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The Knee

Epidemiology of hospitalised osteochondritis dissecans in young people: Incidence, geographical variation and trends over time in England from 2002 to 2010

Oisin J.F. Keenan [a,*], Philip G. Turner [a], David Yeates [b], Michael J. Goldacre [b]

[a] Stockport NHS Foundation Trust, Stockport SK2 7JE, United Kingdom
[b] Unit of Health-Care Epidemiology, Oxford University, Oxford OX3 7LF, United Kingdom

ABSTRACT

Background: Osteochondritis dissecans (OCD) is an important cause of knee pain in physically active adolescents, but its aetiology remains controversial. Modern data on its epidemiology are lacking. The aim of this study was to analyse the hospitalised incidence, age and sex distribution, trends over time and geographical variation in OCD in the whole of England.
Methods: Hospital episode statistics (HES) data were analysed for OCD over the period 2002/3 to 2010/11 for England. HES datasets were record-linked so that anyone with multiple admissions for OCD was counted once only.
Results: The annual incidence rate for hospitalised OCD was 1.58 (95% CI 1.51–1.64) cases per 100,000 population. The peak age at diagnosis was 15–19 years for both sexes, and boys were affected more commonly than girls in the ratio 2:1. The hospitalised incidence of OCD varied significantly across England by government office region, from 1.05 (0.91–1.20) in London to 1.89 (1.70–2.09) in the North West Region.
Conclusions: These data on the epidemiological features and trends over time in OCD provide new information about its basic epidemiological distribution. Its annual hospitalised incidence is about 1.6 cases per 100,000 population under 25 years, but varies significantly across England. These results have implications for planning rheumatology and orthopaedic services for both children and adults.

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1. Introduction

Osteochondritis dissecans (OCD) was first described by Paget in 1870 [1], though Konig was the first to use this term in 1887 [2]. This disease is a member in the osteochondrosis family of disorders, and is characterised by the separation of a subchondral bone segment from the articular surface of a joint [3]. OCD most commonly affects the knee (75% of cases), followed by the talus and elbow. The lateral aspect of the medial femoral condyle is most commonly involved, and the condition may be bilateral in up to 30–40% of young patients [4–9]. It is classified on the basis of skeletal maturity, where the physes are open in the juvenile form (JOCD) and closed in the adult form (AOCD). The aetiology of JOCD remains controversial, but may involve vascular disruption to the epiphysis in the growing child through repetitive microtrauma, particularly in physically active children [3,5].

Previous reports have suggested that the peak incidence of OCD of the knee occurs at around 15 years of age, with most patients diagnosed before 18 years, and boys affected more often than girls [6,10–12].

However, the most recent large-scale epidemiological study of this condition was published by Linden and colleagues in Sweden in 1976 [6], and contains important limitations in its methodology and wider applicability. Many factors suggest that the incidence and distribution of JOCD in developed countries may now differ from that reported in Sweden in the 1960s and 1970s. If repetitive microtrauma is important in the aetiology of this condition, then changes in the quantity and type of exercise taken by children would alter the incidence; high impact sports such as jogging and skiing would be particularly relevant. Increased prevalence of childhood obesity is also likely to affect the incidence of diseases of weight-bearing joints. In addition, it is difficult to infer the national incidence of a disorder from a study involving one orthopaedic department in one city. The incidence of this condition might be expected to differ in urban and rural populations, and diagnostic sensitivity and specificity are known to vary between clinicians [13,14]. Finally, modern imaging techniques such as magnetic resonance imaging (MRI) and arthroscopy are likely to have altered diagnostic rates; MRI has demonstrated a high accuracy in diagnosing OCD, and is considered the definitive investigation for its evaluation [13].

The aims of this study were to analyse the epidemiological features, trends over time and geographical variation for hospitalised OCD in England, using hospital episode statistics (HES) data.

* Corresponding author. Tel.: +44 1625584582; fax: +44 1625582847.
E-mail address: oisin-keenan@doctors.org.uk (O.J.F. Keenan).

2. Methods

The English national system of statistical abstracts of hospital admission records, Hospital Episode Statistics (HES), is similar to systems of hospital administrative data in other developed countries. The units of recording of patients' care in HES are 'finished consultant episodes' (FCEs). The FCE is the period of continuous care under one consultant's team and there may be more than one FCE per hospital admission. HES include information on all inpatient and day case admissions for NHS care in England. Data linkage in the HES dataset was used to distinguish between individual people in receipt of care and total numbers of episodes of care. Thus, with linkage, each person with OCD was counted once, regardless of the number of episodes they had.

HES datasets were analysed to identify counts of people with OCD as follows. The whole linked dataset was used, from 1999/2000 to 2010/11 (where, for example, 1999/2000 refers to the NHS financial year 1st April 1999 to 31st March 2000). For simplicity, we will denote each year by the start date (e.g. 2002/3 as 2002). In the first three years, 1999–2001, we identified everyone with an admission for OCD and excluded them from further analysis. The reason for this was to estimate incidence, i.e. each person's first-recorded admission, as best we could, without excluding too much data. Accordingly, we decided on a 3-year 'OCD-free' period. The substantive study was undertaken from 2002 to 2010 counting only 'new' cases. Some people may have had admissions for OCD prior to 1999, unknown to us, but we used this strategy to maximise the likelihood that we were identifying incident cases in reporting trends over time and age-specific incidence. The analysis was restricted to those aged under 25 years at the time of first recorded admission because the majority of cases occur in people under 25; and, given the restricted years of HES data, the older the patient the more likely it was that we were missing their admissions pre-1999 at a younger age.

English national HES were also analysed to produce a geographical profile of admissions with OCD by Government Office Region (GOR, nine in England), and at local authority level (350 in England), between 2002 and 2010. Each person was counted once only and those with more than one admission were assigned to the region of first admission. All rates, numerators and denominators were restricted to people aged under 25 years. Age-standardised rates were calculated using the indirect method of age standardisation, taking age- and sex-specific rates in the English population as the standard, in 5-year age groups, and applying them to the age- and sex-specific strata up to the age of 24 in each GOR. When sex- and age-specific rates are quoted, the denominators are the populations of England within the specific sex and age group.

The diagnostic code used to identify patients with OCD in the datasets was M93.2 (the code for the term "osteochondritis dissecans") in the International Classification of Diseases, 10th revision.

3. Results

There were a total of 2229 new cases of OCD between 2002 and 2010 (1540 in males, 689 in females). Expressed as rates, the annual incidence of patients admitted with a new diagnosis of OCD in England increased slightly from 1.4 people per 100,000 population in 2002 to 1.6 in 2010 (Fig. 1). The annual rate of admission episodes also increased, from 1.6 episodes per 100,000 population in 2002 to 2.0 in 2010. There has been a modest divergence between rates of "new incident" cases and all admissions, with the ratio increasing from 1.1 in 2002 to 1.3 in 2010, suggesting that patients with OCD were more likely in later than earlier years to be admitted to hospital more than once during the course of their disease.

Age and sex-specific incidence rates for 2002–10 are shown in Fig. 2. Rates were very low under 10 years of age. In both sexes, the incidence rate increased with age to peak in the 15–19 year group, at 4.1 people per 100,000 population for boys and at 1.9 for girls. The rate of new diagnoses then decreased in the 20–24 year group to 3.0 people per 100,000 population for boys and 1.1 for girls. The incidence rate was higher for boys than for girls in every age group. The ratio of male to female incidence increased with age from 1.3 in the 5–9 year group to 2.7 in the 20–24 year group.

Fig. 3 is a map of mean annual hospital admission rates with newly diagnosed OCD between 2002 and 2010 by Government Office Region. The average annual rate, in people under 25 years, was 1.58 (95% CI 1.51–1.64) for the period as a whole. The Region with the lowest incidence rate was London, with an annual rate of 1.05 (0.91–1.20) people, and the Region with the highest incidence rate was the North West at 1.89 (1.70–2.09). The other Regions fell within a narrow range from 1.50 (95% CI 1.32–1.71, Yorkshire and Humberside) to 1.79 (1.49–2.12, North East).

Fig. 4 is a map showing the distribution of OCD by local authority. Most local authority rates fell within a fairly narrow range but there were a few 'outliers'. Table 1 shows the areas with the highest rates.

4. Discussion

The annual hospitalised incidence of OCD in England, in people aged under 25, has been approximately 1.6 cases per 100,000 population over the past decade. Within the average, there appears to have been a slight increase over the period covered by the study of about 10%. We have documented the age and sex incidence with precision, using the whole population aged under 25 in England; OCD is very uncommon below the age of 10, but it rises quite sharply with increasing age to a peak in people aged 15–19, and with a substantial male excess.

The hospitalised incidence of OCD showed some variation between regions, with around a 2-fold difference in rates between London and the North West. However, most regions had rates within a fairly narrow band. It is possible that the difference between London and the North West reflects differences between them in clinical thresholds for using day case and inpatient care. However, given that the aetiology of JOCD is thought to involve vascular disruption to the epiphysis through repetitive microtrauma, particular in physically active children [3,5], it is possible that the lower incidence in London may be explained partly by children resident there having a more sedentary lifestyle. It would be interesting to perform more detailed epidemiological studies to investigate geographical differences and, perhaps in particular,
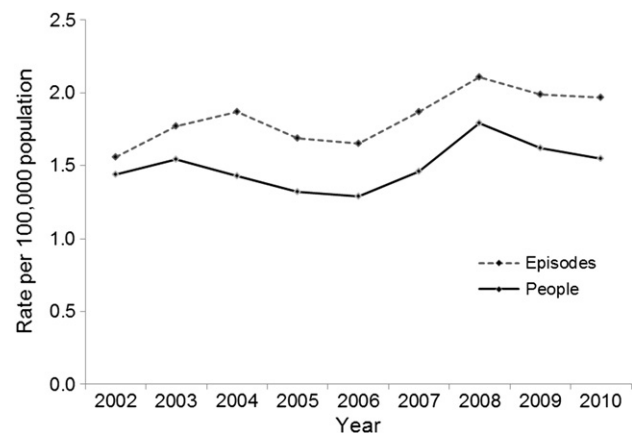
Table 1
Local authority areas with highest annual incidence rates per 100,000 population, together with 95% confidence intervals, in people aged under 25 years.

Local authority	Rate per 100,000	95% confidence interval	
Castle Morpeth	8.34	4.00	15.33
Wasnbeck	7.56	3.91	13.21
Alnwick	6.93	2.25	16.18
Shrewsbury & Atcham	6.36	3.63	10.33
Bolsover	5.25	2.52	9.65
Vale of White Horse	5.07	2.90	8.23
Three Rivers	4.21	1.92	7.98
Bassetlaw	4.16	2.15	7.27
Hastings	3.83	1.75	7.28
Lancaster	3.82	2.27	6.04

Fig. 1. Trends over time in annual incidence of OCD in England in people aged under 25 years.