PREVALENCE AND PATTERNS OF MUSCLE STRAIN INJURIES AMONG AMATEUR MALE FOOTBALLERS IN NNEWI, ANAMBRA STATE, NIGERIA: A CROSS-SECTIONAL STUDY

Authors:
Egwuonwu, V.A.[1], Ugwuanyi, D. C. [2]*

Author Affiliation:
[1] Department of Medical Rehabilitation, Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria
[2] Department of Radiography and Radiological Sciences, Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria

***Corresponding Author:**
Ugwuanyi Daniel Chimuanya
Department of Radiography and Radiological Sciences
Faculty of Health Sciences and Technology
Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria
Email: dc.ugwuanyi@unizik.edu.ng

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ABSTRACT

Background: Lower limb muscle strain injuries represent a significant burden in amateur football, yet epidemiological data from Nigerian community settings remain limited.

Aim: This study determined the prevalence, anatomical patterns, and factors associated with lower limb muscle strain injuries among amateur male footballers in Okofia, Nnewi, Nigeria.

Materials and Methods: A descriptive cross-sectional study was conducted among 173 amateur male football players at the College of Health Sciences, Okofia, Nnewi. Participants were recruited using simple consecutive sampling. Data on sociodemographic characteristics, football participation history, injury characteristics, circumstances, management, and prevention practices were collected via a validated structured questionnaire. Descriptive statistics summarized the data; chi-square tests examined associations between injury severity and selected factors at the $P<0.05$ level of significance.

Results: The mean age of participants was 22.94 ± 3.33 years. The prevalence of lower limb muscle strain injuries was 58.4% (101/173). The most commonly affected sites were the thigh (12.1%) and hamstring (12.1%), followed by the calf (11.6%), knee (9.8%), ankle (7.5%), and groin (5.2%). Injuries occurred more frequently during competitions (32.9%) than during

training (25.4%). Perceived causes included fatigue (13.9%), overtraining (12.1%), poor warm-up (9.8%), and sudden movements or sprinting (8.1%). Most players (86.1%) believed injuries were preventable, and 74.6% reported regular post-activity stretching. Significant associations ($p < 0.001$) were found between injury severity and history of injury, injury site, number of previous injuries, time since last injury, circumstance of injury, perceived cause, and performance impact. No significant associations were observed with training frequency ($p = 0.874$), training duration ($p = 0.074$), or warm-up practice ($p = 0.574$).

Conclusion: Lower limb muscle strain injuries, particularly affecting the thigh and hamstring, are highly prevalent among amateur male footballers in this Nigerian community setting. Injury history, anatomical site, and recurrence are strongly associated with injury severity.

Keywords: *lower limb muscle strain injuries; amateur football; prevalence; injury patterns; Nigeria; sports injury prevention*

INTRODUCTION

Football is the most widely played sport globally, with an estimated 250 million active participants [(1)]. In Nigeria, football serves not only as a major recreational pursuit but also as a talent development platform, particularly among young males [(2)]. Despite its numerous physical and social benefits, football is associated with a high incidence of musculoskeletal injuries, making it a significant public health and sports medicine concern [(3)].

Lower limb muscle strain injuries—commonly referred to as "pulled muscles"—involve overstretching or tearing of muscle fibres or their musculotendinous junctions [(4)]. These injuries range from mild micro-tears (Grade I) to complete ruptures (Grade III) and are frequently precipitated by sudden acceleration, high-speed sprinting, forceful kicking, or abrupt directional changes—movements that are integral to football performance [(5)]. Lower limb muscle strains account for approximately 18–23% of all time-loss injuries in football, with the hamstrings, quadriceps, adductors, and calf muscles representing the most vulnerable muscle groups [(6)].

Globally, 30–50% of football-related injuries involve lower limb muscle strains [(7,8)]. Amateur footballers have been shown to sustain higher injury rates than their professional counterparts, primarily attributable to irregular training, inconsistent conditioning, inadequate recovery, and limited access to sports medicine services [(9,10)]. In Nigeria, previous studies have reported that lower limb muscle strains account for over 40% of all football-related injuries among amateur male players in the southwest [(11)], and that approximately 78% of injuries occur in the lower extremities among amateur players in the north [(12)]. Contextual factors—including poor pitch surfaces, inadequate warm-up routines, and absent medical supervision—further compound the injury burden in Nigerian community football settings [(13)].

Despite growing evidence of football-related injuries in Nigeria, epidemiological data on

lower limb muscle strain injuries in specific community settings, including Okofia, Nnewi, remain limited. This study, therefore, aimed to determine the prevalence, anatomical patterns, and factors associated with lower limb muscle strain injuries among amateur male footballers at the College of Health Sciences, Okofia, Nnewi, with a view to informing context-specific prevention strategies and sports health planning.

MATERIALS AND METHODS

Study Design and Setting

A descriptive cross-sectional study was conducted at the College of Health Sciences, Okofia, Nnewi, Anambra State, Nigeria, between July and September 2025. The College comprises eight departments offering health sciences programmes, each with active amateur football teams.

Study Population and Sampling

The target population comprised 306 registered male amateur football players distributed across eight departments: Medical Rehabilitation (n = 60), Medical Laboratory Science (n = 60), Radiography (n = 66), Environmental Health Science (n = 25), Nursing Science (n = 22), Anatomy (n = 24), Physiology (n = 24), and Medicine (n = 23). Using the Taro Yamane formula [$n = N / (1 + N(e^2))$] with a 5% margin of error, the minimum required sample size was calculated as 173. Participants were recruited using simple consecutive sampling until the target was achieved.

Inclusion and Exclusion Criteria

Players were included if they had been actively participating in organised football for a minimum of one year at the College of Health Sciences. Players were excluded if their injuries were sustained during activities unrelated to football competitions or training.

Data Collection Instrument

A structured 23-item Muscle Strain Injury Questionnaire for Amateur Male Footballers was developed and validated for this study. The instrument collected data in the following domains:

i. Sociodemographic characteristics (age, department, study level)
ii. Football participation history (playing duration, training frequency, session duration, warm-up practices)
iii. History of lower limb muscle strain injury (occurrence, anatomical site, frequency, timing)
iv. Circumstances and perceived causes of injury (training vs. competition)
v. Management and recovery (treatment-seeking behaviour, rest period, performance impact)
vi. Injury prevention beliefs and practices

Content, construct, and face validity were established through expert review. Test-retest reliability and internal consistency (Cronbach's alpha) were confirmed prior to administration.

Data Collection Procedure

Ethical approval was obtained from the Nnamdi Azikiwe University Teaching Hospital Ethical Committee (NAUTHEC). Written informed consent was obtained from all participants prior to data collection. Questionnaires were administered either directly by the researcher or self-administered according to participant preference.

Data Analysis

Descriptive statistics—including frequencies, percentages, means, and standard deviations—were used to summarise participant characteristics and injury patterns. Pearson chi-square tests were applied to examine associations between injury severity (operationalized as the rest period required before return to football) and the following independent variables: training frequency, training duration, warm-up practice, injury history, injury site, number of prior injuries, time since last injury, circumstance of injury, perceived cause, and performance impact. The level of statistical significance was set at $p < 0.05$.

RESULTS

Participant Characteristics

A total of 173 male amateur football players participated in the study, representing a response rate of 100%. The distribution by study level was: 100 level (15.6%), 200 level (20.2%), 300 level (20.2%), 400 level (23.7%), and 500 level (20.2%). The mean age was 22.94 ± 3.33 years (range: 18–28 years). Departmental representation and football participation characteristics are presented in **Table 1**.

With respect to football participation history, 8.7% of participants had been playing for less than one year, 32.9% for 1–3 years, 33.5% for 4–6 years, and 24.9% for more than six years. Training frequency was reported as 1–2 sessions per week by 27.2%, 3–4 sessions per week by 48.2%, and five or more sessions per week by 24.9% of participants. Session duration was less than one hour for 26.6%, one to two hours for 47.4%, and more than two hours for 26.0%. Pre-activity warm-up was practised by 76.9% of participants.

Table 1: Sociodemographic and Football Participation Characteristics (n = 173)

Variable	Category	n	%
Study Level	100 level	27	15.6%
	200 level	35	20.2%
	300 level	35	20.2%
	400 level	41	23.7%
	500 level	35	20.2%
Age (years)	Mean ± SD	22.94 ± 3.33 years (range: 18–28)	
Department	Medical Rehabilitation	34	19.7%
	Medical Lab Science	34	19.7%
	Radiography	37	21.4%
	Environmental Health	14	8.1%
	Nursing Science	12	6.9%
	Anatomy	14	8.1%
	Physiology	14	8.1%
	Medicine	14	8.1%
Playing Duration	<1 year	15	8.7%
	1–3 years	57	32.9%
	4–6 years	58	33.5%
	>6 years	43	24.9%
Training Frequency	1–2 times/week	47	27.2%
	3–4 times/week	83	48.2%
	≥5 times/week	43	24.9%
Session Duration	<1 hour	46	26.6%
	1–2 hours	82	47.4%
	>2 hours	45	26.0%
Warm-up Practice	Yes	133	76.9%
	No	40	23.1%

Prevalence and Anatomical Patterns of Lower Limb Muscle Strain Injuries

A history of lower limb muscle strain injury was reported by 101 participants, yielding a prevalence of **58.4%**. Among those with an injury history, the most frequently affected anatomical sites were the thigh (12.1%) and hamstring (12.1%), followed by the calf (11.6%), knee (9.8%), ankle (7.5%), and groin (5.2%). The frequency of injury episodes was: once (27.2%), twice (17.9%), and three or more times (13.3%). The most recent injury occurred within the previous three months for 18.5% of participants, between three and six months ago for 22.0%, and more than six months ago for 17.9%. Full injury prevalence and pattern data are presented in **Table 2**.

Circumstances and Perceived Causes of Injury

Lower limb muscle strain injuries occurred during training in 25.4% of cases and during competition or matches in 32.9% of cases. The most commonly identified perceived causes were fatigue (13.9%), overtraining (12.1%), poor warm-up (9.8%), sudden movement or sprinting (8.1%), previous injury (6.9%), and uncertainty about the cause (7.5%).

Management, Recovery, and Prevention

Among injured participants, 37.0% sought formal treatment, distributed as follows: physiotherapy clinic (11.6%), sports therapist (8.7%), hospital (7.5%), and self-treatment (9.2%). Rest periods before return to football were less than one week (17.3%), one to two weeks (22.0%), and more than two weeks (19.1%). Lower limb muscle strain injuries affected sporting performance in 46.8% of injured players. Regarding prevention, 86.1% of all participants believed lower limb muscle strain injuries are preventable, and 74.6% reported regular post-activity stretching.

Factors Associated with Injury Severity

Pearson chi-square analyses revealed statistically significant associations ($p < 0.001$) between injury severity—defined as the rest period required before return to football—and the following factors: history of injury ($\chi^2 = 173.000$), injury site ($\chi^2 = 193.863$), number of previous injuries ($\chi^2 = 180.801$), time since last injury ($\chi^2 = 178.343$), circumstance of injury—training versus match ($\chi^2 = 189.127$), perceived cause of injury ($\chi^2 = 185.784$), and performance impact ($\chi^2 = 175.278$). No statistically significant associations were found with training frequency ($p = 0.874$), training duration ($p = 0.074$), or warm-up practice ($p = 0.574$). Full results are presented in **Table 3**.

Table 2: Prevalence, Patterns, Circumstances, and Management of Lower Limb Muscle Strain Injuries (n = 173)

Variable	Category	N	%
History of lower limb muscle strain injury	Yes	101	58.4%
	No	72	41.6%
Injury site (among injured, n=101)	Thigh	21	12.1%
	Hamstring	21	12.1%
	Calf	20	11.6%
	Knee	17	9.8%
	Ankle	13	7.5%
	Groin	9	5.2%
Number of injury episodes	Once	47	27.2%
	2 times	31	17.9%
	≥3 times	23	13.3%
Time since last injury	<3 months	32	18.5%
	3–6 months	38	22.0%
	>6 months	31	17.9%
Injury occurrence	During training	44	25.4%
	During competition/match	57	32.9%
Perceived cause	Fatigue	24	13.9%
	Overtraining	21	12.1%
	Poor warm-up	17	9.8%
	Sudden movement/sprint	14	8.1%
	Previous injury	12	6.9%
	Unsure	13	7.5%
Treatment sought	Yes (any)	64	37.0%
	Physiotherapy clinic	20	11.6%
	Sport therapist	15	8.7%
	Hospital	13	7.5%

Variable	Category	N	%
	Self-treatment	16	9.2%
Rest period (return to football)	<1 week	30	17.3%
	1–2 weeks	38	22.0%
	>2 weeks	33	19.1%
Injury prevention belief	Injuries are preventable	149	86.1%
Post-activity stretching	Regular	129	74.6%

Table 3: Factors Associated with Lower Limb Muscle Strain Injury Severity (Rest Period Before Return to Football)

Factor	χ^2	p-value	Significance
History of injury	173.000	**<0.001**	**Significant**
Injury site	193.863	**<0.001**	**Significant**
Number of previous injuries	180.801	**<0.001**	**Significant**
Time since last injury	178.343	**<0.001**	**Significant**
Circumstance of injury (training vs. match)	189.127	**<0.001**	**Significant**
Perceived cause of injury	185.784	**<0.001**	**Significant**
Performance impact	175.278	**<0.001**	**Significant**
Training frequency	2.450	0.874	Not significant
Training duration	11.499	0.074	Not significant
Warm-up practice	1.994	0.574	Not significant

Note: Significance level set at $p < 0.05$.

DISCUSSION

This study determined the prevalence and anatomical patterns of lower limb muscle strain injuries among amateur male footballers at a Nigerian health sciences college, and examined factors associated with injury severity. The prevalence of 58.4% is substantial and consistent with previous Nigerian studies reporting high injury rates among amateur football populations [11,12]. This figure markedly exceeds the 31% prevalence reported in professional football [14], corroborating the observation that amateur players sustain disproportionately higher injury rates due to irregular training schedules, inconsistent conditioning, inadequate recovery periods, and limited access to sports medicine services [10].

The predominance of thigh (12.1%) and hamstring (12.1%) involvement is consistent with global literature identifying these structures as the most common sites of lower limb muscle strain in football [7,15]. The biomechanical demands of sprinting, forceful kicking, and sudden directional changes impose high eccentric loads on these muscle groups, rendering them particularly susceptible [4]. Tsametis et al. [16] reported analogous findings among Greek amateur soccer players, with posterior thigh injuries being most frequently affected. The comparatively lower prevalence of groin injuries (5.2%) in the present study, relative to some published reports [17], may reflect differences in competitive intensity or overall match exposure within this collegiate amateur cohort.

Injuries occurred more frequently during competition (32.9%) than during training (25.4%), consistent with findings by Kekelekis et al. [18], who reported substantially higher injury incidence during matches compared to training sessions in amateur soccer. This disparity likely reflects the higher physical demands, greater contact forces, and elevated psychological pressure characteristic of competitive match play. Fatigue (13.9%) and overtraining (12.1%) were identified as the leading perceived causes of lower limb muscle strain injuries, underscoring the importance of appropriate load management and structured recovery in amateur settings where players frequently participate in consecutive matches without adequate recuperation [19].

The finding that 86.1% of participants believed lower limb muscle strain injuries are preventable, and 74.6% reported regular post-activity stretching, indicates a positive awareness of injury prevention. Nevertheless, a gap between knowledge and the implementation of structured, evidence-based prevention programmes remains evident. Comparable observations have been reported in Nigerian amateur football, where awareness of injury prevention principles exists without consistent adoption of structured protocols such as the FIFA 11+ warm-up programme [20].

Significant associations between injury severity and prior injury history, injury site, and the number of previous episodes ($p < 0.001$) are consistent with findings by Ekstrand et al. (14), who identified previous injury as the strongest independent predictor of future injury in football. Incomplete rehabilitation, premature return to play, and

residual biomechanical deficits are well-recognized mechanisms underpinning injury recurrence [21]. In the present study, 31.2% of injured players reported two or more episodes, emphasizing the critical need for structured, phase-based rehabilitation protocols and objective return-to-play criteria in amateur football environments.

The absence of a significant association between injury severity and training frequency, duration, or warm-up practice (all $p > 0.05$) warrants careful interpretation. These findings may reflect the relative homogeneity of training practices within this collegiate population, or alternatively, they may be attributable to the inherent limitations of a cross-sectional design in establishing causal relationships. It is possible that the quality, rather than the quantity, of training and warm-up practice is the more critical determinant of lower limb muscle strain injury severity [22].

The finding that only 37.0% of injured players sought formal treatment—with a notable proportion relying on self-treatment (9.2%)—highlights a significant gap in medical access for amateur footballers in this setting. Similar challenges have been documented across Nigerian amateur football communities, where limited availability of physiotherapy and sports medicine services contributes to incomplete recovery and elevated reinjury risk [12,13].

This study has presented some original epidemiological data on lower limb muscle strain injuries in an understudied amateur football population within a Nigerian community setting, employing a validated structured questionnaire and examining a comprehensive range of injury-related variables. However, several limitations should be acknowledged. The cross-sectional design precludes causal inference. Self-reported data are susceptible to recall bias. The single-site focus limits the generalizability of findings to broader Nigerian amateur football populations. Furthermore, the absence of clinical verification of injury diagnoses may affect diagnostic accuracy.

CONCLUSION

This study demonstrates a high prevalence (58.4%) of lower limb muscle strain injuries among amateur male footballers at the College of Health Sciences, Okofia, Nnewi, Nigeria. The thigh and hamstring are the most commonly affected anatomical sites. Injuries occur more frequently during competition than during training, with fatigue and overtraining identified as the principal perceived causes. Prior injury history, anatomical injury site, recurrence, and injury circumstance are strongly associated with injury severity.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

i. Structured warm-up programmes: Coaches and team officials should enforce evidence-based warm-up routines (e.g., FIFA 11+) prior to all training sessions and competitive matches, incorporating dynamic stretching, neuromuscular activation, and progressive eccentric

strengthening of the hamstrings and quadriceps.

ii. Load management: Training schedules should incorporate adequate rest days, periodization principles, and systematic monitoring of training load to mitigate the risk of overtraining and fatigue-related lower limb muscle strain injuries.

iii. Education and awareness programmes: Regular educational sessions should be delivered to players, coaches, and support staff on injury risk factors, early symptom recognition, the importance of complete rehabilitation, and appropriate return-to-play criteria.

Conflicts of Interest:
None declared

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