55 (10.9)	2.09 (0.71–6.13)	0.197
Wrist	7/54 (13.0)	3/55 (5.5)	2.58 (0.63–10.56)	0.202
Upper back	19/54 (35.2)	6/55 (10.9)	4.43 (1.61–12.24)	0.003
Lower back	5/54 (9.3)	11/55 (20.0)	0.41 (0.13–1.27)	0.175
Hip	11/54 (20.4)	27/55 (49.1)	0.27 (0.11–0.62)	0.002
Knee	13/54 (24.1)	30/55 (54.5)	0.26 (0.12–0.60)	0.002
Ankle	26/54 (48.1)	30/55 (54.5)	0.77 (0.36–1.64)	0.567

OR >1 indicates greater odds among defenders; OR <1 indicates lower odds among defenders relative to strikers. CI, confidence interval; OR, odds ratio.

When the anatomical pattern was considered descriptively, defenders most frequently reported symptoms at the ankle (48.1%), followed by the upper back (35.2%), shoulder (27.8%), knee (24.1%), elbow (20.4%), hip (20.4%), neck (18.9%), wrist (13.0%), and lower back (9.3%). Strikers most frequently reported symptoms at the knee and ankle (54.5% each), followed by the hip (49.1%), shoulder (27.3%), lower back (20.0%), neck (14.5%), elbow (10.9%), upper back (10.9%), and wrist (5.5%).

The original questionnaire also collected information about duration of trouble. For neck symptoms, defender responses were concentrated at approximately two days, while striker responses were distributed across approximately one, two, four, and six days. For shoulder symptoms, defender responses included approximately one to four days, whereas striker responses were also distributed from approximately one to four days. Elbow complaints among defenders extended across approximately one to six days, while striker elbow complaints were concentrated between approximately two and four days. Wrist complaints among defenders extended across approximately one to five days, while the smaller number of symptomatic strikers primarily reported approximately four days. Upper-back symptoms among defenders were reported across approximately one to seven days, whereas striker upper-back symptoms were distributed across approximately two to six days. Lower-back symptoms among defenders extended from approximately two to five days, while striker responses were similarly distributed across approximately two to five days. Hip symptoms among defenders were reported over approximately one to four days. Among strikers, hip complaints extended from approximately one to seven days. Knee symptoms among defenders were distributed across approximately one to five days, whereas striker knee complaints were recorded across approximately one to six days. Ankle symptoms were also reported over several days in both groups. The revised region-specific analysis therefore identified a statistically significant excess of upper-back symptoms among defenders and significantly greater hip and knee symptom occurrence among strikers. Neck, shoulder, elbow, wrist, lower-back, and ankle differences were not statistically significant after correction for multiple testing. These findings indicate anatomical heterogeneity in positional symptom patterns rather than uniform equality between defenders and strikers.

DISCUSSION

The present study compared seven-day musculoskeletal symptoms between defenders and strikers and demonstrated that positional differences were specific to particular anatomical regions rather than uniformly distributed across the musculoskeletal system. Defenders demonstrated significantly more upper-back symptoms, whereas strikers demonstrated significantly more hip and knee symptoms. Ankle complaints were highly prevalent in both groups, and no statistically significant positional difference was found for the neck, shoulder, elbow, wrist, lower back, or ankle after adjustment for multiple comparisons.

These results provide a more clinically informative interpretation than the original pooled comparison because musculoskeletal symptoms were measured as participant-level binary outcomes within distinct anatomical regions. Treating the nine anatomical regions as independent observations for an unpaired *t*-test does not reflect the actual sampling unit. Region-specific categorical comparisons retain the individual football player as the unit of observation and demonstrate that meaningful differences can exist in selected body regions even when a single pooled test suggests no overall difference.

The current anatomical pattern can be compared with the work of Murtaza et al., who also examined defenders and strikers in football clubs in Lahore and reported substantial musculoskeletal symptom involvement among strikers, particularly at the shoulder, neck, knee, and hip or thigh (38). Although the precise percentages differed between studies, both investigations demonstrate that positional analysis can reveal clinically relevant variation that may be masked when football players are considered as a homogeneous group.

The higher occurrence of knee symptoms among strikers is consistent with the importance of knee injury in football epidemiology. López-Valenciano et al. identified the lower extremity, including the knee, as an important source of injury burden in professional football (14). Waldén et al. further demonstrated the serious consequences of ACL injury, including prolonged rehabilitation and incomplete longer-term return to the highest level of competition (18). The present study did not diagnose ligament injury and therefore should not be interpreted as demonstrating structural ACL pathology; nevertheless, the high frequency of knee symptoms among strikers identifies this region as an important target for clinical assessment.

A plausible explanation for the striker pattern relates to position-specific movement demands. Gonçalves et al. demonstrated measurable differences in movement behaviour and physical and physiological performance among football positions (11). Strikers frequently undertake accelerations, high-intensity forward runs, rapid decelerations, kicking actions, and directional changes. Hewett et al. demonstrated that landing and knee-loading mechanics can influence biomechanical ACL injury profiles (16). These external findings provide a plausible biomechanical context for the greater knee symptom burden among strikers, although the analytical cross-sectional design of the current study does not permit a causal conclusion.

Hip symptoms were also substantially more common among strikers. High-speed running, acceleration, repeated kicking, rapid directional change, and explosive attacking movements place substantial load on the hip and proximal thigh musculature. Crema et al. showed that acute hamstring injuries in football are anatomically heterogeneous and frequently involve the long head of the biceps femoris and proximal myotendinous regions (15). Swart et al. also identified hamstring and groin injuries as prominent non-contact problems in professional football (33). These findings support close clinical attention to proximal lower-extremity complaints in attacking players.

Defenders demonstrated a distinct pattern, with upper-back symptoms occurring in more than one-third of participants and significantly more frequently than among strikers. Defenders often engage in physical contact, aerial challenges, blocking actions, rapid postural adjustments, and repeated responses to opposition movement. Laakso et al. demonstrated that player role and field location influence interpersonal football behaviour (10), while Gonçalves et al. documented position-related differences in physical performance and movement patterns (11). Although these studies do not directly establish a mechanism for upper-back symptoms, they support the plausibility of different trunk and postural demands between defensive and attacking roles. Ankle symptoms represented one of the most common complaints in both positions. Nearly half of defenders and more than half of strikers reported ankle or foot symptoms. Local evidence from Khan et al. similarly indicates that ankle sprain and ankle-related pain are important problems among football players in Lahore (30). This consistency between the current findings and local literature indicates that ankle health may require attention across playing positions rather than being viewed as a position-specific concern.

The clinical importance of ankle injury is reinforced by studies demonstrating considerable heterogeneity in ankle pathology. Calder et al. showed that stable and dynamically unstable syndesmosis injuries differ in clinical findings and recovery time (17), while Knapik et al. described the rehabilitation requirements of stable high ankle injuries in professional football players (27). Kunugi et al. further demonstrated that landing direction affects foot and ankle kinematics and dynamic postural stability in soccer athletes (31). These findings indicate that repeated landing, cutting, and directional-change activities can create mechanical situations relevant to ankle injury risk.

Foot pathology may also involve structures beyond the ankle joint. Lewis and Anderson emphasized the functional significance of Lisfranc injury and midfoot instability in athletes (19). Although the current Nordic-based assessment did not differentiate specific foot diagnoses, the combined ankle or foot symptom category may encompass a range of clinical problems that require careful assessment where symptoms persist. The present findings should also be interpreted in relation to exposure. Pfirrmann et al. showed that match injury rates generally exceed training injury rates in both adult and youth football populations (5), while Ekstrand et al. demonstrated that even common injuries may produce meaningful periods of absence from play (28). The current study assessed recent symptoms but did not quantify training hours, match hours, or injury-related time loss, preventing calculation of exposure-adjusted incidence rates.

Previous musculoskeletal injury is another important consideration. Wang et al. demonstrated that a range of pre-existing major musculoskeletal injuries may influence later professional participation outcomes (26). Van Dyk et al. showed that injury prediction based on isolated strength measures is limited and that age, body size, position, and other factors contribute to hamstring injury risk (23). These observations emphasize that future position-specific studies should measure previous injury and other relevant confounding variables prospectively. Football injury is therefore unlikely to be explained by playing position alone. Kwakye et al. reported relationships between injury occurrence and player or exposure characteristics among male football players (6). Zech and Wellmann found that football players themselves identified physical contact, fatigue, environmental conditions, and other contextual factors as important contributors to injury risk (7). Cardoso-Marinho et al. similarly identified low muscle strength, inadequate conditioning, fatigue, excessive training, warm-up practices, and playing-surface characteristics as commonly perceived risk factors (8).

McCall et al. reviewed injury-risk factors, screening tests, and prevention strategies used by elite football teams and demonstrated that evidence supporting many commonly used screening practices is inconsistent (9). Wilke et al. likewise emphasized that muscle-injury risk in elite football reflects multiple interacting characteristics rather than one isolated predictor (40). The current findings should consequently be interpreted as position-associated symptom patterns rather than evidence that position independently determines injury.

The potential importance of modifiable risk factors has direct implications for injury prevention. Prieto-González et al. reported associations between injury and inadequate warm-up, inappropriate training load, insufficient physical preparation, poor facilities, lack of injury-prevention exercise, and inadequate sporting equipment or supervision (32). These findings support comprehensive preventive strategies that extend beyond identification of the player's tactical position.

Evidence from football-specific prevention practice also indicates incomplete implementation of recommended exercise components. Szymski et al. reported deficits in strength, balance, and plyometric elements within warm-up programmes used by football referees at different competitive levels (34). Their separate study of international amateur football similarly identified incomplete use of comprehensive injury-prevention exercises despite widespread inclusion of some preventive activity within training (35). O'Brien et al. found that delivery of injury-prevention programmes in professional youth soccer did not consistently include all elements recommended within the FIFA 11 framework (43). This evidence emphasizes the role of coaches, physiotherapists, trainers, and conditioning staff in ensuring that preventive programmes are not only prescribed but implemented with adequate content and consistency.

The present study involved local football clubs rather than elite professional teams. Sousa et al. demonstrated that amateur soccer players experience meaningful injury burden during a competitive season (39), while van Beijsterveldt et al. reported differences in injury risk and characteristics between amateur and professional soccer players (42). These findings caution against direct extrapolation of professional-level injury data to local club populations because training exposure, fitness, facilities, medical support, rehabilitation, and match intensity may differ substantially. Longo et al. described the musculoskeletal problems of soccer players as multifactorial and involving muscles, tendons, ligaments, joints, and other structures (41). This broader perspective is consistent with the current pattern, in which no single anatomical region accounted for all morbidity. Strikers displayed greater hip and knee symptoms, defenders demonstrated greater upper-back symptoms, and ankle complaints were common in both groups.

The original manuscript proposed that insufficient warm-up may have contributed to the observed injury burden. Although individual warm-up exposure was not quantified in this study, the general importance of preparation is supported by Cardoso-Marinho et al. (8), Prieto-González et al. (32), Szymski et al. (34,35), and O'Brien et al. (43). The present data cannot establish warm-up deficiency as the cause of symptoms, but future studies should include direct measurement of warm-up and training practices.

Musculoskeletal injury may also influence psychological wellbeing. Kiliç et al. showed an association between severe musculoskeletal time-loss injuries and symptoms of common mental disorders among professional soccer players (12). In Pakistani footballers, Khan et al. examined resilience and anxiety in relation to participation in injury-prevention programmes and demonstrated differences in psychological characteristics between groups (37). These findings suggest that rehabilitation and prevention should consider athlete wellbeing in addition to the injured anatomical structure. Evidence from other contact-sport settings further demonstrates that proposed relationships between one injury and subsequent morbidity should not be assumed. Buckley et al. did not identify an increased subsequent lower-extremity musculoskeletal injury rate after concussion in their National Football League cohort (36). Mez et al. documented important long-term neurological pathology among deceased former American football players (22), but the mechanisms and implications of such findings differ substantially from the recent self-reported musculoskeletal symptoms assessed in the current association-football sample.

Upper-extremity and cervical complaints should not be dismissed merely because lower-extremity symptoms were more frequent. Farrington et al. demonstrated continued interest in protective equipment for reducing sports-related injury incidence (3), while Elzinga and Chung described clinically important finger injuries and return-to-play considerations in contact sports (21). Chung et al. further demonstrated that cervical injuries occur in competitive football environments and are frequently related to direct contact (29). In the current sample, neck, shoulder, elbow, and wrist symptoms occurred in both defenders and strikers, even though positional differences in these regions were not statistically significant. Broader athletic surveillance provides additional context. Soligard et al. demonstrated that injury and illness affect a considerable proportion of athletes even within a short elite multisport event (20), and Goes et al. documented musculoskeletal injury across several sports (13). These findings reinforce the importance of systematic surveillance rather than relying only on injuries severe enough to interrupt competition.

The study has several strengths. It directly compared two distinct football positions within the same local club environment and assessed symptoms across nine anatomical regions rather than focusing on only one injury type. The defender and striker groups were of similar size, reducing severe imbalance in group denominators. The revised statistical approach also respects the binary nature of the regional symptom variables and identifies clinically meaningful differences that were obscured by the original pooled analysis. Several limitations require consideration. Convenience sampling was used and players were recruited from only two football clubs in Lahore, limiting representativeness and external generalizability. The study included only male players aged 18–30 years and therefore cannot establish whether similar patterns occur among female footballers, adolescents outside this age range, older athletes, or players at different competitive levels. The modest sample size also resulted in relatively wide confidence intervals for several anatomical comparisons.

Only selected portions of the Nordic Questionnaire were used, and symptoms were self-reported rather than confirmed through clinical examination, medical records, or diagnostic imaging. The findings therefore describe recent musculoskeletal symptom occurrence rather than confirmed structural diagnoses. The analytical cross-sectional design also prevents determination of whether positional exposure preceded the development of symptoms. Potential confounding variables such as previous injury, exact years of playing experience, training volume, match exposure, playing surface, fitness, strength, flexibility, warm-up behaviour, recovery, rehabilitation history, and workload were not comprehensively incorporated into the comparison. Future studies should therefore evaluate these factors and use larger multivariable analyses where the available sample and event counts support such modelling.

The duration-of-symptom component also had limitations. Although duration information was collected, inconsistencies within the source frequency tables prevented a robust between-group inferential comparison of symptom duration. Prospective research should record duration using predefined and internally validated categories and should cross-check duration data against symptom occurrence and participant denominators before analysis. The study primarily emphasized recent or acute symptom patterns, while chronic injuries were not comprehensively characterized. Longer prospective follow-up would permit assessment of acute injury, recurrent injury, chronic musculoskeletal symptoms, time loss, rehabilitation, and return to sport. The original recommendation for larger populations and longer follow-up is therefore supported by both the design limitations and the wider football epidemiology literature (5,28,35,42).

Future research should recruit football players from multiple clubs and competitive levels, use larger samples, record training and match exposure, distinguish between symptoms and clinically diagnosed injuries, and document previous injury history. Prospective designs would allow calculation of incidence per 1,000 hours of football exposure and more reliable examination of temporal relationships. Future studies should also measure modifiable risk factors, including warm-up quality, training load, physical conditioning, balance, strength, playing surface, footwear, fatigue, recovery, and adherence to injury-prevention programmes. Evidence supports the value of comprehensive preventive strategies incorporating appropriate conditioning, neuromuscular preparation, balance, strength, and structured warm-up rather than relying on playing position alone (8,9,32,34,35,43).

From a clinical perspective, the present results suggest that strikers may warrant particular surveillance for hip and knee complaints, whereas defenders may require closer attention to upper-back symptoms. Ankle or foot symptoms should remain a preventive priority in both groups because their frequency was high irrespective of playing position. These position-associated patterns may help physiotherapists, trainers, and coaches prioritize assessment, but they should be integrated with individual injury history, physical examination, exposure, and training characteristics rather than used as isolated predictors.

CONCLUSION

Musculoskeletal symptom patterns differed between defender and striker football players from Fame Football Club and United Football Club, Lahore, according to the anatomical region assessed. Defenders demonstrated significantly greater upper-back symptom occurrence, whereas strikers demonstrated significantly greater hip and knee symptoms after correction for multiple regional comparisons. Ankle or foot symptoms were common in both positions, while neck, shoulder, elbow, wrist, lower-back, and ankle differences were not statistically significant. These findings indicate that musculoskeletal problems among football players are better interpreted through region-specific assessment than through a single pooled comparison between positions and support position-sensitive clinical surveillance within a broader multifactorial injury-prevention approach.

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