

## The Prevalence and Factors Associated with Knee Pain in Great Britain's Olympians Aged 40 Years and Older

D. Cooper<sup>1,3</sup>, B. E. Scammell<sup>1,3</sup>, M. E. Batt<sup>2,3</sup>, D. Palmer-Green<sup>1,3</sup>,

<sup>1</sup>*Division of Rheumatology, Orthopaedics and Dermatology, School of Medicine, University of Nottingham*, <sup>2</sup> Nottingham University Hospitals NHS Trust, <sup>3</sup> Arthritis Research UK Centre for Sport, Exercise and Osteoarthritis

**Purpose:** Affecting approximately one in four adults over the age of 40 years in the UK, knee pain is the commonest presenting feature of osteoarthritis (OA). Despite the plethora of studies that have investigated the factors associated with the onset of knee pain in the sedentary population, relatively little is known about the prevalence and occupational factors associated with knee pain in an athletic sporting population. This study aimed to determine in Great Britain's (GB) Olympians, aged 40 years and older, (1) the individual factors associated with knee pain, and (2) the effects of occupational sporting activity on the prevalence of knee pain.

**Methods:** This was a cross-sectional study. A web-based and paper questionnaire was used to collect data on putative risk factors associated with knee pain. The most severe knee was selected as the index joint for data analysis. Knee pain was defined by recent pain reported in or around the knee on most days for at least one month. The Short Form-12 Health Survey was used to record physical and mental well-being. Widespread pain was reported on a manikin and defined by axial pain plus pain in at least two sections of each of two contralateral quadrants of the body. Fourteen covariates were identified for analysis, and those that were significantly associated with knee pain at the 25% level were purposefully fitted into a multivariable regression model. The final multivariable regression model was constructed by refitting, one at a time, the covariates that had previously been excluded until all of the covariates and interactions that were clinically relevant or significant at traditional levels  $p > 0.05$  were included. Relative risk (RR) was estimated using odds ratio (OR), and confounding factors were adjusted (aOR) using logistic regression. The Faculty of Medicine and Health Sciences Research Ethics Committee at the University of Nottingham approved the study.

**Results:** The questionnaire response rate was 32%, with 605 returns achieved from GB Olympians (40-97 years), between the 22<sup>nd</sup> May 2014 and the 31<sup>st</sup> January 2015. Questionnaires with missing data ( $n = 41$ ) were excluded from the data analysis. The prevalence of knee pain was 26% ( $n = 147/564$ ). Logistic regression analysis using eight predictors was able to classify correctly 78% of cases. The chi-square value for the Hosmer and Lemeshow Test indicated support for the fit of the multivariable regression model  $p > .05$ . The strongest factor associated with knee pain was a prior significant knee injury [aOR, 2.86; 95% CI 1.66, 4.94], early-life (20-29 years) varus knee alignment [aOR, 2.23; 95% CI 1.08, 4.64], competing in weight bearing loading sports [aOR, 1.85; 95% CI 1.16, 2.97] and widespread pain [aOR 1.74; 95% CI 1.08, 2.80]. The odds of GB Olympians reporting knee pain was significantly associated with a one-unit increase in body mass index (Kg/m<sup>2</sup>) [aOR, 1.09; 95% CI 1.03, 1.15] and a one-unit decrease in physical well-being [aOR 0.95; 95% CI 0.93, 0.97]. Mental well-being was not detected to be significant and was excluded from the model [OR 1.00; 95% CI 0.98, 1.02]. No association was detected between the sexes [aOR, 1.63; 95% CI 0.99, 2.66] and there was no association detected between knee pain and a one-unit increase in age [aOR, 1.01; 95% CI 0.99, 1.03].

**Conclusions:** Protection from knee injury and a healthy body mass index are important factors in reducing knee pain. Future research should determine what type of physical activity is capable of reducing knee pain in the general population.