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Original Article

Nocturnal Leg Cramps in Young Adults

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ABSTRACT

Nocturnal Leg cramps are painful, involuntary muscle spasms that occur in the legs while sleeping, most particularly in the calves. The soreness usually lasts less than five minutes and occurs before or immediately after you fall asleep. They most commonly affect the calf muscles but can also affect the foot and thighs. Leg cramps can affect anybody at any age, but as people become older, they become more common and often more severe. **Objective:** To study the prevalence and risk factors of nocturnal leg cramps in young adults in Punjab. **Methods:** This was an observational cross-sectional study; data were collected from cities of Punjab. 300 men and women of age 20 to 40 years were included who have nocturnal leg cramps. **Results:** The prevalence of nocturnal leg cramps was 47.3% according to this study. Nocturnal leg cramps are closely related to 3 to 4 hours of standing without changing body posture. **Conclusions:** Research demonstrates that teachers, workers, and medical professionals were more likely to experience nocturnal leg cramps. Prolonged standing and footwear were linked risk factors.

INTRODUCTION

Leg cramps are a typical condition in pregnancy, characterized by rapid, strong, painful, and involuntary spasms of the leg muscles. Leg cramps in pregnancy might arise as a result of various conditions (e.g., amyotrophic lateral sclerosis, hypothyroidism, restless legs syndrome) or medications (e.g., diuretics) or procedures (e.g., undergoing hemodialysis). Almost two-thirds of these women get leg cramps twice a week, which can happen anytime, especially at night [1]. Nocturnal leg cramps (NLC) are painful, involuntary muscle spasms of the lower limbs that occur during sleep or rest and are commonly accompanied by a palpable stiffness of a muscle or group of muscles [2]. The actual mechanism of leg cramps is unknown, however numerous myopathic, neurologic, and metabolic reasons have been hypothesized. The majority of occurrences of leg cramps are idiopathic. Electromyographic investigations indicate that leg cramps are caused by hyperactive, high-frequency involuntary neurotransmission in the lower motor neurons [3]. Risk factors include prolonged sitting, long periods of standing at work [4], Pregnancy, age, effort, exercise or physical activity, water-electrolyte imbalance, salt deficit, renal dialysis, and deep vein thrombosis [5]. Peripheral vascular disease, coronary artery disease, cirrhosis, parkinsonism and peripheral neuropathy, stenosis, and venous insufficiency are all medical disorders connected with Nocturnal Leg Cramps [3]. NLC was more frequent after 27 weeks of pregnancy and is treatable with dietary supplementation [6]. Medication-related leg cramps are most commonly related to intravenous iron sucrose, conjugated estrogens, raloxifene (Evista), naproxen (Naprosyn), and teriparatide (Forteo), clonazepam

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(Klonopin), citalopram (Celexa), celecoxib (Celebrex), gabapentin (Neurontin), and zolpidem (Ambien) [3]. It was observed that 30% of individuals experience NLC at least 5 times per month, with 6% experiencing it at least 15 times per month [7]. The diabetic population has an RLS prevalence of 8.1% [8]. According to Hensley JG, 30% of pregnant women experienced leg cramps, and 26% experienced restless leg syndrome [9]. RLS was discovered to be prevalent in 14% of Parkinson's disease patients [10], 24.2% of chronic renal disease patients [11], 25% to 35% of people with iron deficiency or anemia [12], and 5.2-53.7% in the case of peripheral neuropathy [13]. RLS was widespread in 68.1% of patients with lumbar radiculopathy who were refractory to conservative therapy before surgery but dropped to 24.2% following surgery [14]. According to the International Restless Leg Syndrome Study Group, all of the following criteria must be met for diagnosis [15]. The patient feels a need to move the lower extremities, which is usually accompanied by an uncomfortable and unpleasant sensation in the lower extremities. During periods of rest or inactivity, the urge to move the legs develops or intensifies, with or without unpleasant sensations. The urge to move the legs, with or without unpleasant feelings, develops or intensifies during times of rest or inactivity. The urge to move the legs and any unpleasant feelings accompanying it occurs exclusively in the evening or worse in the evening. The appearance of the aforementioned characteristics cannot be attributed exclusively to signs of a separate medical condition or behavior [15]. Treatment protocols include both pharmacological and non-pharmacological (physiotherapy) treatment. Pharmacological treatment includes Quinine, which is no longer recommended. In 2010, the U.S. Food and Drug Administration issued a warning about multiple drug interactions with quinine and stated that the potential for serious adverse effects outweighs the modest benefit of the drug [16]. No medicine can be suggested for routine therapy of leg cramps due to the low quality of evidence; however, carisoprodol (Soma), diltiazem, gabapentin, orphenadrine (Norflex), verapamil, and vitamin B12 complex may be considered in select individuals. Magnesium, multivitamins, and salt have shown mixed results, while the danger of hypertension with sodium supplementation should be considered. No evidence supports the use of nonsteroidal anti-inflammatory medications, potassium, or calcium regularly. Non-pharmacological treatment includes passive stretching, deep tissue massage [3], stretching [17], stretching before sleep [18], electrolyte replacement [19] and applying heat or cold [20], sensory nerve stimulation [21], Myofascial Release technique [22], mild activities like walking or riding a stationary bike for a few minutes before night and changing footwear [7]. The study's main purpose was to investigate the direct interaction relationship between the prevalence and risk factors of nocturnal leg cramps in young men and women. Furthermore, standing for extended periods at work may be a greater risk factor for nocturnal leg cramps than biological differences between men and women. Nonetheless, this illness is becoming prevalent among young people as well. If research showed that age-related variables were causing nocturnal leg cramps in the elderly, why was this ailment becoming more common among the young? A scientific issue has arisen in our minds: What was the precise cause of this increase in condition among young adults? What exact risk factors caused this disease in a specific cohort of 20-40-year-olds? So, we chose this issue because we wanted to learn about the specific reason why this was more frequent among young adults.

METHODS

The study design was Observational Cross-Sectional Study. The data were collected from cities in Punjab, Pakistan. The population includes working young adults between 20-40 years of population. The data were collected within three months. The sample size of our targeted population was calculated using the Raosoft Sample Size Calculator with the Total Urban population of Punjab, Pakistan was 40 million/ 40,000,000 [23], Margin of Error was taken as 4.75% with a confidence level of 90% and the response Distribution as 50%. It included 300 men and women of age 20 to 40 years. Non- probability Convenient Sampling was used. Data were collected through an Online Google-forms Based Questionnaire. Our inclusion criteria were Age 20 – 40 years, Both Males and Females, Long-standing for 2 – 8 hours, People having Leg Cramps. We excluded people of age < 20 years and > 40 years, any bone condition such as a bone fracture or any underlying nerve pathology, and any surgical treatment of other conditions of the lower limb. There were 16 variables in this procedure. Descriptive statistics are a type of descriptive coefficient that describes a data set; it might represent the full population or a subset of it. Descriptive statistics explain the essential characteristics of a study's data. They featured summaries of selection and metrics and rudimentary visual analysis. Percentage tables were plotted for the data to report the frequency of pain and prevalence of risk factors among participants.

RESULTS

Among 300 participants in our study, 145 (48.30%) were males, and 155 (51.70%) were females.

Table 1: Table showing Descriptive Statistics of Occupation

Statistics of Occupation	N (%)
Business Person	33(11)

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Doctors	56(18.67)
DVM	9(3)
Physiotherapist	70(23.33)
Salesman	10(3.33)
Students	13(4.33)
Teachers	74(24.67)
No Occupation	35(11.6)

Smoking History: The percentage of smoking among 300 participants in results showed 51% (n = 155) were non-smokers and 48.3 (n = 145) were smokers.

Prevalence of Cramps in young adults: The mean prevalence of Nocturnal Leg Cramps in young adults is 47.3% ranging from 59.15% (n = 84) among females and 41% (n=58) among males.

Prevalence of Cramps Associated with Exercise: The muscle cramps occurring at rest were not associated with exercise in the last 3 months among 300 participants. Data collected showed 52.7% (n = 158) experience muscle cramps after exercise while 47.3% (n = 142) experienced muscle cramps without exercise.

Table 2: Showing Gender Prevalence of Cramps in Different Locations

Cramp localization based on gender	Localization	Frequency (%)
Female	Thighs	15(10.6)
	Toes	10(7.04)
	Calf	29(20.4)
Male	Thighs	19(13.4)
	Toes	7(4.9)
	Calf	22(15.5)

Cramps association with Day or Night Time: 44% (n = 62) have cramps at night, 37% (n = 52) have cramps during the day timings and 20% (n = 28) have cramps both at night and day.

Total Time the Cramp Last: In our data, the percentage of how long cramps last among 142 participants, who experienced Cramps without exercise, 44% (n = 62) had cramps for minutes, 41% (n = 58) have cramps for a few seconds while only 15% (n = 21) have cramps for hours.

Association of Activity with Cramps: Among 142 participants, 31% (n=44) reported cramps while standing, only 4% (n=5) reported during exertion, 8% (n=11) reported post-exertion, 25% (n=35) reported due to cold, 15% (n=21) reported at rest and 15% (n=21) reported during sleep, 34% (n=48) had standing routine between 2 pm-7 pm, 31%(n=44) had between 9 am – 2 pm, 24% (n=34) had between 7 pm – 12 am and 11% (n=15) had a standing duration between 12 am – 5 am.

Cramps before or After Prolong Standing: Among 142, 37% (n=104) participants experience cramps after consecutive standing for 3 to 4 hours, and only 26% (n=37) experience cramps after standing for 1 hour.

Footwear and NLC: The percentage of types of shoes worn on the job among 142 participants. 23% (n=33) used to wear slippers, 24% (n=34) used to wear casuals, 26% (n=37) used to wear heels, 18% (n=26) used to wear joggers and only 10% (n=14) used to wear boots.

Association of NLC with Prolong Standing: Among 142 participants equally 32% (n=90) stand or do not stand usually while working and 36% (n=51) sometimes do standing work.

Total Time of Standing at Work of Participants: Percentage of hours per day you stand at your work among 142 participants included in this study. 42% (n=60) of the participants stand at work for 4 hours, 18% (n=26) stand for 3 – 6 hours and 22% (n=31) stand for 5 hours.

NLC in the Past 12 Months: The percentage of past 12 months cramps in your calf or feet at night more than once a month of 142 participants. majority 64% (n=90) sometimes have cramps once in the last 12 months while 22% (n=31) do not have any cramps and 14%(n=20) have cramps.

Pain intensity in Cramps: Percentage of how painful cramps have been among 142 participants included in this study. Mostly 44% (n=62) have unpredictable pain, 43% (n=61) have slight pain and only 13% (n=18) have very painful cramps.

Visual Analogue Scale value in NLC: Percentage of pain according to the visual analog scale among 142 participants included in this study. Mostly 35% (n=49) have a moderate pain rating, 32% (n=46) have a mild pain rating, 20%(n=28) have no pain and only 14%(n=20) have severe pain.

Things for Relief in Cramps: Percentage of what you do to get relief from your muscle cramps among 142 participants included in this study. The majority 39% (n=55) of the participants did nothing to get relief from muscle cramps, 23% (n=33) do some other home remedy, and 19% (n=27) either use prescribed or over-the-counter medication.

DISCUSSION

Nocturnal leg cramps are common and painful episodes of sustained muscle contractions in the calf or foot. These are discomforting muscle contractions predominant in patients with and without the disease. In 2015 Katzberg elaborated muscle cramps are discomforting contractions of muscle, and are predominant in patients with and without ailments [24]. It is studied that several risk factors are associated with an increased likelihood of experiencing nocturnal leg cramps including prolonged standing, duration of standing hours at work, types of shoes worn, localization of cramps in lower extremities, and pain intensity. Data about the prevalence of nocturnal leg cramps among the older population was present but there

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were not enough studies about the prevalence of NLC in the young population. So, the purpose of the current study was to find the prevalence of NLC among young adults ranging from 20 to 40 years. The prevalence of nocturnal leg cramps among adults has been reported in Allen and Kirby's study in 2012 to range from 51.70% among females and 43.30% among males [3]. In 2020, Asghar *et al.*, from Pakistan found 69.4% of females and 51.5% of males experienced cramps [25]. In the current study, the mean prevalence of NLC in young adults is 47.3% ranging from 59.15% (n=84) among females and 41% (n=58) among males. In 2017, a study reported prevalence of leg cramps was 24-25% reporting mild and 6% reporting moderate-severe nocturnal leg cramps among the adult US population [7]. A study conducted in 2017 by Hallegraeff supported findings of nocturnal leg cramps was 24-25% had overwhelming discomfort, and 6% revealed moderate-extreme discomfort NLC [18]. In young adults, it is found that 44% (n=62) of participants experienced severe pain, 43% (n=61) experienced mild pain and 13% (n=18) experienced moderate to severe pain. Bah *et al.*, in the US 2012 reported 51.70% nocturnal leg cramps among female workers who stand for a longer duration while only 48.30% among male workers who stand for a long time [26]. Long periods of standing at work may be a greater risk factor for nocturnal leg cramps than biological variations between men and women [2]. In the present study among 142 affected participants, 32% (n=45) stand or 32% (n=45) do not stand while working and 36% (n=52) stand sometimes during work. In USA 2018, Gaia *et al.*, found 50-60% of cramps were reported after exercises in the last month [27]. In the last three months, this study proposed that 52.67% reported cramps with exercise while 47.3% reported cramps at rest. A study conducted in 2017 by Hallegraeff in the Netherlands revealed that Up to 33% of every 50-year-old were impacted by nighttime leg cramps [18]. Kim *et al.*, 2015 in Korea explored nighttime leg cramps among subjects 73% of the spasms happen in the evening time; 20% of patients report cramps during the day and night, and 7% had just daytime cramps [28]. In the present study, 44% (n=62) reported leg cramps at night, 37% (n=52) participants reported leg cramps at daytime, and 20% (n=28) participants reported leg cramps during both day and night. The present study reported the Duration of cramps mostly 44% (n=62) have cramps for minutes, 41% (n=58) have cramps for a few seconds, ds while only 15% (n=21) had cramps for hours. Similar findings were cited in literature 2016 by Caress et. al. in the USA where 12% experienced cramps for a few seconds but most 33% stated that the cramps lasted for 1 minute or more [29]. A study conducted by Bahk *et al.*, (2012) in the USA found women with non-heeled shoes (53.8%) had leg cramps and men with non-obeyed shoes (73.9%) among delayed standing laborers [26]. In the present study 23% (n=33) were used wore slippers, 24% (n=34) used to wear casuals, 26% (n=37) were used wore heels, 18% (n=26) used to wear joggers, and only 10% (n=14) used to wear boots. A study in 2015 by Young in China showed that 40% of participants have moderate pain during cramps [30]. In the current study 14% (n=20) participants have severe pain, while 35% (n=49) have moderate pain, 32% (n=44) are mild and only 20% (n=28) reported no pain according to the visual analog scale. In short, it is analyzed that nocturnal leg cramps are associated with several factors that make them more likely to occur and be more severe. The risk factors that may aggravate the occurrence of NLC among young adults are studied. It is found that standing for consecutively 3 to 4 hours is aggravating factor among 31% (n=44) participants. Only 4% (n=5) reported cramps during exertion, 8% (n=11) reported post-exertion cramps, 25% (n=35) reported cramps during the cold season, and 15% (n=21) reported cramps during sleep. The Duration of standing work from 2 pm-7 pm reported by participants up to 34% (n=48) from 9 am-2 pm is 31% (n=44), 24%(n=34) from 7 pm to 12 am, and only 11% (n=15) from 12 am-5 am. Rana *et al.*, investigated Differentiating Nocturnal Leg Cramps and Restless Leg Syndrome. He determined the site of pain, which was largely felt in the calf, foot, and hamstring, as well as its relationship to sleep disruption and stress [31]. According to the present study findings 15.5 % (n=22) males experience cramps in the calf region, while 36% (n=54) females experience cramps in the calf region. It studied which particular occupation is more prone to the occurrence of NLC among young adults and found that teachers experienced up to 24.7% of leg cramps which can be associated with the duration of their standing activity. The results indicate that there is a strong association between prolonged standing for more than 3-4 hours, type of occupation like teaching, shoes worn that are mostly heels, localization of pain which is more common in calf muscles, intensity and frequency of pain experiencing nocturnal leg cramps, particularly more prevalent among young women.

CONCLUSIONS

The prevalence of nocturnal leg cramps in young people aged 20 to 40 is estimated to be 47.3%. Prolonged standing, hours of standing during certain employment, and wearing heels are all risk factors.

Authors Contribution

Conceptualization: SA
Methodology: AK
Formal Analysis: MI, SM
Writing-review and editing: TI, SM, SA

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All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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