

## Prevalence of Shin Splint among Treadmill Users in Gym

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### ABSTRACT

**Background:** shin splints are depicting a condition in which leg torment and distress in distal posteromedial part of leg is brought about by dreary action and it rejects reasons for torment because of stress cracks or because of ischemia.

**Purpose of study:** Study aimed to find the prevalence of shin splints among treadmill users in gym.

**Materials & Methods:** The study was observational cross-sectional survey. Purposive sampling was done. 152 data were collected from different gyms of Lahore, Faisalabad and Sargodha, Pakistan. Both male and females aged 18-25 years with duration of gym from last 6 months at least 3 days a week and currently using gym were included in study while person with any physical and anatomical disability or history of surgery of lower limb and systemic illness. (e.g., deep venous thrombosis) were excluded from study. Data was analyzed using SPSS V 23. Descriptive statistics in form of frequency and percentages was presented. Pie and bar charts were plotted. Data was collected through self-devised questionnaire and Medial Tibial Stress Syndrome Score and Ankle Brachial Index and Shin Palpation Test were applied

**Results:** Mean age of participants was 21 years. Out of 140 participants after systemic disease exclusion 87% participants felt pain in lower leg. While 57.1 (n=80) showed some or moderate arterial diseases when evaluated through Ankle Brachial Index. 17.9% (n=25) showed positive shin palpation indicating shin splints. Shin splints were twice as likely to occur in physically active people who had previously reported a running-related injury. To stop the problem from worsening, it is crucial to determine whether treadmill users have shin splints. This study was carried out in Sargodha, Punjab, to discover shin splints in treadmill users. The purpose of this study was to shed light on the frequency and origin of shin splints among treadmill users. Athletes who experience medial shin pain (MSP) may be unable to run. The incidence especially among treadmill users was not previously investigated. Since there was no literature on the population chosen, this topic was chosen.

**Conclusion:** Use of treadmill is one of causes of shin splint and factors associated were duration of treadmill use and supervised use of treadmill while person with shin splint have pain during walking, sporting and running activities which reduced activities.

**Keywords:** Shin Splints, Medial Tibial Stress Syndrome, Treadmill, Gym.

### INTRODUCTION

The term 'shin splints' is utilized comprehensively to depict many circumstances causing exercise prompted torment in donning faculty.<sup>(1)</sup> Medial Tibial Stress Syndrome (MTSS) is one of the most widely recognized work out actuated leg wounds.<sup>(2)</sup> True shin splints are also known as Medial Tibial Stress Syndrome (MTSS), a syndrome that excludes sources of pain brought on by stress fractures or ischemia and in which leg pain and discomfort in the distal posteromedial area of the leg are brought on by repetitive activity.<sup>(3)</sup> Pain along the inner edge of the tibia is known as medial tibia shin splint (MTSS). The most prevalent location of discomfort is in the bottom two-thirds of the anterior and medial section of the tibia.<sup>(4)</sup> One of the most frequent sports injuries following hard activity is shin splints.<sup>(5)</sup> Running is one of the sports for which overuse injuries are most prevalent, while shin splints are one of the most prevalent ones.<sup>(6)</sup> In 1958, the medial tibial stress syndrome (MTSS) was first described. Devas wrote about the symptoms of what he called a stress fracture at the tibia or shin discomfort in his first study, which he published. Shin splint syndrome, medial tibial syndrome, tibial stress syndrome, and medial tibial syndrome are some more terms.<sup>(4)</sup> Physicians started researching shin discomfort in runners as early as the 1950s. During this time, stress fractures in the tibia or shin bone were thought to be the cause of shin pain brought on by frequent running. The injury wasn't thoroughly reviewed until 1967, when "Slocum offered a full study, underlining the fact that shin splints was a separate syndrome with its own clinical signs and pathophysiology."<sup>(7)</sup> The definition of shin splints is debatable; it was first used in 1913 to refer to "spike discomfort" in runners. Shin splint syndrome was first described as "pain and discomfort in the leg from recurrent exercise on hard surfaces, or due to strong, excessive use of foot flexures" by the American Medical Association in 1966.<sup>(8)</sup> There is little histological proof of periostitis. Three patients with inflammation or vasculitis discovered in the fascia following biopsy are described in two publications from the

1980s. When compared to athletes in good health, patients with MTSS had lower regional tibial bone density.<sup>(9)</sup> Shin splint syndrome is a significant performance-impairing ailment among athletes that calls for thorough research despite the fact that its pathogenesis is still unknown.<sup>(6)</sup> Unrepaired microdamage buildup in the cortical bone of the distal tibia is connected to the pathophysiologic mechanism that underlies MTSS. The tendinous attachments of the soleus, flexor digitorum longus, and posterior tibialis commonly coexist with an overlaying periostitis at the site of bone damage.<sup>(10)</sup> Distance runners and other runners are frequently afflicted by chronic exertional compartment syndrome (CECS), an uncommon illness. It is characterized by pressure and soreness in one or more muscle compartments when engaging in repeated motions. Usually, stopping an activity causes discomfort to decrease. A comprehensive history of the patient's symptoms is necessary for CECS evaluation, as is ruling out other potential explanations of the symptoms.<sup>(11)</sup> Rest, physiotherapy, and orthotics are examples of conservative treatments that are frequently effective and that can also help prevent MTSS.<sup>(12)</sup> In comparison to no treatment, some encouraging results were seen with iontophoresis, phonophoresis, cold massage, ultrasound, periosteal pecking, and extracorporeal shockwave therapy in the poorer quality non-randomized data.<sup>(13)</sup> A posteromedial fasciotomy releasing the medial soleus fascia and deep posterior compartment may be necessary if conservative treatment options are ineffective.<sup>(14)</sup> Shin splints were twice as likely to occur in physically active people who had previously reported a running-related injury. To stop the problem from worsening, it is crucial to determine whether treadmill users have shin splints. This study was carried out in Sargodha, Punjab, to discover shin splints in treadmill users. The purpose of this study was to shed light on the frequency and origin of shin splints among treadmill users. Athletes who experience medial shin pain (MSP) may be unable to run. The incidence especially among treadmill users was not previously investigated. Since there was no literature on the population chosen, this topic was chosen.

**MATERIALS & METHODS**

The study design was composed of observational cross-sectional survey. Data collected from different gyms of Lahore, Faisalabad and Sargodha, Pakistan. This study was completed within 3 months after approval of synopsis. Purposive sampling was done on account of specific target population. A sample of 152 subject will be enrolled in this study.

The sample size was 152 approximately calculated using the following formula:

$$N = z^2 \times p(1-p) / d^2$$

Data was analyzed using statistical package for social sciences (SPSS). Descriptive statistics in form of frequency and percentages was presented. Pie and bar charts were plotted. The information was obtained from all respondents through informed consent and data was collected through self-devised questionnaire and following score and test were applied. The MTSS score displayed a single-factor structure with adequate internal consistency and strong test-retest reliability, according to factor analysis. The MTSS score is a numeric value between 0 and 10. The MTSS score is a legitimate, accurate, and responsive way to determine how severe MTSS is. It is intended to assess how well treatments work in clinical research.<sup>(15)</sup> Numerous healthcare professionals, including specialized nurses, doctors, surgeons, and podiatrists working in primary and secondary care settings, frequently utilize the ankle brachial index (ABI) to evaluate the signs and symptoms of PAD. A comprehensive analysis of the ABI test's diagnostic accuracy in patients presenting with leg discomfort indicative of PAD is extremely relevant to everyday clinical practice because it is non-invasive, affordable, and widely used in the medical field.<sup>(16)</sup>

**RESULTS**

Age of 152 participants including in this study was minimum age 18 years, maximum age 25 years. 92.1% showed no systemic disease while 7.9% showed disease. 27.9% showed 45 minutes workout while 9.3% showed 20 minutes workout. 40.7% performed supervise treadmill exercises while 59.3% performed non-supervise treadmill exercises. 9.3% showed 20 minutes pain while 25.7% showed 10 minutes pain after gym. 35.7% showed moderate pain while 10.0% showed very severe pain. 17.9% showed normal (1.0-1.4) while 16.4% showed moderate arterial disease (0.5-0.8). 17.9% showed positive Shin Palpation test while 82.1% showed negative test. 44.0% were forced to do alternative sporting activities only due to pain in their shin while 36.0% were forced to do less of my usual sporting activities due to pain in their shin. 36.0% showed the reduced frequency of sporting activities by 1-25% a week while 12.0% showed the reduced frequency of sporting activities by 76-100% a week. 36.0% showed the adjusted sporting activities substantially ( $\pm 50\%$ ), sporting activities are less intense while 16.0% showed the adjusted the majority ( $\pm 75\%$ ) of my sporting activities, my sporting activities are substantially less intense. 32.0% showed pain after 15 minutes while 36.0% showed pain within the first 15 minutes. 40.0% showed pain disappeared after 10 minutes while 16.0% showed pain disappeared within 10 minutes. 12.0% showed pain disappeared between 12 hours to 2 days while 60.0% showed pain disappeared within 12 hours. 44.0% showed no pain while 20.0% showed a lot pain while standing. 12.0% showed no pain while 36.0% showed a lot of pain while walking. 12.0% showed no pain while 8.0% showed a lot of pain at rest. 28.0% showed no pain while 12.0% showed pain in my shin for parts of the night. 32.0% showed pain when I bump my shin while 36.0% showed pain when I rub, press on and when I bump my shin.

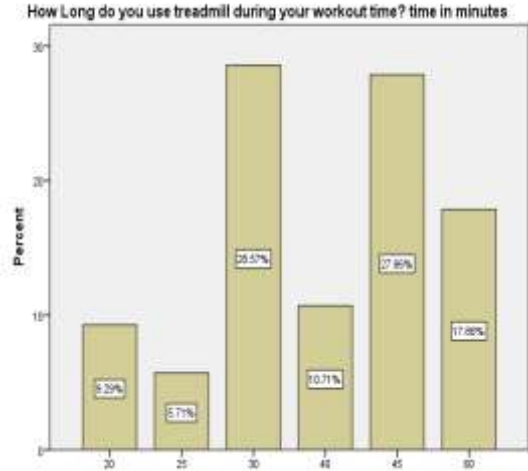
Table 01: Ankle Brachial Index (ABI)

Ankle Brachial Index (ABI)	Frequency	Percent
normal (1.0-1.4)	25	17.9
acceptable (0.9-1.0)	35	25.0
some arterial disease (0.8-0.9)	92	65.7
moderate arterial disease (0.5-0.8)	23	16.4
Total	140	100.0

Table 02: After sporting activity:

After sporting activities	Frequency	Percent
I have no pain	7	28.0
The pain disappears within 12 hours	15	60.0
The pain disappears between 12 hours to 2 days	3	12.0
Total	25	100.0

Figure 1

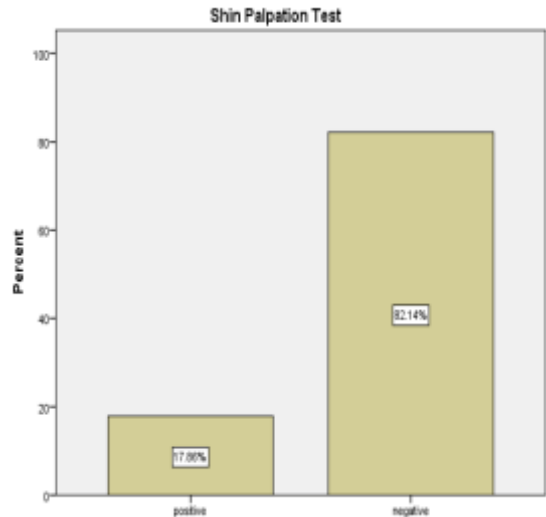


This table shows frequency and percentage of the Shin Palpation Test among 140 participants. 17.9% showed positive test while 82.1% showed negative test.

Table 3: Shin palpation test.

Shin Palpation Test	Frequency	Percent
Positive	25	17.9
Negative	115	82.1
Total	140	100.0

Fig 2: Shin palpation test



This bar chart shows the Shin Palpation Test among 140 participants.

**DISCUSSION**

Shin splints often referred to as medial tibial stress syndrome (MTSS), are a type of discomfort that develops on the front of the tibia as a result of repeated stress on the tissues that surround the tibia bone. Shin splints can also be brought on by biomechanical issues like overpronation of the foot. Shin splint pain can spread across the bottom two-thirds of the tibia, whereas stress fracture discomfort is limited to the injury.<sup>(17)</sup> Out of 152 individuals, 88 were

men and 64 women in the current study, with a mean age of 21.482.068 and a mean weight of 70.52kg5.031. 140 participants had further tested for shin splints whereas 12 people with systemic illness were eliminated from the research. Twenty minutes (9.3%) to sixty minutes (17.9%) were spent on the treadmill. 40.7 percent of participants engaged in treadmill activities under supervision, whereas 59.3 percent did not. 87 percent of individuals said they have ever had lower limb discomfort. Additionally, 35.7% of people reported foot to knee discomfort. 37.4% of runners reported experiencing discomfort. Maximum reported time for the discomfort following exercise was 20 minutes (9.3 percent). The current study discovered 16.4% of individuals had moderate lower leg arterial disease and were thus excluded. According to Jonathon M. 2019, between 12 to 20 percent of people have lower extremity peripheral arterial disease (PAD).<sup>(18)</sup> 152 subjects underwent shin palpation with 17.9% of them testing positive and 82.1% testing negative. According to these tests, shin splints can occur up to 17.9% of the time. Shin splint prevalence among young girls and boys was found to be up to 13.6 percent in a research by Alexander C. Wu done in the United States in 2020, compared to a 5.9 percent higher incidence among women.<sup>(19)</sup> In a 2016 research by Sadiya Sultana et al. in Bangladesh, it was shown that more over one-quarter (25.9%) of male athletes from several reputable clubs were suffering from shin splints, while 3.4% had a history (ever prevalence) of the condition.<sup>(6)</sup> 17.9% of people filled out the MTSS questionnaire to rate the severity of shin splints. According to a 2016 Terre Haute study by Z. K. Winklemann, clinicians should evaluate their patients passively to identify this risk factor, develop prevention and treatment plans, and use the MTSS Score to gauge the severity of shin pain and identify any limitations or restrictions in active people.<sup>(20)</sup>

## CONCLUSION

Study concluded that use of treadmill can be one of causes of shin splint and factors associated were duration of treadmill use and supervised use of treadmill while person with shin splint have pain during walking, sporting and running activities which reduced activities.

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