Clinical Research

Prevalence of calcaneal spur among foot and ankle patients at the Cape Coast Teaching Hospital, Ghana

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ABSTRACT

BACKGROUND A calcaneal spur is a bony protrusion that grows from the calcaneus. This study aimed to estimate the prevalence of calcaneal spurs and associated risk variables (age, gender, and type) in patients undergoing foot and ankle X-ray examinations at the Cape Coast Teaching Hospital.

METHODS A retrospective cross-sectional approach and non-probability purposive sampling were used to analyze radiographic reports. A total of 323 radiographic reports from patients undergoing ankle and foot X-ray examinations between July 2020 and July 2023 were selected from 1,690 radiographs and analyzed using Microsoft Excel 2019 and SPSS software version 26.0.

RESULTS The overall prevalence was 34.7% (112/323), with 112 cases indicating calcaneal spurs. Of the patients, 72 (64.3%) were females. Among the cases, 53 (47.3%) were plantar spurs, 40 (35.7%) were dorsal spurs, and 19 (17.0%) exhibited both types. The highest prevalence was found in the 51–60 age group, representing 30 (26.8%) cases. Age was found to have a significant association with calcaneal spur development (p = 0.044).

CONCLUSIONS Both plantar and dorsal calcaneal spurs were significantly associated with age, with the 51–60 age group at higher risk.

KEYWORDS calcaneal spur, patients, prevalence, X-ray

A calcaneal spur, also known as a heel spur, is a bony protrusion that grows from the calcaneus.[1,2] There are two types based on their location: dorsal calcaneal spurs on the back of the heel and plantar calcaneal spurs on the underside of the sole.[3] Plantar calcaneal spurs can be categorized as either simple, with triangular shapes and broad bases tapering to sharp points, well-defined trabecular structures, and smooth cortical margins, or irregular, which lack distinct edges and trabecular formations.[4] The genesis of this condition was first elucidated by a German physician, who observed osseous projections forming due to irritation, compression, and traction of the plantar fascia, a band of connective tissue, that leads to inflammation and results in spur formation.[5] Prolonged standing is also a contributing factor to spur development. Calcaneal spurs predominantly affect older adults, individuals with obesity, osteoarthritis, and those with heel pain.[6] Initial symptoms include heel pain and foot stiffness, particularly exacerbated during the first steps after walking or prolonged periods of standing. Subsequent symptoms include chronic inflammation of the plantar fascia (plantar fasciitis), extending to the calcaneal tuberosity. However, calcaneal spurs can be asymptomatic in some individuals.[7,8]

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Diagnosis primarily relies on comprehensive patient history, physical examination, and imaging studies, especially X-rays of the foot and ankle that visualize the calcaneal spur presence on lateral radiographs.[3,9] This ensures accurate diagnosis and severity assessment of the spurs. These insights are crucial for devising effective treatment plans,[9,10] from understanding and managing calcaneal spurs to empowering healthcare professionals to tailor treatment strategies based on diagnostic findings.

Calcaneal spur prevalence varies across populations, with heel spur syndrome being one of the most common painful foot conditions, representing approximately 15% of all foot disorders.[11] Research has primarily focused more on morphometry or the characterization of the condition itself.[10,12,13] However, research on assessing calcaneal spur prevalence and the incidence of heel discomforts later diagnosed as calcaneal spurs over the years is still limited in many African countries, including Ghana. Thus, this study aimed to estimate the prevalence and risk factors for calcaneal spurs among patients experiencing foot or heel discomfort at the Cape Coast Teaching Hospital, Ghana.

METHODS

In this cross-sectional study, we systematically selected standard lateral ankle and foot radiographs obtained between July 2020 and July 2023. A random sample of 323 radiographs, representing 19.1% of the 1,690 foot and ankle X-rays performed during this period, was determined using Slovin's formula and retrieved from the picture archiving and communication system (PACS) of the Department of Radiology, Cape Coast Teaching Hospital in the central region of Ghana. Patients aged 20–90 who underwent foot and ankle radiographic examinations were included as samples. They were grouped as 20–30, 31–40, 41–50, 51–60, 61–70, 71–80, and 81–90.

The selected radiographs were reviewed by a radiologist (PN) who issued the original reports during the data collection period. Data were collected using a Microsoft Excel 2019 spreadsheet (Microsoft Corp., USA), with patient names replaced by codes (e.g., patient 1 = P1) for anonymity. No ethnic backgrounds were documented. The Cape Coast Teaching Hospital is a referral center for the central and western regions of Ghana, catering to a diverse patient population. A population census conducted in 2021 by the Ghana statistical survey revealed that the Cape Coast Metropolitan area has a population of 189,925 people comprising various ethnic backgrounds.[14]

Ethical approval for this study was obtained from the institutional review boards of the University of Cape Coast and Cape Coast Teaching Hospital (IRB/C5/VOL.1/0445/2023). Data were analyzed using SPSS software version 26 (IBM Corp., USA) with frequency distribution and descriptive analyses. The occurrence of each type of spur within each age group was expressed as a percentage. A chi-square test was also used to assess the relationship between calcaneal spur and age, with significance set at $p = 0.05$.

RESULTS

Among the 323 cases we reviewed, 112 (34.7%) were diagnosed with calcaneal spurs. Table 1 summarizes the distribution of calcaneal spurs according to age, sex, and spur type. Females recorded the highest number of cases, regardless of the spur type (72 cases, 64.3%; $p = 0.579$). The 51–60 year age group had the highest number of cases (30 cases, 26.8%; $p = 0.044$). There was a consistent increase in dorsal spurs among patients aged 51–60, which gradually decreased in those over 60.

The highest number of cases were found in 51–60 age group. Females have a higher incidence of all spur types compared to males, with plantar spurs being the most common in both sexes (Table 1).

DISCUSSION

This study assessed the prevalence of calcaneal spurs in patients with foot or heel discomfort. A total of 323 ankle and foot radiographs from the hospital's PACS were reviewed to determine calcaneal spur rates and variations across different demographics. We found that more females with foot discomfort underwent ankle or foot radiographic examinations and were diagnosed with both dorsal and plantar spurs. These results indicate an increase in the incidence of all spur types among females compared with males. This aligns with a study by Kuyucu et al[15] who investigated the correlation between calcaneal spur length and clinical findings in 75 patients and reported a similarly sex-skewed cohort with 68% (n = 51) female and 32% (n = 24) male cases. Furthermore,

another study by Adanaş et al[9] examined the levels of 25-hydroxyvitamin D, parathyroid hormone, calcitonin, and lipid profiles in patients with calcaneal spurs. Their findings revealed that spur development is influenced by weight-related pressure with lipid and hormone changes, affecting calcium metabolism.[9] Thus, further investigation is required to determine whether this is actually a sex-associated condition.

However, our result was not significant as spurs can develop in both sexes, although certain factors may make them more common among females. Therefore, caution should be exercised while interpreting the association between spur formation and sex. Studies by Beytemür and Öncü[16] and Velagala et al[3] also reported no significant association between sex and spur development.

We found that calcaneal spur development is significantly associated with age. Spur formation increased notably from 20–30 years, peaked at 51–60 years, and then decreased steadily at >61–70 years. This result contrasts with a previous study that detected the highest spur cases among individuals over 70.[4] This trend suggests that older patients are more likely to develop calcaneal spurs, influenced by factors such as age-related degeneration, occupation, improper footwear, genetic predisposition, hormonal and mineral imbalances, gait abnormalities, and obesity.[17] Toumi et al[13] detected a high incidence of spurs in patients aged 40–79 years in their review of 1,080 radiographs from nine age cohorts ranging from 2 to 96 years, with an increased prevalence among females. Their study also noted a moderately positive correlation between the dorsal and plantar spurs in women aged <30, suggesting that spur formation can begin as early as 20.

A cross-sectional study in Pakistan revealed a 56% prevalence of calcaneal spurs among 141 participants working as teachers, suggesting that prolonged periods of standing may contribute to foot pain and spur development.[6] Furthermore, a study investigating the association between calcaneal spurs and hallux valgus found a higher prevalence among older women, although no significant link between spur formation and hallux valgus.[18] Their findings indicated that female sex and advanced age contribute to both spur development and hallux valgus.[18]

Given that calcaneal spurs are more common in individuals aged 51–60, healthcare providers should focus on the early screening and diagnosis of foot or heel pain in older patients, particularly those with age-related degenerative changes. Although sex was not a statistically significant factor, the higher incidence among women, particularly those aged 41–60 years, implies that healthcare providers should be attentive when diagnosing and treating female patients within this demographic. For older patients, treatment should address not only pain relief but also underlying degenerative issues such as gait abnormalities and joint deterioration. The integration of physical therapy with orthotics may improve mobility and long-term outcomes.

Healthcare providers should encourage patients to adopt preventive strategies, including weight management, proper footwear, and avoiding

Table 1. Distribution of types of calcaneal spur with gender and age

Characteristics	Dorsal spur, n (%) (N = 40)	Plantar spur, n (%) (N = 53)	Both dorsal and plantar spur, n (%) (N = 19)	Total, n (%)	*p*
Gender					0.579
Females	26 (65)	32 (60)	14 (74)	72 (64.3)	
Males	14 (35)	21 (40)	5 (26)	40 (35.7)	
Age (years)					**0.044**
20–30	1	1	0	2 (1.8)	
31–40	8	8	0	16 (14.3)	
41–50	9	11	6	26 (23.2)	
51–60	10	18	2	30 (26.8)	
61–70	9	9	3	21 (18.8)	
71–80	2	6	6	14 (12.5)	
81–90	1	0	2	3 (2.7)	

prolonged standing. This is important for those at higher risk owing to occupational factors or biomechanical stress. Routine assessment of vitamin D, calcium, and hormone levels is recommended for high-risk populations, particularly postmenopausal women. Adding nutritional counseling to patient care plans can reduce the risk of calcaneal spurs related to metabolic imbalances. Collaboration with public health bodies to promote awareness of calcaneal spurs is also important, including educating people about the symptoms, the value of proper footwear, and the benefits of early medical interventions for foot discomfort.

This study has some limitations. The lack of data on the ethnic backgrounds and socioeconomic status of patients at Cape Coast Teaching Hospital limits our ability to explore how factors such as ethnicity, occupation, or income might influence calcaneal spur development. This study used pre-existing radiographs in a retrospective, cross-sectional design, limiting access to detailed clinical information such as patients' medical histories. Therefore, it only offers a snapshot of the condition, preventing any analysis of how calcaneal spurs progress over time or their effects on long-term outcomes. The relatively small sample size may not fully reflect the broader population, limiting the applicability of our findings to other regions or healthcare settings in Ghana.

In conclusion, calcaneal spurs are common in females and older patients. Although sex was not significantly linked to calcaneal spur development, the higher prevalence among females might suggest that factors like hormonal alterations and footwear choices may contribute to their development. These insights emphasize the need for increased awareness, early diagnosis, and targeted interventions to manage and prevent calcaneal spurs.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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