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PREVALENCE OF SHIN SPLINT IN RECREATIONAL MARATHON RUNNER

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ABSTRACT

Background: It is essential to find out the presence of shin splint in recreational marathon runners to prevent the injury from causing more damage. This study was conducted to identify shin splint in recreational marathon runners in Krishna Hospital, Karad. This study was designed to provide meaningful insight into the cause of shin splint in recreational marathon runners.

Objectives of the study were to find out the impact of shin splint in recreational marathon runners and to assess the severity of shin splint in recreational marathon runners of age group 20-30 years both males and females in Krishna Hospital, Karad.

Material and Methods: 190 recreational marathon runners who fit in the criteria were given Runner's Questionnaire and were asked to fill it.

Result: There was marked significance pain was present during ($p=0.04$) and running throughout ($p<0.0001$) in recreational marathon runners.

Conclusion: It was concluded from the present study that there is a prevalence of shin splint in marathon runners. Shin splint was found more in females (55.3%) than in males (44.7%). Based on the duration of pain and shoe surface was found to be more prevalent to cause shin splint in marathon runners.

Keywords: Shin Splint, Recreational marathon runners, Pain, Shoe surface, Medial tibial stress syndrome.

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INTRODUCTION

Shin splint is most often used to be described as exertional leg pain. There are mainly two types of shin splint that occur which are a) Anterior shin splint refers to as dysfunction of the anterior leg compartment or surrounding structures b) Medial tibial stress syndrome refers to as exercise due to pain associated to distal two-third of the leg [1].

Recreational runners are increasing in number and are mostly participating in marathon runners. Mostly recreational runners having training intervention has important implications for that design of training protocol [2]. Improper foot biomechanics such as static pronated foot, lower standing foot angle, varus rearfoot and forefoot, maximum pronation, and increased navicular drop is associated with medial tibial stress syndrome among runners [3]. In most of the studies, recreational runners have medial tibial stress syndrome, mostly or second most frequently diagnosed injury. Pain is present during exercise in mild cases, and in severe cases, pain is present during rest [4]. The posteromedial muscular weakness is a consequence of muscular overuse and chronic fatigue [5].

Cause of anterior shin splint is not completely understood; overuse or chronic injury of the anterior compartment muscles, fascia, bony, and periosteal attachment. Causes of medial tibial stress syndrome are traction periostitis of soleus or flexor digitorum longus muscle origin and increased heel eversion [1]. Some studies suggested that Medial tibial stress syndrome is a consequence of repetitive stress imposed by impact force that eccentrically fatigues the soleus, which creates repetitive bending and bowing of tibia [2].

Detmer classified medial tibial stress syndrome based on etiology, i.e., Type 1: included local stress fracture, Type 2: periostitis/periostalgia, and Type 3: was due to deep posterior compartment syndrome [4]. A study showed no connection of myofascial attachment of the deep crural fascia, soleus, flexor digitorum longus and tibialis in the posterior border of tibialis in which the pain appeared as Medial tibial stress syndrome [5].

A large study showed no connection of the deep crural to the crural fascia, long flexor digitorum, and tibialis in the posterior border of the tibia, in which the pain appeared as a tibial stress syndrome.

Medial tibial stress syndrome should be differentiated from chronic exertional compartment syndrome, stress fracture, popliteal artery entrapment syndrome, and various neuropathies [4]. A navicular drop with feet shoulder-width apart was measured, which was found to be significantly associated with Medial tibial stress syndrome [5]. One of the most often causes of Medial tibial stress syndrome is increased valgus force on the rear foot and excessive pronation [4].

People with higher Body mass index and the individuals who used prior orthotic devices for a prolonged period were found to be more prone to develop Medial tibial stress syndrome [5]. Other studies suggested that over two times

more likely to incur Medial tibial stress syndrome injury in runners who had experienced previous running injury [3]. Women appear more frequently to have this diffused tenderness over the posteromedial aspect of the distal third of the tibia, as compared to men [4].

Positive confirmation of Medial tibial stress syndrome can be done by bone stress marker, advances in computed tomography, magnetic resonance imaging technique, and dual-energy absorptiometry [5]. Shock-absorbent insoles, pronation-control insoles, and graduated running the program have been proven to be a preventive method of Medial tibial stress syndrome [2]. Running on an uneven platform and hill running should be prevented whereas to minimize rearfoot valgus and to correct the excessive pronation, pes cavus or pes planus appropriate shoe wear is an essential tool to use [4]. The lower limb musculature stretch has been consistently proven not to prevent Medial tibial stress syndrome [2].

Flexibility and the strengthening regime should be initiated to correct any muscle imbalances; Non-steroidal anti-inflammatory drugs and Anti-inflammatory modalities can also be used for rehabilitation of Medial tibial stress syndrome [4]. Person conditioning, which is included as one of the graduated running programs, is accepted as one of the preventive measures for many injuries [2]. For an athlete which severe limitation of physical activities, frequent recurrence, or no response to available therapy, an operative method has been suggested [4]. The runner's questionnaire is used to evaluate the shin splint in recreational marathon runners. The purpose of the present study is to determine the individual having shin splint in a recreational marathon runner, which is usually misdiagnosed and can cause more damage to the area.

Overuse injuries result in repetitive microtrauma, which leads to damage in cellular and intracellular degeneration. This is most likely to occur due to change in mode, intensity, or duration of the timing.

Common overuse injuries of the lower leg include tendinopathy, stress fracture, chronic exertional compartment syndrome, and shin splint. The incorrect method of training or lack of proper training is the leading cause of this injury. An adequate light upon the correct regime can prevent this injury.

For a recreational marathoner, injury this early and often can hamper that individual's performance and daily activities. If the marathoner is enlightened about the injury and its cause, prevention can cause betterment in his performance hereafter.

Considering the above facts, the present study was planned to determine shin splint in recreational marathon runners in Krishna Hospital, Karad. The current study objectives were to find out the impact of shin splint in recreational marathon runners and assess the severity of shin splint in recreational marathon runners.

MATERIAL AND METHODS

The present cross-sectional observational study was conducted at KIMS for three months. A total of 190 subjects were selected by using simple random method. The subjects were included in the present study of both males and females with the age group 20 to 30 years. The subjects who participated in cross country runners, long-distance runners, and who are not willing to participate in the study were excluded from the present study.

Data collection procedure:

Procedure: 190 subjects aged between 20 to 30 years, both male and female, were selected randomly for the present study. Individuals who are not willing to participate and who participated in cross country runners and long-distance runners were excluded. Written consent was taken from subjects those willing to participate. Institutional Ethical Committee approved was obtained (Ref No: 0481/2018-2019) before the beginning of the study. The assessment was done based on the Runner's Questionnaire filled by the subjects.

Statistical Analysis:

Descriptive statistics such as mean, SD, and the percentage was used to present the data. Association of shin splint with various variables was assessed by using the Chi-square test. A p-value of less than 0.05 was considered significant. Data analysis was performed by using Microsoft Excel and SPSS v16.0

RESULTS

Majority of the subjects were belongs to age group 23-25 (46.3%) followed by 26-28 (31.1%), 20-22 (21.1%) and 29-31 (1.6%). In the present, male and female subjects were almost the same. In the present study, the prevalence of shin splint in marathon runners was 132 out of 190 i.e.69.5% (Table - 1).

Table 1: Basic characteristics

Characteristics	Number	Percentage
Age		
20-22	40	21.1
23-25	88	46.3
26-28	59	31.1
29-31	3	1.6
Gender		
Male	95	50.0
Female	95	50.0
Shin splint		
Yes	132	69.5
No	58	30.5

Majority of running interest was multisport (32.65%), 82.6% having pain during running and 81.1% having pain after running (Table - 2).

Table 2: Distribution of subjects according to sports-related parameters

Parameters	Number	Percentage
Duration of running		
1-5	46	24.2
6-10	63	33.2
11-15	75	39.5
>15	6	3.2
Running interest		
Fitness and fun	58	30.5
Multisport	62	32.6
Racing for Improvement	15	7.9
Recreational and social	55	28.9
Pain during running		
Yes	157	82.6
No	33	17.4
Running throughout		
No	33	17.4
Same	65	34.2
Better	41	21.6
Worst	51	26.8
Pain after running		
Yes	154	81.1
No	36	18.9

Out of 190 recreation marathon runners with shin splint, a maximum of 88 (48.5%) were in the age group of 23-25 years, and a minimum of 2 (1.5%) were in the age group of 29-30 years. There was no statistical association between shin splint and age ($p=0.56$). Maximum of getting shin splint in recreational marathon runners were Females (55.3%), and remaining were males (44.7%). There was a statistical association between a shin splint and gender ($p=0.03$) (Table - 3).

Table 3: Association of shin splint with socio-demographic data

Variables	Shin splint (%)		χ^2 value	p-value
	Yes	No		
Age				
20-22	28 (21.2)	12 (20.7)	1.16	0.56
23-25	64 (48.5)	24 (41.4)		
26-28	38 (28.8)	21 (36.2)		
29-31	2 (1.5)	1 (1.7)		
Gender				
Male	59 (44.7)	36 (62.1)	4.86	0.03
Female	73 (55.3)	22 (37.9)		

Maximum 49 (37.1%) was in duration between 6-10, and a minimum of 3 (2.3%) was in duration between >15. There was no statistical association between shin splint and duration of running ($p=0.16$). In turn, it shows that the occurrence of shin splint was not dependent on the duration of running.

Maximum was Multisport 47(35.6%), and minimum were Racing for improvement 9(6.8%). There was no statistical association between shin splint and duration of running (p=0.43).

Maximum people have pain during running 114(86.4%), and the minimum has no pain during running 18(13.6%). There was a highly statistical association between shin splint and pain during running (p=0.04). It shows pain during running plays a significant role in shin splint.

Maximum was at worst 50(37.9%), and the minimum was at not present 18(13.6%). There was a highly statistical association between shin splint and pain throughout running (p<0.0001).

Maximum people have pain after running 111(84.1%), and minimum people have present with no pain 21(15.9%). There was no statistical association between shin splint and pain after running (p=0.11) (Table - 4).

Table 4: Association of shin splint with sports-related factors of the respondents

Variables	Shin splint (%)		χ^2 value	p-value
	Yes	No		
Duration of running				
1-5	32 (24.2)	14 (24.1)	3.67	0.16
6-10	49 (37.1)	14 (24.1)		
11-15	48 (36.4)	27 (46.6)		
>15	3 (2.3)	3 (5.2)		
Running interest				
Fitness and fun	41 (31.1)	17 (29.3)	2.73	0.43
Multisport	47 (35.6)	15 (25.9)		
Racing for Improvement	9 (6.8)	6 (10.3)		
Recreational and social	35 (26.5)	20 (34.5)		
Pain during running				
Yes	114 (86.4)	43 (74.1)	4.19	0.04
No	18 (13.6)	15 (25.9)		
Running throughout				
No	18 (13.6)	15 (25.9)	60.31	<0.0001
Same	26 (19.7)	39 (67.2)		
Better	38 (28.8)	3 (5.2)		
Worst	50 (37.9)	1 (1.7)		
Pain after running				
Yes	111 (84.1)	43 (74.1)	2.60	0.11
No	21 (15.9)	15 (25.9)		

DISCUSSION

The present study was found that the current prevalence of shin splint among recreational marathon was 69.5%. The previous research has reported the onset of pain during early sports events, after the sports events, during the whole sports events, during the initial steps from the bed always, etc. [9]. The present study shows the same nature of the pain and as well as there has been pain after the running. The current research says that there is an occurrence of shin

splint in both the gender. Some studies stated that females are at significantly higher risk of developing medial tibial stress syndrome than males, as females have typically later onset of menarche and suffer commonly from menstrual disturbance. Bennell (1996) et al., in a prospective study of 53 female athletes, found the age of menarche, menstrual disorder, lower bone mineral density, leg length discrepancy, a less lean mass of the shank and a lower-fat diet were a significant risk factor for a stress fracture in females [10]. The present study has stated that the shin splint is seen in age groups around the adult. There has been a close relationship between sports events and sports injuries, and among them, a shin splint is very common in sports injury in the lower leg [11]. Regarding the risk factors of shin splint, this study found no any significant association with socio-demographic data characteristic of this study such as age, gender, and anthropometrical factors such as height, weight, body mass index, etc. and also with lifestyle-related factors such as smoking, maintenance of diet plan, water intake, etc.. In contrast, other study found association with gender and body mass index [12]. Again present study suggested that gender was associated with causing shin splint and not with other factors for causing shin splint.

Regarding the risk factors of shin splint, the present study found a significant association with the pain while running (p=0.04) and running throughout (p<0.0001), findings were comparable with research done by Middelkoop 2008 [13]

Musculoskeletal pain is associated with the amount of weekly training and the number of years of running in recreational runners [14-16]; this relationship was not found in the present study, maybe because of the sample was homogeneous in the amount training and the number of years running. Other factors, such as the use of different running shoes and preferred running surface, the non-treadmill, and the stability of the thigh muscles, have been identified as triggers for injuries and can also be related to muscle pain[15,17]. However, in the present study, these factors were not evaluated.

Clinical implementation of present research:

Based on the high prevalence of shin splint, the pain that is observed in this population, it is important to take action on the recreational marathon by conducting education aims to promote more information about the risks and consequences of renewal. It can help reduce the incidence of overuse injuries and contribute to the development of injury prevention strategies. However, this hypothesis should be confirmed in future studies.

CONCLUSION

It was concluded from the present study that there is a prevalence of shin splint in marathon runners. Shin splint was found more in females than in males. Based on the duration of pain and shoe surface was found to be more prevalent to cause shin splint in marathon runners. Further, it is also essential to give more emphasis on the

recreational marathon by conducting education aims to promote more information about the risks.

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AUTHORS CONTRIBUTION

Prina Y. Patel conducted the study by working on protocol preparation, collecting samples, literature review for this manuscript, developed introduction section of the script, together with the discussion of the study findings, collected data and analyzed the data. Namrata Patil guided in providing a description of the background information and drafting the article.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest concerning the content of the present study.

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