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Brief report
Physician diagnosed arthritis, reported arthritis and radiological non-axial osteoarthritis

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Summary

Objective: To determine the question that best predicts radiographic evidence of non-axial osteoarthritis (OA).

Design: The Melbourne Women's Mid-life Health Project (MWMHP), commenced in 1991, is a population-based prospective study of 438 Australian-born. Two hundred and fifty-seven (57%) women remained in longitudinal assessment in 2002 and 224 (87%) women agreed to undergo X-rays of their hands and knees between 2002 and 2003.

Methods: Annually participants were asked about aches and stiff joints and arthritis or rheumatism. In the eleventh year of follow-up X-rays were scored for evidence of OA using a validated scale, by two investigators who were blinded to questionnaire results. Information on hormone therapy use, physical activity, mood, smoking, body mass index (BMI) and age were obtained by both self-administered and face-to-face questionnaires.

Results: Patient reported physician diagnosed arthritis was the best predictor of radiological OA (ROA). The question had a specificity of 64%, a positive predictive value of 57% and a negative predictive value of 71%. Even the most reliable question about arthritis still had a relatively low specificity for radiologically diagnosed OA. Reporting symptoms were significantly more common in participants who were depressed, those who had a higher negative affect and those with a higher BMI.

Conclusion: In large epidemiological studies where questionnaire assessment of OA is required, the greatest accuracy is achieved by asking about physician diagnosed arthritis. Concurrent application of a validated scale for mood is important.

Key words: Radiological, Osteoarthritis, Mood, Joint symptoms, Menopause, Weight, Physical activity.

Introduction

Osteoarthritis (OA) is the most common musculoskeletal disease[1]. The pain and limitation of function caused by the symptoms of OA affect many aspects of an individual's health and quality of life[2]. Its impact on functional ability imposes a significant burden on the community in the provision of support for those with arthritic disability[3]. The progression of joint degeneration varies considerably between individuals. Current treatment strategies target symptoms and prevention of disability. With no current curative therapy available, treatment at earlier stages of disease may be more effective. Therefore joint symptoms associated with OA are important to study as a possible indicator of early disease[4].

Large population-based studies are required to address these issues as well as for the planning of health services. In these studies, the current gold standard for classification of OA requires assessment of both symptoms and radiographic evidence of disease. However in large epidemiological studies the logistics and the cost of X-ray assessment may not be feasible, and expose study participants to radiation. X-ray measures are also associated with greater participant withdrawal and non-participation compared with simpler measures such as questionnaires. In addition, as investigators have used diverse criteria to determine the presence of symptoms, with a mixture of radiographic views and different definitions of

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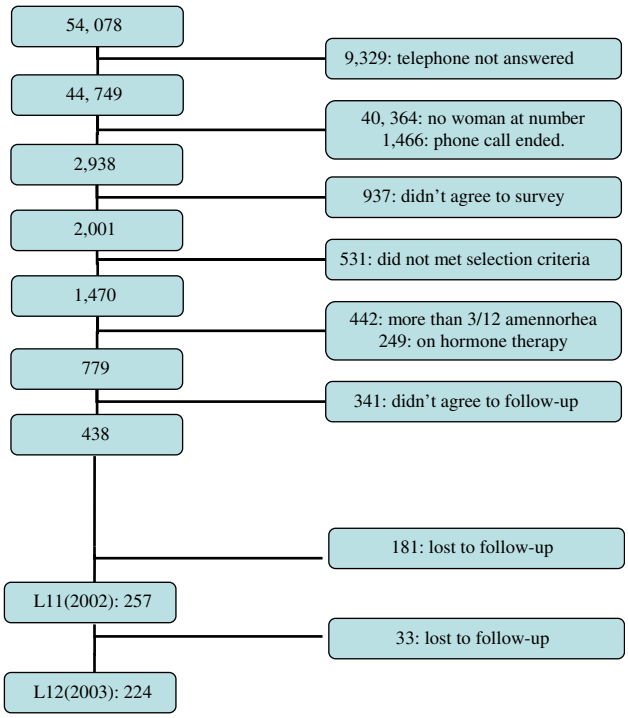

Fig. 1. MWMHP cohort – from baseline to current study.

knee OA, the prevalence of OA varies widely across studies[5]. There is a paucity of recent evidence regarding the prevalence and incidence of OA, with a publication this year based on data obtained between 1990 and 1994[6,7] demonstrating a significant lag time to publication. This highlights the need to revisit self-reported measures as a means to determine those with OA.

In addition to the requirement for a non-procedural diagnosis of OA in the research field, a validated questionnaire may provide important information for the clinical management of this disease. The earlier the diagnosis of disease, the more chance preventative measures can be employed to reduce the enormous burden of disability. A community-based questionnaire, if effective, would provide a better tool to identify those people who may benefit from preventive programmes and earlier treatment.

Previous literature has shown that joint symptom reports are poor predictors of radiological OA (ROA) as they may be caused by more than one pathology[8]. It has been well documented that ROA is not necessarily symptomatic. The American College of Rheumatology (ACR) criteria[9] have also been examined and whilst shown to identify severe OA they do not have the sensitivity required to identify most cases of disease[10,11]. The doubling of the number of cases identified when the criteria were expanded to include "any pain in the last month" indicate just how dependent such criteria are, highlighting the need to determine the best questions[11]. In this study we examined the sensitivity and specificity of a number of survey questions to detect subjects in the Melbourne Women's Mid-Life Health Project (MWMHP) with ROA.

The analysis accounts for important confounders of reporting, as outlined above, in addition to confounders for the presence of OA. The effect of increased weight associated with OA has been well documented[12–14] and obesity has been associated with disease progression[15]. Menopause has been implicated in the development of OA by several epidemiological studies[16]. Further support for an influence of menopause is the finding that women who have surgical menopause have significantly higher rates of clinical signs of knee OA and first carpo-metacarpal (first CMC) OA than control women without a hysterectomy and oophorectomy[17,18]. Furthermore, an inverse association between premenopausal status and patello-femoral (PF) OA has also been observed[19,20].

Methods

Participants for this study were recruited from the MWMHP which is a population-based prospective study of Australian-born women. Ethics approval was obtained from the Melbourne Health Research Directorate and the University of Melbourne. The study began in 1991 (baseline) with the use of random digit dialling to interview 2001 Australian-born women aged between 45 and 55 years and residing in Melbourne. The response rate was 71%. Seven hundred and seventy-nine of these women were eligible for longitudinal assessment (they had menses in the prior 3 months and were not taking oral contraceptives or hormone therapy)[21]. Of these 779 women, 438 (56%) were recruited for longitudinal assessment with 257 participants remaining in follow-up in 2001 and of these 224 (87%) had X-rays of their hands and knees (see Fig. 1).

Analysis was conducted on these 224 participants. All participants answered the questions on joint symptoms and disease from the annual MWMHP. The questions were "Do you have Arthritis or Rheumatism" (self-reported arthritis) and "Have you experienced Aches or Stiff joints" (self-reported aches). In addition a further questionnaire was designed with the use of a skeleton picture and asked two questions: (1) "Have you ever been told by a doctor that you have arthritis?" please colour in the circles over the joints where you have been told by a doctor that you have arthritis (physician diagnosed arthritis) and (2) "Do you have arthritis or rheumatism?" (self-perceived arthritis) "please colour in the circles over the joints where you have arthritis pain".

X-rays were taken of the knees both in a weight bearing antero-posterior view in full extension and in skyline view in 45° flexion using a perspex positioning wedge. Both knees were X-rayed in each participant. PF joint disease was based on the radiological findings on the skyline view. All radiographs were assessed independently by two trained observers who were blind to the subject details. Using a published atlas of individual features[22], the presence of definite osteophytes or narrowing were used to classify disease in the hands and knees. The radiological features of knee OA in both the tibio-femoral (TF) and PF joints were graded on a four-point scale (0–3) for individual features, which included osteophytes and joint space. Classification of hand OA including the distal interphalangeal (DIP), proximal interphalangeal (PIP) and first CMC joints of the thumb were based on a previously validated and similar four-point scoring system devised by Kallman *et al.*[22].

'OA' was defined as any hand or knee OA where hand or knee OA was defined as significant (score ≥ 2) osteophytes or joint space narrowing at any one of the joint compartments. Symptomatic OA was determined by those participants reporting aches and joint pains who had radiological evidence of OA as defined above.

The Centre for Epidemiologic Studies Depression Scale (CES-D, 10-item) was used to determine mood status in the eleventh year of follow-up. This

Table I
Demographics of the cohort at time of X-rays and questionnaire

Variable	Mean, range (SD) or *N* (%)
Age (years)	59.9, 55.9–66.8 (2.5)
Self-reported arthritis	83 (37.1%)
Self-reported aches	140 (62.5%)
Self-reported physician diagnosed arthritis	94 (48.7%)
Self-perceived arthritis	118 (63.7%)
Any OA	129 (58.6%)
Knee OA	49 (21.9%)
Hand OA	101 (45.1%)
Depression scale (CES-D)	6.6, 0–22 (4.1)
BMI (kg/m^2)	27.7, 17.5–56.1 (3.5)
Current smoker	17 (7.6%)
Drinker of alcohol	173 (77.2%)