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Original Research Article

Injuries and its Associated Risk factors among Leisure Time Runners in Debretabor Town, Ethiopia

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Abstract

Running is a popular, accessible activity often chosen for its health benefits, such as weight control and better fitness. However, running injuries are common. This cross-sectional study investigated the prevalence of these injuries among leisure-time runners in Debretabor town over a six-month period. Out of the 350 registered runners, 323 completed the survey (a 92.28% response rate), comprising 155 females and 168 males. The results showed that 188 injuries occurred, giving an overall injury prevalence of 58.2% (or 0.58 injuries per runner) during the study period, with very similar rates for both females (0.58) and males (0.57). A significant majority of injuries—58.5% (62/106)—happened during competition, compared to 33.96% during training and 7.55% during warm-up. The most frequently injured anatomical sites were the knee (38.3%), the foot (30.85%), and the ankle (17.55%). The specific types of injuries most often reported were tendinopathies and muscle strain/rupture, followed by abrasion.

Keywords: Injuries; prevalence, Athletics, Leisure time running

INTRODUCTION

Athletics, described as a "track and road sport" that is non-contact, is a highly popular and dynamic activity globally, with runner participation significantly increasing over recent decades (Van Middelkoop et al., 2008). Many individuals choose running as a low-cost, easily implemented method for pursuing a healthier lifestyle, managing weight, and boosting exercise capacity (Taunton et al., 2002). Furthermore, running offers significant health advantages, such as reducing risk factors for cardiovascular disease (Zemper & Pieter, 2009). Although the precise origins of Athletics in Ethiopia are unclear, it is thought to have been commonly practiced in schools and military settings before 1897.

Despite these benefits, running-related injuries are frequent. International studies report a wide range of injury prevalence, from 18.2% to 92.4% (Van Middelkoop et al., 2008; Starke & Ryan, 2001), or an incidence of 6.8 to 59 injuries per 1000 hours of running exposure (Buist et al., 2010; Rauh et al., 2006; Lun et al., 2004). This variability in reported rates is likely due to differences in runner characteristics and the definitions used for running-related musculoskeletal injuries (RRMIs).

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Research has been conducted to identify the most common injuries among runners (Buist et al., 2010; Knobloch, Yoon & Vogt, 2008; Taunton et al., 2003) and the predisposing factors that contribute to them. These factors include poor training habits, inadequate recovery from previous injuries, high weekly mileage, wearing incorrect shoes, and muscle imbalances (Noakes, 2001; Van Mechelen, 1992; Taimela, Kujalo and Oesteiman, 1990; Marti et al., 1988). Anatomical studies consistently identify the knee as the most vulnerable site for RRMIs, followed by the ankle (Noakes, 2001; Van Mechelen, 1992; Taimela, Kujalo and Oesteiman, 1990; Marti et al., 1988). Intrinsic biomechanical issues, such as deviations in the quadriceps angles (Q-angles) and foot alignment (e.g., genu varum, rear foot valgus), have been linked to an increased risk of knee and ankle injuries (Puckree, 2007; Noakes, 2001; Powell, 1986).

Despite the existence of numerous studies globally on RRMIs and their associated factors, there is a lack of research in Africa, and specifically in Ethiopia. The investigator is unaware of any previous study conducted on running-related musculoskeletal injuries among leisure-time runners in Ethiopia. Therefore, the present study aims to investigate the common running-related musculoskeletal injuries and associated risk factors among leisure-time runners in Debretabor Town, North West Ethiopia, in 2018.

MATERIALS AND METHODS

This quantitative, retrospective study focused on the leisure-time runners within the community of Debretabor town.According to the Debretabor town sport office's second-quarter 2018 report, the estimated total number of leisure-time runners in the area was 1,547 (comprising 982 males and 565 females).The sample size of 350 participants was calculated from this population using the Slovin formula ($n = N / (1+Ne^2)$).To select the final participants, a systematic random sampling method was applied to the registered runners from the Ajibar and Arada regions. The sample was distributed by age, with 65 participants aged over 35 years and 285 participants aged 35 years or younger.Ultimately, 323 leisure-time runners (155 female and 168 male) completed the survey and were included in the present study.

Data collection instrument, procedure and definition of injury

This study utilized a structured interviewer-administered questionnaire and exposure forms to collect injury data, an instrument that was adopted from Augustsson (2006). For the purpose of this research, an injury was specifically defined as any incident occurring during warm-up or competition that required medical attention (Honkamp, 2016) and caused the runner to miss participation in either a training session or a competition (Bahr & Reeser, 2003).

Anthropometric and Biomechanical Measurements

In addition to the information collected via the questionnaire, the following anthropometric and intrinsic biomechanical factors were recorded: body mass, stature, the Q-angle, and hip flexion (measured via the Thomas test). These measurements were taken to objectively determine the existence of a significant relationship between these intrinsic factors and the prevalence of musculoskeletal injury.

Statistical methods

Descriptive analysis of the injury data was conducted using the information gathered from the interviewer-administered questionnaires. Incidence tables were used to present categorical data, while means and standard deviations (SD) described continuous data.Injury prevalence was calculated as the total number of reported injuries divided by the number of leisure-time runners.To determine the association between explanatory variables and the dependent variable

(injury), the Odds Ratio (OR) and Relative Risk (RR) were calculated, each presented with a 95% Confidence Interval (CI). Statistical significance was set at a p-value of less than 0.05.

RESULTS

Socio-Demographic Characteristics of the participants

The study achieved a high participant response rate, with 323 runners completing the survey out of 350 targeted participants, which translates to 92.28%. The final sample included slightly more males (n=168; 52%) than females (n=155; 48%).

Table1: Demographic characteristics of the participants.

Variables	Females(N=155)	Males(N=168)
Age (Years),Mean(±SD)	29.12(±6.19)	27.21(±8.7)
Stature(cm),Mean(±SD)	162.12(±3.8)	168.19(±5.2)
Weight (kg),Mean(±SD)	61.07 (±8.81)	69.33 ±6.27)
BMI(kg/m2),Mean(±SD)	19.95(±2.19)	18.12(±2.27)
Running experience	2.11 (±1.11)	4.35 (±3.45)

SD = standard deviation; BMI = body mass index.

The mean age for female runners was 29.12 (±6.27) years, while the mean age for male runners was slightly lower at 27.21 (±8.70) years. The average height of the female participants was 162.12 (±3.80) cm, compared to 168.19 (±5.27) cm for the males. Similarly, the mean body mass for females was 61.07 (±8.81) kg, whereas males had a higher mean body mass of 69.33 (±6.27) kg. In terms of body composition, the mean Body Mass Index (BMI) was 19.95 (±2.19) for females and 18.12 (±2.27) for males. Finally, male runners reported a longer average running experience (4.35 ±3.45years) compared to female runners (2.11 ±1.11 years).

Injury rate

The rates of injuries by gender and participant type are reflected on the following Table-2 below.

Table 2: Frequency and percentage of injuries sustained by gender and participants type.

Participant Type	Gender	Injury			
		Injury Cases (%)	Injured (%)	Uninjured (%)	X^2
Youth	Female	68(36.17%)	53(40.46%)	91(47.39%)	0.11, p = 0.74
	Male	58(30.85%)	45(34.35%	84(43.75%)	
	Total	126(67.02%)	98(74.81%)	175(91.15%)	
Adult	Female	23(12.23%)	15(11.45%)	9(4.69%)	0.25, p = 0.62
	Male	39(20.75%)	18(13.74%)	8(4.17%)	
	Total	62(32.98%)	33(25.19%)	17(8.86%)	
Youth vs Adult		X^2=15.88,p<0.0001 OR=0.2885,Cl:0.1528-0.5445,p<0.0001 RR=0.5439,Cl:0.4217-0.7014,p<0.0001			

Injuries among runners were significantly higher in young athletes compared to adults, with young runners sustaining 67.02% (126 out of 188) of all registered injuries, a rate statistically distinct from the adult group (32.98%; x^2 = 15.88, p < 0.05). The study registered 188 injuries across 131 participants. When looking at injury frequency, the majority of the injured cohort, 65.65% (86 runners), were injured only once, while 25.19% (33 runners) were injured twice, and 9.16% (12 runners) were injured three times. Although female runners accounted for a higher absolute number of injuries (68 total vs. 63 for males when considering all injury frequencies), the statistical analysis showed no significant difference in the odds of injury between female and male runners (Odds Ratio 0.9930 (95% Cl: 0.6366 to 1.5489) p>0.05). Further dividing the 323 runners into specific age ranges revealed a significant association between age and injury occurrence (X^2=5.89, p<0.05). Specifically, the 14–16 year old group bore the brunt of the injuries, accounting for 62.77% of cases (118 injuries on 91 runners), followed by the 17–25 year old group with 34.57% (65 injuries on 37 runners). Runners aged 26 and above had the lowest incidence, representing only 2.66% of the injuries.

Injury Rates by Body Part and Diagnosis

Body Part Analysis

The majority of the 188 registered injuries affected the lower extremities. The knee was the most frequently injured body part, accounting for 38.3% of cases (72/188). This was closely followed by the foot at 30.85% (58/188) and the ankle at 17.55% (33/188). Less frequent injury locations included the back (6.9%, 13/188), the shin (3.72%, 7/188), and the hamstring (2.66%, 5/188).

Diagnosis and Sex Comparison

Regarding the specific diagnoses, strain was the most common type of injury overall, accounting for 24.53% of cases (n=26). This was followed by tendonitis (17.92%, n=19), abrasion (14.15%, n=15), and both sprain and blister each representing 13.20% (n=14). Shin splint and dislocation were the least frequent diagnoses, both occurring in 8.5% of cases (n=9 each).

When comparing injury types between sexes, there was a difference in the most common diagnoses: male runners were most frequently exposed to strain (34.43%, n=21), followed equally by sprain and tendonitis (14.76% for each). In contrast, female runners primarily sustained tendonitis (22.22%, n=10), followed by abrasion (15.56%).

Table 3: The rate of injuries and injured runners related to participant type.

Participant Type	Number of runners (N=323)	Number of Injury Cases (N=188)	Injured runners (N=131)	Uninjured runners (N=192)
Youth	273(84.52%)	126(67.02%)	98(74.81%)	175(91.15%)
Adult	50(15.48%)	62(32.98%)	33(25.19%)	17(8.85%)
X^2 = 15.88, p = 0.0001< 0.05*				
Young Vs Elite	OR = 0.2885, Cl:0.1528-0.5445, p = 0.0001< 0.05			
	RR = 0.5439,Cl:0.4217-0.7014, p = 0.0001< 0.05			

Injury Exposure by Age and Sex

Injury distribution varied by age and sex. Among youth runners (98 total reported injuries), females sustained the majority of injuries (54.08%, 53 cases), compared to 45.92% (45 cases) in

males. Conversely, among adult runners (33 total injuries), the majority of cases occurred in males (54.55%, 18 cases), versus 45.45% (15 cases) in females.

A statistically significant difference was found when comparing female youth and adult runners ($X^2 = 5.64$, p = 0.017), with the odds of injury being lower for youth females compared to adult females (0.5889, Cl: 0.4041 to 0.8582, p=0.0059). Similarly, a statistically significant difference was also observed between youth and adult male runners (X^2=10.58, p=0.0011). The odds of injury were significantly lower for youth males compared to adult males (0.2381, 95%Cl: 0.096 to 0.5904, p=0.002<0.05). This is further highlighted by the probability of injury for adult males being substantially higher (69.23%) than for youth males (34.88%) with a relative risk of 0.5889.95%Cl: 0.3557 to 0.7138, p=0.0001.

Injury Type: Acute vs. Overuse

The study found a highly significant difference between the occurrence of acute injuries and overuse syndromes (X^2=90.8,p<0.0001). Acute injuries overwhelmingly dominated, accounting for 88.83% (167 total) of all injuries, with a prevalence rate of 0.51 per 1000 hours. Of these acute injuries, males and females were almost equally affected (51.50% males, 48.50% females). The odds of suffering an acute injury were over nine times higher than an overuse injury (Odds Ratio 0.5889, Cl: 0.4041 to 0.8582, p=0.0059), confirming a statistically significant difference between the two types. The probability of an acute injury was 88.83%, compared to 11.17% for overuse, with a relative risk (RR) of 6.2105 (p < 0.0001).

Table 4: Comparative analyses of the mean Q-Angle of runners with Knee injuries v. those with Non-Knee injuries (N=33)

		Injured	Un injured	t-test	P-Value
Female	Left Q-Angle[^{0}]Mean[SD]	11.22[±3.289]	9.529[±2.426]	2.507	0.0184*
	Right Q-Angle[^{0}]Mean[SD]	10.7[±3.255]	9.058[±3.578]	1.77	0.0911
Male	Left Q-Angle[^{0}]Mean[SD]	6.944[±2.577]	6.826[±3.09]	0.172	0.864
	Right Q-Angle[^{0}]Mean[SD]	7.687[±3.718]	6.815[±3.39]	0.877	0.39
	***Statistically Significant**				

In comparison with the left Q-angle of knee injured and non-injured runners of female and male runners, statistical difference was found only on the left leg Q-angle of female runners(*t-test*=-02.507,p=0.0184). On the contrary, no significant difference was observed on right leg Q-angle of female and both Q-angle of male runners. Even if, statistical difference was not found on Q-angles between the injured and non-injured male runners, in this study have large Q-angle.

DISCUSSION

The study achieved a high response rate of 92.2% from a sample of 323 runners, which lends support to the validity of the findings, despite the small overall sample size limiting its generalizability. This high participation is consistent with results from previous research (Fields et al., 2010; Luiz et al., 2012; Ellapen et al., 2013). Participation skewed slightly towards males (52%) over females (48%), which aligns with several prior studies (Bennell et al., 1996; Brunet & Cook, 1990; Larkins, 1990) but contrasts with others (Buist et al., 2010). The age and Body Mass Index (BMI) of the participants in this study were lower than those reported by Luiz Hespanhol Junior et al. (1912).

A total of 58.2% (188/323) of leisure time runners sustained an injury during the season, occurring in both road races and training. The injury breakdown was nearly even between sexes: 51.59% (97/188) in males and 48.41% (91/188) in females. Conversely, 192 runners (59.44%) remained injury-free. This prevalence rate of 58.2% is lower than rates reported by Bennell, Crossley (1996) and Jacobs & Berson (1986), but higher than those reported by Lysholm & Wiklander (1987) and Buist et al. (2010). Consistent with literature (Ellapen et al., 2013; Luiz Hespanhol Junior et al., 2012; Alexandre Dias Lopes, 2012), injuries to the knee and foot/toe were the most prevalent anatomic sites. Key risk factors identified included large Q-angle (also associated in Ellapen, 2013), absence of preventive exercises, and the use of uncomfortable socks and running shoes.

CONCLUSIONS

This retrospective study determined that the prevalence rate of musculoskeletal running-related injuries during the observation period was 58.2%. The most common injury diagnoses were tendinopathies and muscle strain/rupture, followed by abrasion, while the knee and foot/toe were the most frequently affected anatomic sites. The intrinsic and extrinsic risk factors identified for these injuries included physical alignment (large Q-angle), absence of preventive exercise, lack of warming up, and the use of uncomfortable running shoes and socks. Notably, high running experience was associated with the absence of musculoskeletal injuries, and the majority of injuries were found to occur during competition (specifically the great run at Debretabor).

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