

Original article

Characteristics of primary care consultations for musculoskeletal foot and ankle problems in the UK

Hylton B. Menz^{1,2}, Kelvin P. Jordan¹, Edward Roddy¹ and Peter R. Croft¹

Abstract

Objective. Foot and ankle problems are highly prevalent in the general population; however, little is known about the characteristics of those seeking medical assessment for these problems. The objective of this study was to explore the extent and types of musculoskeletal foot and ankle problems in primary care.

Methods. Consultation data related to musculoskeletal foot and ankle problems in 2006 were extracted from the Consultations in Primary Care Archive (CiPCA), which covers consultations in 12 general practices in North Staffordshire. Data were cross-tabulated by age and gender, and annual consultation prevalence per 10 000 registered persons was calculated.

Results. Of the 55 033 musculoskeletal consultations documented in CiPCA in 2006, 4500 (8%) related to foot and ankle problems. The most commonly documented Read term was 'foot pain' (1281 consultations; 28%), followed by 'ankle pain' [451 (10%)]. Most consultations [3538 (79%)] involved non-traumatic conditions. Females accounted for slightly more consultations than males (55 vs 45%), and the highest proportion of consultations involved people aged 45–64 years (36%). The number of consultations per patient ranged from 1 to 11. Annual consultation prevalence was 290 per 10 000 registered persons and increased with age, reaching a peak in the 65- to 74-year age group (411 per 10 000 registered persons).

Conclusion. Foot and ankle problems account for a substantial number of consultations in primary care, and most frequently involve non-traumatic conditions. Further research is required to evaluate the factors that influence consultation for foot problems and strategies that general practitioners use to manage these conditions.

Key words: Foot deformities, Osteoarthritis, Pain, Consultation.

Introduction

Foot problems are highly prevalent in the community. Population-based studies indicate that between 18 and 63% of people report pain, aching or stiffness in their feet [1–3], and a substantially higher proportion have clinically assessed foot conditions such as hallux valgus ('bunions'), corns and calluses and nail problems [1, 4]. Factors associated with foot problems include increased age [1, 5, 6], female gender [1, 7, 8], obesity [8–10] and

chronic diseases such as OA and diabetes [8, 10]. In older people, foot problems contribute to decreased ability to undertake activities of daily living, problems with balance and gait, and an increased risk of falls [11–14], and several studies have shown that foot problems have a significant detrimental impact on measures of health-related quality of life [9, 15].

A range of health care professionals contribute to the management of foot problems, including general practitioners (GPs), podiatrists, chiropodists, nurses, physiotherapists, orthopaedic surgeons, rheumatologists and orthotists [16]. Due to the differences in health care systems between countries, primary or first contact for an individual with foot problems could involve the GP (particularly in countries such as the UK and the Netherlands where GPs play a major 'gatekeeper' role), or allied health professionals, particularly podiatrists (as is commonly the case in Australia). While there has been some examination of consultation patterns for foot

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surgery [17, 18], relatively little is known about the characteristics of foot problems presenting to GPs. To the best of our knowledge, the only detailed assessments of primary care consultations for foot problems have been conducted in the Netherlands, one of which specifically focused on children [19, 20].

Primary care consultation for foot problems is an important area to explore for two main reasons. First, in the UK, the GP is usually the first point of contact with the health care system. More than 95% of people are registered with a general practice, so analysis of GP consultations can provide valuable insights into patterns of foot disorders in the community [21]. Secondly, there is evidence of considerable variation in the diagnosis and management of foot problems by GPs, and it has been suggested that the training of GPs in managing these conditions may not be adequate [22]. Therefore, understanding the prevalence of foot problems in primary care may assist in targeting educational activities to those conditions most commonly encountered in general practice, thereby potentially improving clinical outcomes.

We recently examined consultations for regional musculoskeletal problems in primary care and reported the annual consultation prevalence for foot and ankle problems to be 208 and 88 per 10 000 registered persons, respectively (Jordan *et al.*, submitted). The objective of this study was to explore in more detail the patterns of consultation for musculoskeletal foot and ankle problems in primary care. In doing so, our aim was to estimate the prevalence of specific foot and ankle problems presenting to GPs and how they are coded, and provide a basis upon which further investigation of consulting behaviour and management of foot problems in the community could be undertaken.

Methods

Consultations in Primary Care Archive

The Consultations in Primary Care Archive (CiPCA) is a database of consultations from 12 general practices in North Staffordshire that are part of the Keele GP Research Partnership. These practices undergo a cycle of assessment, feedback and training in the use of computerized morbidity coding [23]. Morbidity information from consultations is documented in CiPCA using Read codes and terms, a commonly used hierarchical coding system in UK primary care [24]. GPs are requested to enter at least one morbidity term for every contact. Although the use of diagnostic terms is encouraged, symptom terms may also be used until a diagnosis is reached. We have previously shown that 93% of GP contacts at these practices are given a morbidity term [23], and that musculoskeletal disease prevalence estimates from CiPCA are comparable with the national Royal College of General Practitioners Weekly Returns Service database [25]. For the analysis outlined in this article, all consultations documented in CiPCA for the 2006 calendar year were extracted. Ethics approval for CiPCA was given by the North Staffordshire Local Research Ethics

Committee. Patients are informed by a poster at their GP's practice and by leaflet that the practice is a Keele research practice and that their anonymized records (with identifiable information removed) may be used for research, and that they can opt out if they wish by informing the practice staff.

Categorization of consultations

Initially, all Read terms were allocated to a body region using a protocol described in detail elsewhere (Jordan *et al.*, submitted). Briefly, four GPs allocated relevant musculoskeletal Read terms under Chapters N (musculoskeletal and CTDs), R (symptoms, signs and ill-defined conditions), S (injury and poisoning) and 1 (history/symptoms) to the individual body regions. If no region could be allocated, the code was defined as unspecified. Unspecified problems tended to be codes where either no region was described in the associated Read term (e.g. arthralgia) or the problem covered more than one region (e.g. generalized OA). The defined regions were then grouped into four main body sectors: (i) head/neck, (ii) torso, (iii) upper limb and (iv) lower limb. The lower limb sector included consultations specified as foot, ankle, lower leg, knee, thigh, hip and pelvis.

Due to the large number of Read terms that could potentially be used to record foot and ankle problems, a hierarchical categorization was developed for the purpose of this analysis and was applied to group similar terms. The first level of the hierarchy was non-traumatic vs traumatic terms, the second was whether the region of the foot and ankle affected had been specified or not and the third was the region affected (ankle, heel, mid-foot, forefoot or toes). Read terms were designated as 'traumatic' if the condition specified was considered to be the result of acute trauma or injury, such as fractures and sprains; however, conditions that possibly result from chronic, repetitive overuse injury (such as plantar fasciitis and Achilles tendonitis) were allocated to the 'non-traumatic' category.

Statistical analysis

Descriptive analysis of the data was undertaken in three stages to provide an indication of the absolute numbers of consultations, rates of multiple consultation and consultation prevalence according to gender, age and type of consultation. First, the frequency of all consultations was cross-tabulated by gender, age group and Read term category. Although the distribution of consultations will clearly be influenced by the demographic structure of the consulting population, these 'absolute' numbers provide an indication of the caseload of musculoskeletal foot and ankle problems for GPs. Secondly, the proportion of multiple consultations was compared between genders and age groups. Thirdly, annual persons consulting prevalence rates were calculated per 10 000 registered persons, and cross-tabulated by gender and age group. To be counted as a prevalent case, patients had to have one or more recorded consultations in 2006.

Pearson's chi-square (χ^2) tests were applied to assess for differences in consultation type by age and gender. Differences in prevalence rates according to gender were also assessed through the use of negative binomial regression, adjusting for age group. The female to male prevalence rate ratio with 95% CI is reported. Analysis was performed using SPSS 15.0 for Windows (SPSS, Chicago, IL, USA) and STATA version 10.0 for Windows (STATA, College Station, TX, USA).

Results

Total consultations

In 2006, a total of 55 033 musculoskeletal consultations were documented in CiPCA from 100 758 registered patients. Of these, 4500 (8%) related to foot and ankle problems involving 2924 patients, which were documented using 135 different Read terms. The hierarchical categorization of consultations is shown in Fig. 1. Most consultations [3538 (79%)] involved non-traumatic conditions. For non-trauma consultations where the region affected was specified by the Read term, the most commonly affected region was the ankle [721 (42%)], followed by the heel [605 (35%)]. For trauma-related consultations, the most commonly affected region was the ankle [506 (70%)], followed by the toes [150 (21%)]. The 10 most frequently documented Read terms for non-trauma and trauma consultations are shown in Table 1.

Of those consulting for foot and ankle problems, 35.2% also consulted on at least one occasion for a non-foot and ankle musculoskeletal problem in the same year. The percentage consulting by anatomical region was as follows: back (10.3%), knee (6.4%), hip (2.6%), upper limb (10.4%) and widespread (28.4%). A breakdown of these consultations by age is provided as supplementary file 1, available as supplementary data at *Rheumatology* Online.

Total consultations by gender, age group and trauma status

Total consultations according to gender and age group are shown in Fig. 2. Females accounted for slightly more consultations than males (55 vs 45%), and the highest proportion of consultations involved people aged 45–64 years (36%). Trauma status of the consultation was not influenced by gender ($\chi^2=1.95$, $df=1$, $P=0.16$). However, the trauma status of the consultation was significantly influenced by age ($\chi^2=252.0$, $df=5$, $P<0.01$). Non-trauma consultations peaked in the 45- to 64-year age group (38%), whereas trauma consultations peaked in the 25- to 44-year age group (34.5%).

Multiple consultations

Most patients consulting for a foot or ankle problem [1978 (67%)] recorded a single consultation, with the total number of consultations per patient ranging from 1 to 11. A similar proportion of males (34%) and females (31%) recorded multiple consultations ($\chi^2=2.7$, $df=1$, $P=0.10$).

Fig. 1 Hierarchical classification of all foot and ankle consultations according to trauma status and region affected.

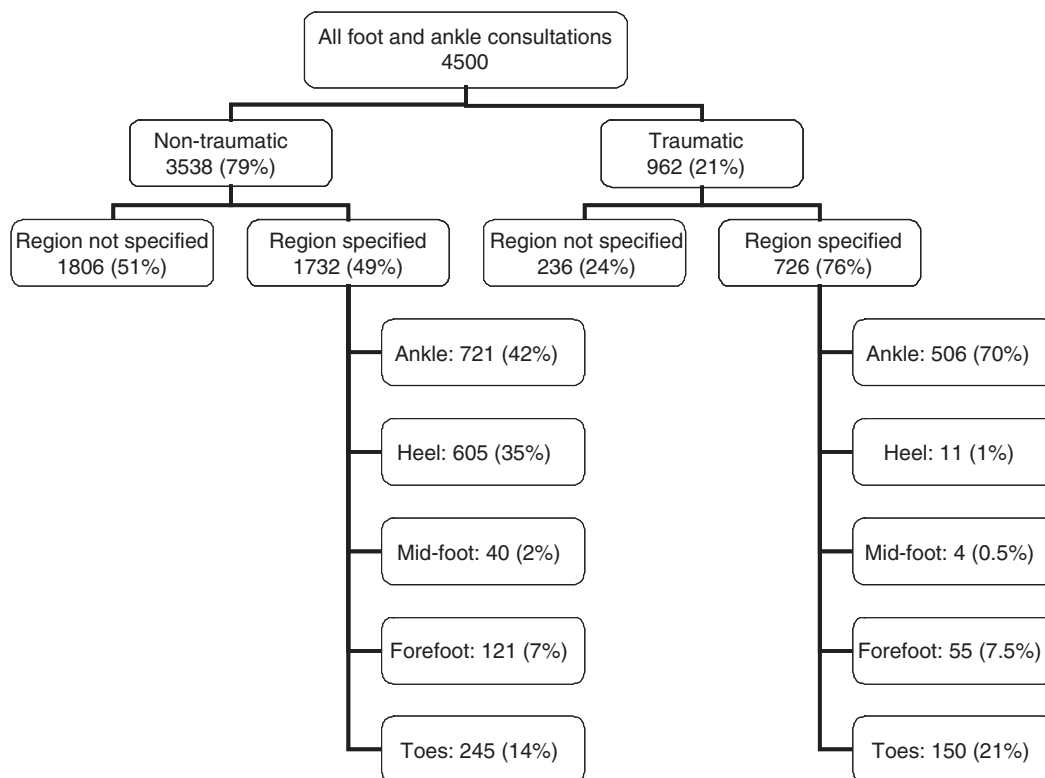
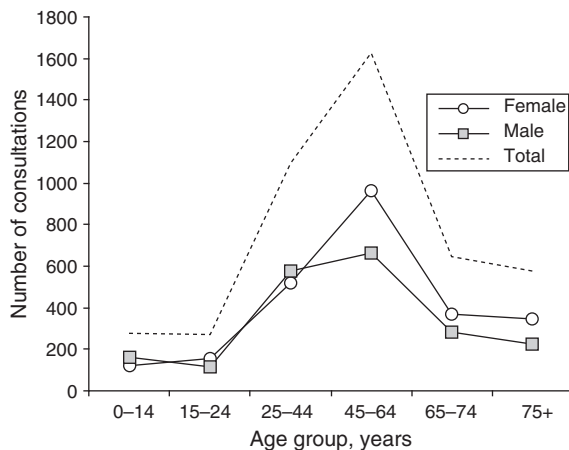


TABLE 1 The 10 most frequently documented Read terms for non-trauma and trauma foot and ankle consultations

Non-trauma		Trauma	
Read term	Consultations, <i>n</i> (%) ^a	Read term	Consultations, <i>n</i> (%) ^a
Foot pain	1281 (28.5)	Other ankle injury	191 (4.2)
Ankle pain	451 (10.0)	Other foot injury	187 (4.2)
Plantar fasciitis	339 (7.5)	Ankle sprain	114 (2.5)
Toe pain	299 (6.6)	Injury—toe	102 (2.3)
Heel pain	205 (4.6)	Ankle sprain NOS ^b	86 (1.9)
Achilles tendinitis	144 (3.2)	Fracture of metatarsal bone	29 (0.6)
Metatarsalgia NOS ^b	120 (2.7)	Fracture of ankle	24 (0.5)
Bunion	65 (1.4)	Toe fracture	23 (0.5)
Hallux valgus—acquired	49 (1.1)	Sprain ankle joint lateral	17 (0.4)
Arthralgia—ankle or foot	47 (1.0)	Injuries to the ankle and foot	14 (0.3)

^aAs percentage of all foot and ankle consultations; ^bnot otherwise specified.

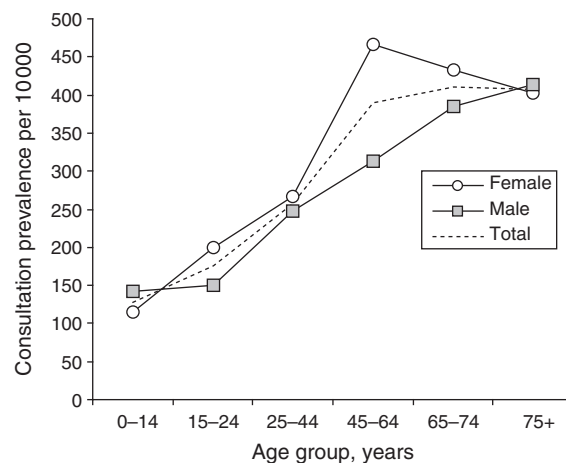
Fig. 2 Total number of foot and ankle consultations according to gender and age group.

However, age significantly influenced likelihood of multiple consultation ($\chi^2 = 28.2$, $df = 5$, $P < 0.01$), with those aged 45–64 years having the highest prevalence of multiple consultation (37%).

Annual consultation prevalence

Annual consultation prevalence for foot and ankle problems is shown in Fig. 3 (and is provided in tabular form as supplementary file 2, available as supplementary data at *Rheumatology* Online). Overall, the annual consultation prevalence was 290 per 10 000 registered persons. Annual consultation prevalence increased with age but was not significantly influenced by gender (female to male prevalence rate ratio 1.05; 95% CI 0.93, 1.19).

Figure 4 shows the annual consultation prevalence for males and females divided into non-trauma and trauma categories. Annual consultation prevalence for non-trauma consultations increased with age but did not significantly differ according to gender (female to

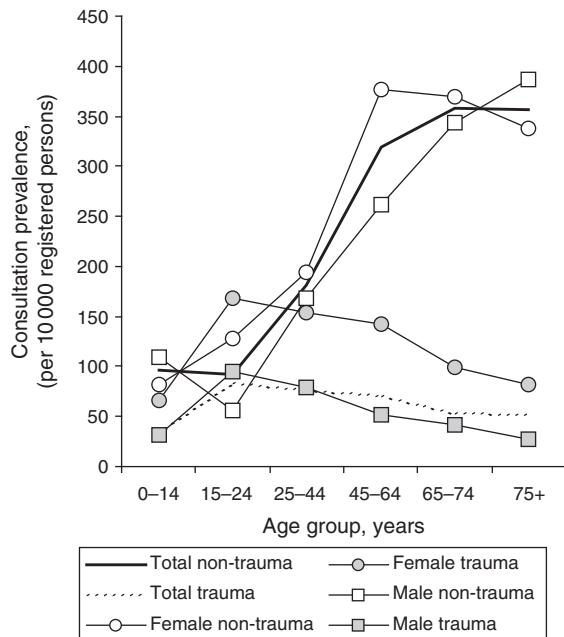
Fig. 3 Annual consultation prevalence for foot and ankle problems per 10 000 registered persons according to gender and age group.

male prevalence rate ratio 0.99; 95% CI 0.92, 1.07). Annual consultation prevalence for trauma consultations was not influenced by age, but was significantly higher in females compared with males (female to male prevalence rate ratio 1.89; 95% CI 1.62, 2.20).

Discussion

The objective of this study was to explore patterns of consultation for musculoskeletal foot and ankle problems in UK primary care. The findings indicate that the management of these problems accounts for a substantial proportion of the caseload of GPs (8% of all musculoskeletal consultations), and most frequently involves non-traumatic conditions in middle-aged women. When expressed relative to the number of patients registered, the annual consultation prevalence increased with age but was not affected by gender. These findings are

Fig. 4 Annual consultation prevalence for foot and ankle problems per 10 000 registered persons by gender and age group according to trauma status.



consistent with a similar study conducted in the Netherlands [19], which reported higher rates of primary care consultation for non-traumatic foot, toe and ankle symptoms in older age groups.

The annual consultation prevalence for musculoskeletal foot and ankle problems was 290 per 10 000 registered persons, which is again very similar to findings from the Netherlands (249 per 10 000 registered persons) [19]. Comparison of this figure with prevalence rates of foot problems from population-based studies is problematic due to differences in population characteristics and considerable variation in the case definitions used. However, given that the prevalence of foot problems in the general community has been estimated to be at least 18% [1–3], it is probably reasonable to conclude that only a minority of people with foot problems consult their GP about them—a phenomenon that has also been observed in relation to knee pain [26, 27].

A wide range of Read terms were used to document foot and ankle morbidity. However, despite being encouraged to use specific diagnostic terms where possible, the majority of consultations were categorized by GPs using the non-specific 'foot pain' and 'ankle pain' terms. There are several potential explanations for this. First, musculoskeletal foot and ankle problems often require further investigation (primarily diagnostic imaging) before a definitive diagnosis can be reached, and it is therefore possible that specific diagnoses were not yet available for many of the consultations recorded in the database. Secondly, as there are no standard methods of applying codes in general practice, the selection of Read terms varies between

clinicians and may be simply influenced by habit [21]. Thirdly, diagnosis and management of foot and ankle problems does not constitute a large component of undergraduate medical education [28], and there is some evidence that GPs may not be proficient at diagnosing common foot problems [22, 28]. A recent survey of junior hospital doctors indicated that the majority (64%) had never been taught to examine the foot, and only 13% felt competent doing so [28]. Similarly, a Dutch study of GPs involving clinical vignettes of common foot problems reported that only 58% correctly diagnosed all seven conditions [22]. Subsequently, the documentation of foot and ankle problems in general practice databases may be suboptimal.

Despite the fact that consultation data only provides information regarding the morbidity for which people seek treatment (and thus underestimates true prevalence [21]), the data reported here nevertheless provide useful insights into the patterns of foot and ankle morbidity in the community. Although the overall consultation prevalence was not significantly different between males and females, it was higher in women than men for the 45- to 64- and 65- to 74-year age categories. Gender differences in foot problems in older people have generally been attributed to the detrimental effects of female footwear [29], which is consistent with the markedly higher prevalence of conditions such as hallux valgus and toe deformity in older women [4, 30]. In addition, the prevalence of overweight and obesity peaks around this age and is higher in women [31], and there is some evidence that obesity may be a risk factor for foot pain [8–10]. The higher annual consultation prevalence of males aged <14 years may be due to a higher prevalence of conditions such as flat feet, heel pain, trauma and congenital deformities compared with females [18, 20].

Annual consultation prevalence increased with age up to the 65- to 74-year age group but plateaued thereafter. A similar pattern has been observed in population-based surveys [1, 5], and has previously been attributed to the confounding influence of physical activity. That is, the persistence of foot symptoms may require some degree of weight-bearing activity, so even older people with severely deformed feet may not develop symptoms if they are sedentary. Indeed, it has previously been reported that a large proportion of older people with hallux valgus do not report foot pain [4, 10]. However, it is also possible that older people, particularly older women, may consult other health care professionals such as podiatrists and chiropodists rather than their GP for the management of their foot problems. Previous studies have indicated that those accessing podiatry are significantly more likely to be older and female [32, 33]. In 2004–05 (the most recent years for which data are available), over 80 000 NHS consultations for podiatry/chiropody services were documented in the Staffordshire region, and relative to population, the highest proportion of these consultations involved those aged over 85 years [34].

Annual consultation prevalence also varied depending on whether the documented condition was traumatic or

non-traumatic. While the consultation prevalence of non-traumatic conditions increased markedly with age, the prevalence of trauma consultations remained relatively stable across age groups. Although this suggests that the prevalence of foot and ankle trauma does not substantially vary with age, it is likely that the specific types of trauma do vary according to age. The variable coding of trauma in the CiPCA database makes drawing solid conclusions somewhat difficult; however, previous studies indicate that sporting and occupational injuries of the foot and ankle are more common in younger people [35], while osteoporotic fractures associated with accidental falls are common in older people, particularly women [36]. It is worth noting, however, that some misclassification of traumatic vs non-traumatic conditions may have occurred, as GPs may have allocated Read terms such as 'ankle sprain' to non-traumatic causes of foot or ankle pain.

The consulting behaviour, referral patterns and adequacy of services for people with foot and ankle problems have not been examined in detail. In a population-based study in the Netherlands [37], 6 out of 10 older people with foot problems reported seeking treatment (mostly from their GP). In the Cheshire Foot Pain and Disability Survey in the UK [1], 36% of those with disabling foot pain reported receiving treatment (mostly from a podiatrist), and a recent study in Australia suggested that less than one in five people with foot pain had consulted a podiatrist in the past year [33]. Interestingly, there is some evidence that patients make a distinction between health care providers depending on the type of foot problem they have. The National Health Interview Survey in the USA indicated that while treatment of corns, calluses and nail disorders was almost exclusively performed by podiatrists, musculoskeletal foot conditions and acute trauma were more likely to be managed by physicians [6]. Due to differences in health care systems and scope of practice of the health care professions between countries, it is difficult to extrapolate these findings to the UK context. Nevertheless, it is possible that these factors may play a role in determining the patterns of consultation in primary care in the UK, and as such are worthy of further examination.

The findings of this study need to be interpreted in the context of several inherent limitations. First, although they provide a very useful source of information regarding patterns of morbidity, general practice consultation databases underestimate the true prevalence of disease in the community, as they only measure morbidity for which an individual seeks treatment [21]. Secondly, the diagnostic labels documented in CiPCA are likely to vary considerably between GPs. For example, a patient presenting with plantar heel pain could have their consultation documented using a vague symptom code such as 'foot pain', or a specific diagnostic code such as 'plantar fasciitis'. Similarly, arthritic conditions affecting the foot may be documented under a broader Read term such as 'arthralgia of multiple joints'. As such, the

prevalence of specific conditions is also likely to be underestimated, as many will be obscured by non-specific coding. Thirdly, although GPs can record more than one Read term per consultation, they generally do not, so patients presenting with other complaints in addition to a foot or ankle problem may not have their foot or ankle problem documented. As such, the approach we have used is likely to detect consultations where the foot or ankle problem is considered by the GP as the dominant reason for the consultation and recorded as such, thereby underestimating the true prevalence of all foot-related consultations. Finally, we focused on musculoskeletal foot and ankle problems for this analysis; however, it needs to be acknowledged that non-musculoskeletal foot conditions (such as nail problems, calluses and fungal infections) are also highly prevalent in the community [1, 38] and are likely to account for a substantial number of GP consultations.

In conclusion, this analysis has shown that a substantial number of consultations in primary care involve musculoskeletal foot and ankle problems. Further research is required to explore the consulting behaviour of people with foot problems and the strategies GPs use to manage these conditions.

Rheumatology key messages

- Musculoskeletal foot and ankle problems are commonly seen in primary care.
- Most musculoskeletal foot and ankle consultations in primary care are non-traumatic.
- Annual consultation prevalence is highest in those aged 65–74 years.

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Supplementary data

Supplementary data are available at *Rheumatology Online*.

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