

RESEARCH ARTICLE

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Prevalence of musculoskeletal complaints in female university students participating in sports activities at the University of Lagos

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Abstract

Objectives: Musculoskeletal complaints (MSCs) are among the most reported health issues globally and a leading cause of disability in younger populations, including university students. This study investigated the prevalence of MSCs among female students at the University of Lagos who engage in sporting activities.

Methodology: A cross-sectional analytical survey was conducted among 363 female university students recruited across various departments. Data collection involved the use of Nordic Musculoskeletal Questionnaire to assess MSCs prevalence. The self-administered questionnaire captured reports of musculoskeletal pain over the past 12-months. Descriptive statistics, including mean, frequency, percentages, and tables, were used to summarize demographic variables, sport-related characteristics and medical consultations, while chi-square tests examined associations between sports participation and MSCs occurrence at an alpha level of 5%.

Results: Participants had a mean age of 20.30 years. The lower limb was most affected, with 203 (56%) reporting hip/thigh pain, followed by the shoulder 182(50.2%), neck 176(48.5%), lower back 167(46.1%), ankle/foot 160(44.1%), and knee 148(40.8%). Among those affected, 35.2% reported activity limitations due to hip or thigh pain. Additionally, a significant association was found between sport duration and 12-month prevalence of musculoskeletal complaints in the shoulder ($p = 0.008$) and lower back ($p = 0.036$).

Conclusion: MSCs were highly prevalent among female university students engaged in sports, with the lower limbs being the most affected. Awareness and preventive strategies are essential to reduce the risk and long-term impact of MSCs in this population.

Keywords: Musculoskeletal Complaints, Prevalence, Female University Students, Sports Activities

Plain English Summary

This study examined the prevalence of musculoskeletal complaints (MSCs), including joint, muscle, and bone pain, among female students participating in sports at the University of Lagos. A total of 363 students participated in the study by completing questionnaires regarding any body pain experienced in the past year or week. The results showed that 98.3% of the participants experienced at least one MSC in the last 12 months. The hip/thigh area was the most affected, followed by the shoulders, neck, and lower back. Many students also reported that the pain interfered with their daily activities, but only a smaller number sought medical help. The study found that the longer someone had been involved in sports, the more likely they were to experience shoulder and lower back pain. However, the type of sport didn't make a significant

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difference. Overall, the study shows a high rate of sport-related body pain among female university athletes and highlights the need for better prevention and awareness to protect their health and performance.

Background

Musculoskeletal complaints (MSCs) are among the most reported health issues globally and a leading cause of disability in younger populations, including university students. They are often manifested as pain, discomfort, or functional limitations in the muscles, joints, tendons, or ligaments (1). Though frequently dismissed as minor or temporary, these complaints can progressively evolve into musculoskeletal disorders (MSDs) when they persist, recur, or impair function over time (2, 3). University students, particularly those engaged in organised or recreational sports, are at a known risk of musculoskeletal issues due to a combination of academic stress, prolonged static postures, and sports-related overuse or trauma (4). While physical activity is essential for health, several factors, such as improper training, poor technique, lack of supervision, or insufficient recovery, can shift physical activity from a protective to a predisposing factor for MSCs (5).

Studies consistently report high prevalence rates of MSCs among university students, with the neck, shoulders, and lower back being the most frequently affected sites (6, 7). In Canada, a longitudinal study at McMaster University revealed that over 60% of undergraduates experienced MSCs within a year (8). Another similar study in Saudi Arabia reported that the prevalence among medical students reached 70.7%, with lower back pain accounting for more than half of all reported symptoms (9). A Nigerian study found a 76% annual prevalence of MSDs among undergraduates, with females more affected. Neck pain was most common, linked to stress, inactivity, and poor study habits (10). However, most Nigerian studies tend to generalise student populations without considering athletic subgroups or gender-specific risk factors.

Gender disparities in MSCs and injury risk are well-documented, with females consistently reporting higher rates of pain symptoms across multiple body regions compared to males (11). Recent anatomical and biomechanical evidence underscores that female university athletes are inherently more susceptible to certain musculoskeletal complaints and disorders due to sex-specific structural features. Factors such as a wider pelvic structure, increased joint laxity, steeper tibial slopes, and relatively lower core and hip stabilisation capacity can alter lower-limb alignment and loading dynamics during physical

activity. These anatomical predispositions contribute to an elevated risk of overuse injuries, joint dysfunctions, and chronic strain conditions among female sports participants, as highlighted in recent MRI-based analyses and musculoskeletal reviews (12). Moreover, fluctuating hormone levels during the menstrual cycle have been associated with changes in joint stability and injury susceptibility (13).

Despite the growing participation of women in competitive sports at the university level and the rising prevalence of MSCs among this population, most studies have only focused on a particular sport or an aspect of MSCs. One such study established an association between sports participation and musculoskeletal pain (14). The prevalence and patterns of MSCs across various sports are still an under-explored area of study. This knowledge gap is particularly evident among female undergraduates in Nigerian universities, including the University of Lagos. Existing research often generalises findings across genders or focuses on elite athletes, thereby overlooking the unique risk profiles and needs of female university-level competitors. Addressing this gap is crucial for developing targeted prevention and management strategies that can enhance both the health and performance of female student-athletes in Nigerian universities.

The goal of this study was to evaluate the prevalence and patterns of MSCs among female university students participating in different sports at the University of Lagos. This study also sought to examine the association between variables such as type of sport or duration of sport, and the 12-month prevalence of MSCs.

Materials and Methods

Study design

This cross-sectional analytical study was conducted among female university students engaged in sporting activities at the University of Lagos to assess the prevalence and patterns of musculoskeletal complaints. (MSCs). A total of 389 female amateur athletes were recruited from various departments at the University of Lagos between June 2019 and November 2019. The inclusion criteria were female students enrolled at the University of Lagos who had been actively participating in structured sporting activities for at least one session per week, with a minimum duration of six consecutive months before the study. The exclusion criteria included students with

pre-existing or previously diagnosed musculoskeletal disorders unrelated to sporting activity, and those with physical disabilities or impairments that could independently affect musculoskeletal function or limit participation in sports. Informed consent was obtained from all participants, and confidentiality was maintained through the secure storage of completed questionnaires. The study was designed to be anonymous; no personal identifiers such as name, phone number, or academic level were collected to ensure strict data confidentiality and encourage honest participation. The sample size was determined using Cochran's formula (1997), assuming a 95% confidence level, a 5% margin of error, and an estimated proportion of 50% to maximise variability. Since there was no precise registry of student-athletes at the University of Lagos, the target population was considered large. This yielded a minimum sample size of 384. To accommodate possible non-responses, 389 questionnaires were distributed.

Participants for the study were recruited using a convenience sampling technique. The study's purpose and objectives were explained in detail to all participants before the distribution of the questionnaires. The Nordic Musculoskeletal Questionnaire (NMQ) was administered to identify musculoskeletal symptoms across various body regions, alongside questions about socio-demographic details and sports activities.

Description of Instruments

The NMQ, used as the primary tool for data collection in this study, was initially developed by the Nordic Council of Ministers as a standardised instrument for screening musculoskeletal symptoms in occupational and epidemiological settings (15). It is a validated and widely adopted tool designed to assess the prevalence and impact of musculoskeletal symptoms across nine anatomical regions: the neck, shoulders, upper back, elbows, lower back, wrists/hands, hips/thighs, knees, and ankles/feet. The questionnaire inquires about symptoms experienced in the past 12 months and the last 7 days, and whether these symptoms have interfered with normal activities or required medical attention (16).

Its structured and region-specific format allows for consistent data collection across different populations. It has been successfully used in both clinical and non-clinical settings, including sports and occupational health studies (17). The NMQ has demonstrated good reliability and validity, with

test-retest reliability coefficients ranging from moderate to high across various body regions (18). A proforma was included to collect socio-demographic and activity-related variables to supplement the NMQ in this study. This covered the participant's age, height, weight, marital status, and detailed information about their sporting activities, including the type of sport, duration of participation, training frequency, and competitive level. NMQ was distributed in paper format during scheduled sporting events and team meetings, with the assistance of sports coordinators and team leaders to facilitate access and participation. Participants were instructed to report any musculoskeletal symptoms they had experienced in the past 12 months and the past 7 days, including the body regions affected and whether these symptoms interfered with daily or sporting activities or required medical attention. This approach allowed for the structured assessment of musculoskeletal complaints and enabled a more comprehensive analysis of potential risk factors associated with sport participation.

Statistical analysis

Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software, version 25.0. Descriptive statistics, including frequencies and percentages, were used to summarise demographic variables, sport-related characteristics, and medical consultations, while inferential statistics of chi-square tests were employed to evaluate associations between the presence of musculoskeletal complaints and variables such as sport type and sport duration. Results were presented using tables for clarity. Statistical significance was set at $p \leq 0.05$.

Results

A total of three hundred and eighty-nine (389) consenting female University of Lagos students were assessed for the presence or absence of MSCs. Socio-demographic details were also taken. Of the 389 questionnaires distributed, 22 were voided, and 4 of the respondents met the exclusion criteria. This resulted in 363 valid responses, implying a response rate of 93.3%, which were subsequently used for analysis. Table 1 emphasises the socio-demographic details and sports-related characteristics of the participants. It shows that the mean age of participating students was 20.30 years, while the mean number of sports done was two. It shows that a higher percentage of participants were engaged in contact sports (75.4%), including football (39.4%), Basketball (11%), and Volleyball (6.9%), compared to non-

contact sports (42.5%), such as Athletics (22.9%), Tennis (8.8%), and Swimming (10.8%). The most

extended duration in sports by the participants was noted to be in the first 6 months (Table 1).

Table 1: Sociodemographic details of participants

Variables	Mean	Standard Deviation
Age (Years)	20.3	2.71
Weight (kg)	61	12.99
Height (m)	1.64	1.8
	Frequency	Percentage (%)
Marital Status		
Single	349	96.1
Married	14	3.9
Sport		
Football	143	9.4
Basketball	40	11
Athletics	83	22.9
Tennis	32	8.8
Volleyball	25	6.9
Swimming	39	10.8
Duration		
6 months	114	31.4
12 months	53	14.6
3 years	62	17.1
6 years	42	11.6
7 years and above	92	25.4

Table 2 presents a detailed summary of the prevalence rates of MSCs among female students from the University of Lagos who participate in sports. 357 of the participants reported MSCs, while 6 participants reported no MSCs. This gives a 12-month general prevalence rate of 98.3%. The highest 12-month prevalence was reported in the

hips/thighs (56%), followed by the shoulder (50.2%) and neck (48.5%). For 7-day prevalence, the highest was observed in the hips/thighs (29%), followed by the lower back (25.9%) and ankle/feet (25.4%). The lowest 7-day prevalence was in the upper back (15.2%), while the elbow (26.5%) had the lowest 12-month prevalence. (Table 2)

Table 2: Prevalence of Musculoskeletal Complaints in the female students who partake in sport

MSCs Response	Frequency (n)	Percentage (%)
Yes (Reported MSCs)	357	98.30%
No (Did not report MSCs)	6	1.70%
Total	363	100%
General Prevalence of MSCs	357/363	98.30%
Body Part	7-Day Prevalence n (%)	12-month Prevalence n (%)
Neck	81(22.4)	176(48.5)
Shoulder	85(23.5)	182(50.2)
Upper Back	55(15.2)	155(42.7)
Elbow	62(17.1)	96(26.5)
Wrist/Hand	79(21.8)	150(41.3)
Lower Back	94(25.9)	167(46.1)
Hips/Thighs	105(29.0)	203(56.0)
Knee	82(22.6)	148(40.8)
Ankle	92(25.4)	160(44.1)

Tables 3 and 4 show the pattern of MSCs over the last 12 months across various body regions. This was divided into upper and lower limb complaints. Table 3 highlights the pattern of MSCs in the upper limb. Basketball players exhibited the highest frequency and percentage of MSCs in the shoulder (18 cases, 5%) and wrist/hand (22 cases, 6.1%) regions. Conversely, swimmers recorded the lowest prevalence in both the shoulder (9 cases,

2.5%) and wrist/hand (8 cases, 2.2%) regions. Table 4 shows the prevalence pattern of MSCs in the lower limb. Football players had a higher frequency and percentage of MSCs in the lower back (112 cases, 31%) and knee (85 cases, 24%) regions. In contrast, athletics had the lowest prevalence of MSCs in the knee (45 cases, 13%) and ankle (53 cases, 15%) regions.

Table 3: Pattern of Musculoskeletal Complaints in various sports in the upper limb

Variable		Football n (%)	Basketball n (%)	Athletics n (%)	Tennis n (%)	Volleyball n (%)	Swimming n (%)
Neck 12	Yes	76(21.11)	22(6.11)	49(10.83)	15(4.16)	33(9.16)	8(2.22)
	No	16(4.72)	17(4.72)	30(8.33)	10(2.77)	16(4.44)	10(2.77)
Neck PT	Yes	120 (33.33)	36(10.00)	71(19.72)	28(7.78)	25(6.94)	14(3.89)
	No	20(5.56)	3(0.83)	12(3.33)	4(1.11)	0(0.00)	1(0.28)
Shoulder 12	Yes	69(19.17)	53(14.72)	16(4.44)	16(4.44)	16(4.44)	8(2.22)
	No	71(19.72)	30(8.33)	9(2.50)	16(4.44)	9(2.50)	7(1.94)
Shoulder PT	Yes	121(33.61)	35(9.72)	72(20.00)	28(7.78)	24(6.67)	14(3.89)
	No	19(5.28)	4(1.11)	11(3.05)	4(1.11)	1(0.28)	1(0.28)
Upper Back	Yes	82(22.78)	23(6.39)	52(14.44)	22(6.11)	18(5.00)	8(2.22)
	No	56(15.56)	16(4.44)	31(8.61)	10(2.78)	7(1.94)	7(1.94)
Upper Back PT	Yes	123(34.17)	36(10.0)	70(19.44)	26(7.22)	23(6.39)	14(3.89)
Elbow	Yes	82(22.78)	28(7.78)	67(18.61)	23(6.39)	21(5.83)	13(3.61)
	No	57(15.56)	10.278	15(4.17)	9(2.50)	4(1.11)	2(0.56)
Elbow PT	Yes	123(34.17)	36(10.00)	72(20.0)	28(7.78)	24(6.67)	15(4.17)
Wrist/hand 12	Yes	87(24.17)	22(6.11)	59(16.39)	16(4.44)	19(5.27)	8(2.22)
	No	52(14.44)	15(4.17)	22(6.11)	16(4.44)	6(1.67)	7(1.94)
Wrist/hand PT	Yes	122(33.89)	32(8.89)	75(20.83)	26(7.22)	20(5.56)	13(3.61)
	No	17(4.72)	5(1.39)	7(1.94)	6(1.67)	5(1.39)	2(0.56)

12- Any form of trouble felt within the last 12 months

PT- If they have seen any healthcare worker in the last 12 months

Table 4: Pattern of Musculoskeletal Complaints in various sports in the lower limb

Variable		Football n (%)	Basketball n (%)	Athletics n (%)	Tennis n (%)	Volleyball n (%)	Swimming n (%)
Lower Back 12	Yes	112(31.11)	19(5.28)	45(12.50)	24(6.67)	15(4.16)	9(2.50)
	No	27(7.50)	18(5.00)	37(10.27)	8(2.22)	6(1.66)	10(2.77)
Lower Back PT	Yes	124(34.44)	32(8.89)	63(17.50)	27(7.50)	23(6.38)	12(3.33)
	No	15(4.17)	5(1.38)	19(5.28)	5(1.38)	2(0.55)	3(0.83)
Hip/Thigh 12	Yes	59(16.39)	20(5.55)	42(11.67)	15(4.16)	13(3.61)	10(2.77)
	No	77(21.39)	18(5.00)	41(11.39)	17(4.72)	12(3.33)	4(1.11)
Hip/Thigh PT	Yes	115(31.94)	34(9.44)	69(19.17)	25(6.94)	24(6.67)	14(3.88)
	No	22(6.11)	4(1.11)	13(3.61)	6(1.66)	1(0.27)	1(0.27)
Knee 12	Yes	85(23.61)	20(5.55)	58(16.11)	21(5.83)	16(4.44)	13(3.61)
	No	52(14.44)	18(5.00)	24(6.67)	10(2.77)	9(2.50)	2(0.55)
Knee PT	Yes	119(33.06)	30(8.33)	72(20.00)	28(7.78)	21(5.83)	14(3.88)
	No	18(5.00)	8(2.22)	8(2.22)	3(0.83)	4(1.11)	1(0.27)
Ankle 12	Yes	83(23.05)	21(5.83)	53(14.72)	18(5.00)	15(4.16)	10(2.77)
	No	54(15.00)	17(4.72)	29(8.05)	13(3.61)	10(2.78)	5(1.38)

Ankle PT	Yes	117(32.50)	30(8.33)	75(20.83)	30(8.33)	24(6.67)	13(3.61)
	No	20(5.56)	8(2.22)	7(1.94)	1(0.27)	1(0.27)	2(0.55)

12- Any form of trouble felt within the last 12 months
 PT- If any healthcare professional has been consulted in the past 12 months.

Table 5 shows the chi-square analysis results assessing the association between MSCs in various body regions and selected sport participation variables, like type of sport and sport duration. The body regions included the neck, shoulder, lower back, hips/thighs, and ankle/feet. Sport duration was noted to have a significant association with MSCs in the shoulder (P = 0.008) and lower back (P = 0.036). This suggests that prolonged participation in sports activities may increase the risk of MSCs in these regions. There

were no statistically significant associations observed between the type of sport and MSCs in any of the assessed body regions, indicating that the nature of the sport may not play an important role in the development of MSCs among participants. Regions such as the neck, hips/thighs, and ankle/feet showed no significant associations with either type of sport or sport duration, suggesting that these regions may be less affected by the studied variables. (Table 5)

Table 5: Association between Sport type, Duration, and 12-month prevalence of Musculoskeletal Complaints

Variables	Sport Participation Variables	X2	p-value
Neck -12	Sport	3.397	0.758
	Duration	4.959	0.421
Shoulder - 12	Sport	6.686	0.351
	Duration	15.599	0.008
Lower Back - 12	Sport	15.939	0.194
	Duration	19.328	0.036
Hips/Thighs-12	Sport	8.189	0.976
	Duration	13.646	0.553
Ankle/Feet-12	Sport	8.399	0.972
	Duration	16.64	0.341

12- Any form of trouble felt within the last 12 months

Table 6 shows the distribution of MSCs and medical consultations across the population. There was a high prevalence of MSCs among the population, with the hips/thighs (56%), shoulders (50.2%), and neck (48.5%) being the most affected regions over the past 12 months. The hips/thighs also recorded the highest rate of activity limitation at 35.2%, suggesting that discomfort in this region significantly interferes with daily functioning. The lower back followed closely with a prevalence of

30.6%, reflecting its critical role in posture and mobility. Physician (healthcare professional) consultations remained relatively low across all body regions, with most areas recording less than 23% of respondents seeking medical care. Furthermore, recent symptoms (within the last 7 days) were most prevalent in the lower back (26.2%) and wrists/hands (25.9%), indicating persistent or recurrent issues in these areas. (Table 6)

Table 6: Distribution of Musculoskeletal Complaints and Medical Consultations

	Trouble felt within the last 12 months n (%)	MISS n (%)	Physician n (%)	Trouble felt within the last 7 days n (%)
Neck	176(48.5)	85(23.5)	66(18.2)	81(22.4)
Shoulder	182(50.2)	99(27.3)	67(18.5)	85(23.5)
Upper Back	155(42.7)	94(25.9)	68(18.7)	55(15.2)
Elbow	96(26.5)	65(17.9)	61(16.8)	62(17.1)
Wrist/Hands	150(41.3)	78(21.5)	72(19.9)	79(21.8)
Lower Back	167(46.1)	111(30.6)	80(22.1)	94(25.9)
Hips/Thighs	203(56)	128(35.2)	79(21.8)	105(29)

Knee	148(40.8)	98(27.0)	76(21.0)	82(22.6)
Ankle	160(44.1)	99(27.3)	71(19.6)	92(25.4)

MISS - If an individual has been prevented from carrying out everyday activities for the last 12 months
 Physician -If any physician (healthcare professional) has been consulted in the past 12 months

Discussion

This study aimed to determine the prevalence of musculoskeletal complaints among undergraduate female students participating in sports activities at the University of Lagos. The overall 12-month prevalence of MSCs was recorded at 98.3%, demonstrating a high burden of these complaints in this population. This exceeds the 76% prevalence reported among undergraduates in a similar Nigerian study conducted at a private university, where 82.5% of female respondents reported MSCs (10). The disparity may be explained in part by differences in the study populations. This study focused exclusively on female student-athletes who are generally exposed to greater physical demands and cumulative training loads, whereas the comparative study included both athletic and non-athletic students who may have a lower risk. It is also possible that more recent improvements in injury awareness, education, and preventive measures within university environments have contributed to lower prevalence rates in other settings.

From this study, the 12-month prevalence of neck MSCs was noted to be 48.5%. This agrees with the findings by (19), who reported a neck pain prevalence range of 38–73% among athletes. However, only 18.2% of participants in this study sought medical attention for the resulting neck pain, and 23.5% reported missing activities due to this pain. A similar study of university students with neck and shoulder pain reported comparably low levels of healthcare utilisation. Only 0.3% visited emergency services and 4.2% attended outpatient clinics when pain severity was low, while 5.8% and 12.4% did so respectively when pain severity was higher (20). These findings reflect a generally low rate of help-seeking behaviour for MSCs among university students.

Shoulder MSCs were the most prevalent upper limb complaints in this study, with a reported prevalence of 50.2%. This may be attributed to the significant physical demands placed on the shoulder during various sports involving repetitive upper limb movements. Despite the high prevalence of shoulder complaints, only 27.3% of participants consulted a health professional, while 18.5% reported missing activities due to the pain. A similar pattern is observed in broader university populations beyond student-athletes. Shoulder pain was the most frequently reported MSC, with a

12-month prevalence of 55.2% in a study among South Korean university students (21). As is common in much of the shoulder pain literature, prevalence is well-documented, while health-seeking behaviour remains largely underreported or insufficiently explored.

Elbow complaints were the least affected upper limb region in this study, with a prevalence of 26.5%. 16.8% of affected participants sought medical care, and 17.9% missed activities. Although elbow-related pain and overuse injuries are frequently reported in specific athletic populations such as swimmers and tennis players, recent data on the general prevalence of elbow complaints among university students or student-athletes remains limited. Wrist and hand complaints were reported by 41.3% of participants, with 19.9% seeking care and 21.5% missing activities. Most existing studies on wrist pain among university students focus on smartphone use (22), with limited attention to sports participation or healthcare utilisation. Upper back complaints were reported by 42.7% of participants, with 18.7% seeking medical care and 25.9% missing activities. This aligns with a recent study that found a 7-day prevalence of 31.9% among university students, although healthcare utilisation was not assessed (23). The disparity may reflect differences in reference periods.

Lower back MSCs were reported by 46.1% of participants. Of these, 22.1% sought medical care, while 30.6% missed activities due to the pain. This could be explained by the pain severity, fear-avoidant behaviour, and the biomechanical stress placed on the lumbar spine during daily activities. In this study, the hips/thigh region had the highest prevalence, occurring in 56% of the participants. Despite this, only 21.8% sought medical attention, while 35.2% missed activities due to hip/thigh pain. For participants associated with swimming, the hip/thigh and elbow were recorded as the most prevalent regions with MSCs. However, this finding contrasts with a study by (24) that identified the shoulder as the region with the highest prevalence of MSCs among swimmers. The difference may result from variations in sample size, the non-exclusivity of sport participation, and the inclusion of amateur rather than professional swimmers in this study. The prevalence of ankle complaints was 44.1%, while the knee had the lowest prevalence among lower limb regions at 26.5%.

This study reported the hip/thigh to be the most common site for MSCs. This is inconsistent with the study by (25) that reported the knee to be the most affected body region in female athletes. This could be attributed to the broader scope of this study, which included participants engaged in various sports rather than focusing exclusively on athletics. Athletes participating in athletics could also have been involved in other sports, influencing the distribution, pattern, and prevalence of injuries. The prevalence of MSCs was established to be the highest in the lower limb. This agrees with the findings of (26), who reported that lower extremity injuries are the most common among athletes. Additionally, (27) identified participation in competitive sports as a significant risk factor for injuries affecting the knee, ankle, feet, and shoulder joints. This could be explained by the excessive and repetitive stress placed on the lower limb during the performance of most sports.

For volleyball participants in this study, the highest prevalence of MSCs was recorded in the wrist/hand region (5.3%). This finding is inconsistent with (28), who identified the knee as the most affected body part due to overuse in volleyball players. The difference may be attributed to the poor techniques adopted by participants in this study, who were amateur volleyball players. Poor hand positioning and biomechanics during play may have also contributed to the increased wrist/hand MSCs. In basketball participants, this study identified the upper limb as the most affected body part with MSCs. This is contrary to a study by (29), who reported the lower limb as the most affected region in basketball players. The difference may be due to the poor techniques adopted by amateur players in this study, particularly during shooting, passing, or rebounding, leading to an increased prevalence of upper limb injuries. For participants associated with football, the lower back was reported as the prevalent region for MSCs.

Conclusively, this study observed a significant association between sport duration and MSCs prevalence in the shoulder and lower back regions. This finding reflects the cumulative mechanical stress and overuse commonly experienced in these anatomical sites during prolonged and repetitive sports activities. This aligns with (30), who reported a dose-response relationship between sports activity time and musculoskeletal pain, with increased duration linked to a higher risk of pain in these regions.

Study limitations

Most of the respondents identified football as their primary sport. This skews the study toward football, limiting conclusions on other sports.

Conclusion

There is a relatively high prevalence of MSCs among female university students participating in sports. The hip/thigh region was identified as the most affected body region. In the upper limb, the shoulder was observed as the most affected region. This study recommends raising awareness about MSCs among female athletes, implementing sport-specific prevention strategies, integrating MSCs prevention into training, and conducting broader studies to improve generalizability.

List of Abbreviations

MSCs: Musculoskeletal Complaints

MSDs: Musculoskeletal Disorders

NMQ: Nordic Musculoskeletal Questionnaire

SPSS: Statistical Package for the Social Sciences

LUTH: Lagos University Teaching Hospital

Declarations

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Health Research and Ethics Committee of the Lagos University Teaching Hospital (ADM/DCST/HREC/APP/2884). All participants provided written informed consent before data collection, following the Declaration of Helsinki.

Consent for publication

All participants provided written consent for anonymised data to be used for publication purposes.

Availability of data and materials

The datasets used and/or analysed during the study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' Contributions

AOA and OOC conceptualised and designed the study. AOA conducted literature searches and wrote the protocol. OOC and FOA provided

summaries of previous research studies, while AOA did the data collection. AAK, TBA, and JIMOH interpreted the data and reviewed the manuscript. JFA wrote the first draft of the manuscript, after which all authors contributed to and approved the final version.

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References

1. Vos T, Lim SS, Abbafati C, Abbas KM, Abbasi M, Abbasifard M, Abbasi-Kangevari M, Abbastabar H, Abd-Allah F, Abdelalim A, Abdollahi M. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*. 2020 Oct 17;396(10258):1204-22. [https://doi.org/10.1016/S0140-6736\(20\)30925-9](https://doi.org/10.1016/S0140-6736(20)30925-9)
2. Aasdahl L, Granviken F, Meisingset I, Woodhouse A, Evensen KA, Vasseljen O. Recovery trajectories in common musculoskeletal complaints by diagnosis contra prognostic phenotypes. *BMC musculoskeletal disorders*. 2021 May 19;22(1):455. <https://doi.org/10.1186/s12891-021-04332-3>
3. Hirase T, Okubo Y, Delbaere K, Menant JC, Lord SR, Sturnieks DL. Predictors of development and persistence of musculoskeletal pain in community-dwelling older people: a two-year longitudinal study. *Geriatrics & Gerontology International*. 2021 Jun;21(6):519-24. <https://doi.org/10.1111/ggi.14172>
4. Hendi OM, Alturkistani LH, Bajaber AS, Alhamoud MA, Mahfouz ME. Prevalence of musculoskeletal disorders and its relation to stress among medical students at Taif University, Saudi Arabia. *International journal of preventive medicine*. 2021 Jan 1;12(1):98. https://doi.org/10.4103/ijpvm.IJPVM_335_20
5. Alrushud AS. A cross-sectional study of musculoskeletal injuries related to exercise among gym members in Saudi Arabia in 2022: prevalence, common types, and predictor factors. *BMC Musculoskeletal Disorders*. 2024 Aug 3;25(1):621. <https://doi.org/10.1186/s12891-024-07733-2>
6. Felemban RA, Sofi RA, Alhebshi SA, Alharbi SG, Farsi NJ, Abduljabbar FH, Farsi JM. Prevalence and predictors of musculoskeletal pain among undergraduate students at a dental school in Saudi Arabia. *Clinical, Cosmetic and Investigational Dentistry*. 2021 Feb 17:39-46. <https://doi.org/10.2147/CCIDE.S292970>
7. Hashim R, Salah A, Mayahi F, Haidary S. Prevalence of postural musculoskeletal symptoms among dental students in United Arab Emirates. *BMC Musculoskeletal Disorders*. 2021 Jan 6;22(1):30. <https://doi.org/10.1186/s12891-020-03887-x>
8. Parto DN, Wong AY, Macedo L. Prevalence of musculoskeletal disorders and associated risk factors in Canadian university students. *BMC Musculoskeletal Disorders*. 2023 Jun 19;24(1):501. <https://doi.org/10.1186/s12891-023-06630-4>
9. Alsulaihebi HS, Alsulaihebi AS, Alsaedi ZK, Alsharif SY, Mahamid AW, Babateen OM. Musculoskeletal disorder prevalence and its correlation with stress in medical students: A cross-sectional survey. *Journal of Family Medicine and Primary Care*. 2024 Apr 1;13(4):1524-9. https://doi.org/10.4103/jfmpc.jfmpc_1659_23
10. Afolabi JO, Abel PT, Oyeyemi AL. Prevalence of musculoskeletal disorders and associated risk factors among undergraduates of a private university in Nigeria. *WORK*. 2025 May 13:10519815251341142. <https://doi.org/10.1177/10519815251341142>
11. Overstreet DS, Strath LJ, Jordan M, Jordan IA, Hobson JM, Owens MA, Williams AC, Edwards RR, Meints SM. A brief overview: sex differences in prevalent chronic musculoskeletal conditions. *International Journal of Environmental Research and Public Health*. 2023 Mar 3;20(5):4521. <https://doi.org/10.3390/ijerph20054521>
12. Jin X, Wu X, Xu W, She C, Li L, Mao Y. Gender differences in the impact of anatomical factors on non-contact anterior cruciate ligament injuries: a magnetic resonance study. *BMC Musculoskeletal Disorders*. 2024 Apr 4;25(1):264. <https://doi.org/10.1186/s12891-024-07390-5>
13. Martínez-Fortuny N, Alonso-Calvete A, Da Cuña-Carrera I, Abalo-Núñez R. Menstrual cycle and sport injuries: a systematic review. *International Journal of Environmental Research and Public Health*. 2023 Feb 13;20(4):3264. <https://doi.org/10.3390/ijerph20043264>

14. Chan LL, Wong AY, Wang MH. Associations between sport participation and knee symptoms: a cross-sectional study involving 3053 undergraduate students. *BMC Sports Science, Medicine and Rehabilitation*. 2020 Mar 23;12(1):20. <https://doi.org/10.1186/s13102-020-00169-w>
15. Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Biering-Sørensen F, Andersson G, Jørgensen K. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. *Applied Ergonomics*. 1987 Sep 1;18(3):233-7. [https://doi.org/10.1016/0003-6870\(87\)90010-X](https://doi.org/10.1016/0003-6870(87)90010-X)
16. Pinheiro FA, Tróccoli BT, Carvalho CV. Validity of the Nordic Musculoskeletal Questionnaire as morbidity measurement tool. *Revista de saúde pública*. 2002;36:307-12. <https://doi.org/10.1590/S0034-89102002000300008>
17. Dickinson CE, Campion K, Foster AF, Newman SJ, O'Rourke AM, Thomas PG. Questionnaire development: an examination of the Nordic Musculoskeletal questionnaire. *Applied ergonomics*. 1992 Jun 1;23(3):197-201. [https://doi.org/10.1016/0003-6870\(92\)90225-K](https://doi.org/10.1016/0003-6870(92)90225-K)
18. Descatha A, Roquelaure Y, Chastang JF, Evanoff B, Melchior M, Mariot C, Ha C, Imbernon E, Goldberg M, Leclerc A. Validity of Nordic-style questionnaires in the surveillance of upper-limb work-related musculoskeletal disorders. *Scandinavian Journal of Work, Environment & Health*. 2007 Feb;33(1):58. <https://doi.org/10.5271/sjweh.1065>
19. Noormohammadpour P, Farahbakhsh F, Farahbakhsh F, Rostami M, Kordi R. Prevalence of neck pain among athletes: a systematic review. *Asian Spine Journal*. 2018 Oct 16;12(6):1146. <https://doi.org/10.31616/asj.2018.12.6.1146>
20. Al-Hadidi F, Bsisu I, AlRyalat SA, Al-Zu'bi B, Bsisu R, Hamdan M, Kanaan T, Yasin M, Samarah O. Association between mobile phone use and neck pain in university students: A cross-sectional study using numeric rating scale for evaluation of neck pain. *PloS One*. 2019 May 20;14(5):e0217231. <https://doi.org/10.1371/journal.pone.0217231>
21. Kim HJ, Boo S, Meeker TJ. Pain prevalence, management and interference among university students in South Korea: an exploratory cross-sectional study. *Journal of Pain Research*. 2021 Aug 11:2423-31. <https://doi.org/10.2147/JPR.S324758>
22. Banadaki FD, Rahimian B, Moraveji F, Varmazyar S. The impact of smartphone use duration and posture on the prevalence of hand pain among college students. *BMC Musculoskeletal Disorders*. 2024 Jul 23;25(1):574. <https://doi.org/10.1186/s12891-024-07685-7>
23. Kandasamy G, Almanasef M, Almeleebia T, Orayj K, Shorog E, Alshahrani AM, Prabahar K, Veeramani VP, Amirthalingam P, Alqifari SF, Alrashidi F. Prevalence of musculoskeletal pain among undergraduate students. *Frontiers in Medicine*. 2024 Sep 20;11:1403267. <https://doi.org/10.3389/fmed.2024.1403267>
24. Oliveira de Almeida M, Hespanhol Junior LC, Dias Lopes A. PREVALENCE OF MUSCULOSKELETAL PAIN AMONG SWIMMERS IN AN ELITE NATIONAL TOURNAMENT. *International Journal of Sports Physical Therapy*. 2015 Dec 1;10(7).
25. Østerås H, Garnæs KK, Augestad LB. Prevalence of musculoskeletal disorders among Norwegian female biathlon athletes. *Open Access Journal of Sports Medicine*. 2013 Mar 25:71-8. <https://doi.org/10.2147/OAJSM.S41586>
26. Patel DR, Yamasaki A, Brown K. Epidemiology of sports-related musculoskeletal injuries in young athletes in United States. *Translational Pediatrics*. 2017 Jul;6(3):160. <https://doi.org/10.21037/tp.2017.04.08>
27. Fliciński J. Occurrence and risk factors of musculoskeletal pain and sport injuries in students of physical education in University of Szczecin. In *Annales Academiae Medicae Stetinensis* 2008 Jan 1 (Vol. 54, No. 3, pp. 31-47).
28. Clarsen B, Bahr R, Heymans MW, Engedahl M, Midsundstad G, Rosenlund L, Thorsen G, Myklebust G. The prevalence and impact of overuse injuries in five Norwegian sports: Application of a new surveillance method. *Scandinavian journal of medicine & science in sports*. 2015 Jun;25(3):323-30. <https://doi.org/10.1111/sms.12223>
29. Garbenytė-Apolinskienė T, Salatkaitė S, Šiupšinskas L, Gudas R. Prevalence of musculoskeletal injuries, pain, and illnesses in elite female basketball players. *Medicina*. 2019 Jun 14;55(6):276. <https://doi.org/10.3390/medicina55060276>
30. Kamada M, Abe T, Kitayuguchi J, Imamura F, Lee IM, Kadowaki M, Sawada SS, Miyachi M, Matsui Y, Uchio Y. Dose-response relationship between sports activity and musculoskeletal pain in adolescents. *Pain*. 2016 Jun 1;157(6):1339-45. <https://doi.org/10.1097/j.pain.0000000000000529>