

# Current osteoarthritis treatment, prescribing influences and barriers to implementation in primary care

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**Aim:** To explore general practitioners' (GPs) management of osteoarthritis (OA).

**Background:** OA represents a large burden on primary care. Little is known about GPs' current management of OA, especially influences on their prescribing quality care and the barriers they face while doing so. **Methods:** A total of 1006 GPs were randomly selected and invited to participate in an online survey on assessment and treatment of OA, on factors influencing their management, burden on their practice, and on the need for improving care. **Findings:** There were 232 respondents (23%). National Institute for Health and Clinical Excellence (NICE) guidance (65%) and professional experience (64%) were the biggest influences on OA management. When assessing patients, pain and mobility were most frequently assessed, with quality of life, independent living, sleep and depression addressed by over half of them. In all, 52% did not use educational materials; only a third of users rated their current educational material as good or very good. Treatments employed were largely in line with NICE recommendations. Prescription review was reported by a high proportion (74%). Achieving adequate pain control and lack of time were the most frequently cited challenges, whereas more time with patients, collaboration with specialist colleagues and improved communication tools were the most common needs identified to improve OA management. In summary, national guidelines are an important influence for GP treatment of OA. This survey has highlighted issues about the adequacy of information available for OA, about GPs' need for more time with OA patients and their interaction with specialist colleagues.

**Key words:** osteoarthritis; primary health care; professional practice

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## Introduction

Osteoarthritis (OA) is the most common chronic musculoskeletal condition worldwide and a leading

cause of chronic disability (Arthritis Care, OA Nations Survey, 2003; Murray and Lopez, 1997b), currently accounting for more than a third of chronic moderate-to-severe pain in the United Kingdom (Breivik *et al.*, 2006). Of the UK adult population, 10–15% is estimated to have OA, with the prevalence rising considerably in the older population. At least half of those over the

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age of 60 years have knee, hip and/or hand OA, whereas three of every four people over the age of 75 years have OA in at least one joint (Arden and Nevitt, 2006). Over the past 20 years the incidence of OA has increased two- to fourfold and, with the continual ageing of the UK population and the growing problem of obesity, it is expected to continue to rise in the years to come (Murray and Lopez, 1997a).

Aside from the considerable suffering to individuals in terms of poorly controlled pain, loss of function and markedly reduced quality of life, OA places an enormous burden on healthcare services (Arthritis Care, OA Nations Survey, 2003). OA is a chronic condition that may require periodic review over many years, with primary care acting as the major provider of both initial and continuing care for OA. It has been estimated that at least 20% of adults consult their general practitioner (GP) with a musculoskeletal problem over the course of a year, with the majority of these consultations attributed to OA (Jordan *et al.*, 2007). On average, one in every seven GP consultations is related to a musculoskeletal problem (Jordan *et al.*, 2007).

Efficient primary care management of OA is crucial to reduce or delay the use of limited and expensive specialised care resources, particularly in light of the growing prevalence of OA and the potential increasing burden on the healthcare service. To appropriately manage OA in both primary and secondary care, several evidence-based guidelines have been produced nationally (Conaghan *et al.*, 2008) and internationally (Jordan *et al.*, 2003; Zhang *et al.*, 2005; 2007; 2010), with some related to specific anatomical sites of OA. However, relatively little is known about current management of OA, use of available guidelines and barriers to optimal management of OA at the primary care level.

Therefore, the aims of this study were to survey randomly selected primary care practitioners to obtain data on current management strategies for OA and perceived barriers to providing optimal care.

## Methods

### Questionnaire development

After discussion with researchers experienced in primary care surveys, we decided on an electronic survey rather than a mail-out, largely because of the

immediacy of response. A 21-question survey was constructed to obtain relevant information from GPs on the following questions: how they assess and treat OA; the influences on their management; the burden on their practice; and their need for improving care. The questions were developed in an iterative manner by consultation between the authors and the electronic survey development team and piloted with a GP colleague. Questions offered a variety of relevant set responses, which were developed through a consultation process and with the option to provide additional/other information where appropriate (see Supplementary Appendix).

### Sample

GPs across the United Kingdom were randomly selected from the GP database held by Opinion Health and invited to take part in the online questionnaire. Only participants who selected either a GP or a GP with a special interest in musculoskeletal conditions (GPwSI) as their speciality were able to complete the survey. All respondents remained anonymous unless they chose to include contact details to receive a summary of results.

### Ethical review

According to the National Research Ethics Service definitions of research, this project is classified as a service evaluation and is therefore exempt from the need for ethical review.

### Data analysis

Descriptive statistics were used to present the data according to the questionnaire categories. In some categories, respondents had the opportunity to include more than one response; therefore, data could exceed 100%.

## Results

### Profile of respondents

A total of 1006 GPs were invited to participate, of whom 232 completed the survey (23%). There were slightly more number of male GPs than there were female GPs; the majority were aged between 35 and 54 years, and a small number were GPwSI (Table 1). Geographically, respondents were evenly

**Table 1** Characteristics of GPs completing the survey

| Characteristic             | Number (%) of respondents |
|----------------------------|---------------------------|
| Female                     | 93 (40)                   |
| Aged (years)               |                           |
| <35                        | 28 (12)                   |
| 35–44                      | 72 (31)                   |
| 45–54                      | 81 (35)                   |
| 55+                        | 51 (22)                   |
| Type                       |                           |
| GPs                        | 213 (92)                  |
| GPwSI (musculoskeletal)    | 19 (8)                    |
| Practice location          |                           |
| Mainly urban               | 200 (86)                  |
| Mainly rural               | 32 (14)                   |
| Strategic Health Authority |                           |
| London                     | 32 (14)                   |
| South Central              | 16 (7)                    |
| South East                 | 11 (5)                    |
| South West                 | 19 (8)                    |
| East of England            | 19 (8)                    |
| East Midlands              | 14 (6)                    |
| West Midlands              | 21 (9)                    |
| North East                 | 9 (4)                     |
| North West                 | 28 (12)                   |
| Yorkshire                  | 21 (9)                    |
| Scotland                   | 21 (9)                    |
| Northern Ireland           | 7 (3)                     |
| Wales                      | 14 (6)                    |
| Practice size              |                           |
| Single handed              | 7 (3)                     |
| 2–5                        | 107 (46)                  |
| 6–9                        | 93 (40)                   |
| 10+                        | 26 (11)                   |

GPwSI = GP with a special interest.

spread across the Strategic Health Authorities with the majority working in urban locations and in medium-sized group practices (Table 1).

### Patient assessment

OA represented the fourth most demanding condition in terms of practice time (ranked first by 23 respondents (10%)), with depression ( $n = 81$ , 35%), diabetes ( $n = 72$ , 31%) and hypertension ( $n = 39$ , 17%) being the most demanding conditions. Over 60% ( $n = 139$ ) of GPs reported that they were very confident at differentiating OA from rheumatoid arthritis when assessing a patient presenting with joint pain. In terms of OA management, the majority of respondents rated National Institute for Health and Clinical Excellence (NICE) and professional experience as their biggest influences,

**Table 2** Sources of information used to guide OA management in primary care

| Source of information used to guide OA management | Number (%) of respondents |
|---|---------------------------|
| NICE  | 151 (65)                  |
| Professional experience                           | 149 (64)                  |
| PCT guidelines                                    | 100 (43)                  |
| Arthritis Research UK                             | 72 (31)                   |
| Own practice guidelines                           | 63 (27)                   |
| Treatment pathways                                | 37 (16)                   |
| National Prescribing Centre                       | 30 (13)                   |
| No guidelines used                                | 19 (8)                    |
| NRAS  | 11 (5)                    |
| eMC   | 5 (2)                     |
| NeLM/UKMi   | 2 (1)                     |

OA = osteoarthritis; NICE = National Institute for Health and Clinical Excellence; PCT = Primary Care Trust; NRAS = National Rheumatoid Arthritis Society; eMC = Electronic Medicines Compendium; NeLM/UKMi = National Electronic Library for Medicines/UK Medicines Information.

**Table 3** Problems assessed by GP when patient presents with OA

| Construct  | Number (%) of respondents |
|--|---------------------------|
| Pain   | 230 (99)                  |
| Function/walking/mobility                        | 225 (97)                  |
| Quality of life                                  | 183 (79)                  |
| Effect on independent living                     | 167 (72)                  |
| Sleep quality                                    | 155 (67)                  |
| Depression                                       | 183 (49)                  |
| Effects on relationships with family and friends | 51 (22)                   |
| Effects on sexual relationships                  | 14 (6)                    |

OA = osteoarthritis.

followed by Primary Care Trust guidelines, Arthritis Research UK and own practice guidelines (Table 2).

When treating patients, pain and mobility were reported to be the most frequently assessed constructs, with quality of life, independent living and sleep quality addressed by over half of them (Table 3). Depression, the effect of OA on relationships with friends and family and the effects on sexual relationships were the least likely constructs to be assessed by GPs. The majority ( $n = 191$ , 82%) of GPs reported that they did not use any tools to evaluate pain in OA patients; the few that did use

tools ( $n = 41$ , 18%) most commonly used a numerical rating scale ( $n = 24$ , 58%) or general questioning about pain ( $n = 17$ , 42%). Approximately half of the GPs ( $n = 111$ , 48%) used educational materials with OA patients; however, only a third rated their current educational material as good or very good. The most commonly cited reasons for not providing adequate information or using educational material with patients were lack of time ( $n = 128$ , 55%), availability of material ( $n = 126$ , 54%) and quality of material ( $n = 67$ , 28%).

### OA management

In accordance with NICE guidelines, recommendation of exercise and/or prescription of paracetamol and topical Nonsteroidal Anti-inflammatory Drugs (NSAIDs) were the most commonly reported management strategies (Table 4), with diet, prescription of oral NSAIDs or COX-2s, referral to a physiotherapist and opioid prescription also commonly used. Referral to a specialist or for joint replacement surgery and recommendation of walking aids or braces were less common (Table 4). GI risk ( $n = 70$ , 30%), pain control ( $n = 51$ , 22%), severity of condition ( $n = 46$ , 20%) and CV risk ( $n = 46$ , 20%) were the main reported influences for prescribing NSAIDs. Pain and side effects were also the main focus for NSAID ( $n = 218$  (94%) and  $n = 223$  (96%), respectively) and opioid (both  $n = 223$  (96%)) prescription review, reported to be carried out by 74% ( $n = 172$ ) of GPs every two to six months. On average, GPs reported prescribing

gastroprotection, most commonly omeprazole, to 57% of patients treated with an NSAID.

### Barriers to OA management

Achieving adequate pain control was the most frequently cited challenge to OA management, followed by lack of time and getting patients to make lifestyle changes (Table 5). When asked what would enable GPs to manage OA patients more effectively, more time to see patients, collaboration with a specialist team, a need for improved tools to

**Table 4** Treatments recommended by GP to patients with OA

|   | Proportion of patients treatment recommended to (%) |
|---|---|
| Recommend exercise  | 69  |
| Prescribe paracetamol, topical NSAIDs/capsaicin             | 64  |
| Use educational material with patients                      | 48  |
| Recommend diet  | 37  |
| Prescribe oral NSAIDs or COX-2s                             | 35  |
| Co-prescribe gastroprotection with NSAIDs                   | 57  |
| Refer to a physiotherapist                                  | 31  |
| Prescribe opioids (oral and/or topical, including tramadol) | 19  |
| Referral to a consultant                                    | 15  |
| Recommend walking aids/braces                               | 12  |
| Joint replacement surgery                                   | 12  |
| Other   | 4   |

OA = osteoarthritis; NSAIDs = nonsteroidal anti-inflammatory drugs.

**Table 5** Most challenging aspects of OA management

|   | Number (%) of respondents |         |         |
|---|---------------------------|---------|---------|
|   | Rank 1                    | Rank 2  | Rank 3  |
| Achieving adequate pain control                                   | 77 (33)                   | 46 (20) | 37 (16) |
| Lack of time in consultations                                     | 58 (25)                   | 14 (6)  | 16 (7)  |
| Getting patients to make lifestyle changes/take exercise          | 44 (19)                   | 56 (24) | 49 (21) |
| Co-morbidities related to OA                                      | 14 (6)                    | 28 (12) | 25 (11) |
| Assessing severity of the problem                                 | 11 (5)                    | 16 (7)  | 11 (5)  |
| Side effects  | 11 (5)                    | 35 (15) | 17%     |
| Getting the diagnosis right                                       | 9 (4)                     | 9 (4)   | 9 (4)   |
| Patients not taking medication as directed                        | 5 (2)                     | 26 (11) | 28 (12) |
| Communicating risk management advice to patients                  | 0 (0)                     | 46 (20) | 9 (4)   |
| Providing patients with adequate information/educational material | 0 (0)                     | 2 (1)   | 7 (3)   |

OA = osteoarthritis.

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**Table 6** Strategies to improve OA management

|   | Number (%) of respondents |
|---|---------------------------|
| More time to see patients                       | 121 (52)                  |
| Collaboration with specialist team              | 102 (44)                  |
| Tools to aid patient communications around risk | 97 (42)                   |
| Accredited training course                      | 81 (35)                   |
| More staff/resources                            | 53 (23)                   |
| Not required, already managing effectively      | 35 (15)                   |
| Other   | 9 (4)                     |

OA = osteoarthritis.

aid patient communications around risk, accredited training courses for GPs and more staff and resources were commonly suggested solutions (Table 6). Only a small proportion of GPs felt that they were currently managing their OA patients effectively (Table 6).

## Discussion

Management of OA places considerable burden on primary care practitioners, with only depression, diabetes and hypertension found to be more demanding in terms of practice time. This is the first study to examine the influences on GP treatment of OA and their perceived barriers to optimal patient management. National guidelines were reportedly an important influence for GP treatment of OA, and our data suggest that most GPs employ at least some of the recommendations in their practice. This survey has highlighted a perception about the adequacy of the educational material available for OA and a need to improve both access to and quality of material used by GPs on patients. In particular, OA management within primary care would benefit from increased time for GPs to spend with OA patients, as well as improved interaction with specialist colleagues.

The fact that the majority of responding GPs reported being influenced by the NICE recommendations in their practice is an important finding of this study and underlines the value of this guidance in patient management. This view is also reflected in the data on the therapies used, with most GPs prescribing paracetamol, topical NSAIDs and exercise for their OA patients,

which are recommended early treatments in the NICE OA guidance (Conaghan *et al.*, 2008). Use of gastroprotection was modest (57%), although it appeared to be increased compared with recent reports (van Soest *et al.*, 2011) and may reflect the impact of NICE guidance. Importantly, there was a high rate of medication review, with 74% of GPs reporting medication reviews every two to six months, in line with NICE recommendations for periodic review.

Educational material was used by less than half of the GPs who responded. NICE has recommended provision of information as part of the core treatment of OA. It is possible that some of these GPs provided verbal information, but there is a concern about access to written information and its quality. Of note, and an area requiring further investigation, is the opinion of many GPs currently using educational material that it is not adequate. Nearly half of the GPs felt that improved tools to aid patient communication around risk would help with OA patient management. It is encouraging that there are a number of ongoing studies to develop new educational material for GPs to be used with people with OA, with a recent feasibility study of a hip and knee OA management booklet showing small improvements in illness, exercise and fear-avoidance beliefs and increased levels of physical activity in patients provided with the booklet compared with a control group not provided with the booklet (Williams *et al.*, 2011). However, the findings in our study suggest that mechanisms to encourage GPs to use such material and further studies to develop, improve and validate educational material should be explored.

The NICE guidelines recommend a holistic approach to OA assessment and management, considering the global needs of an individual and taking into account social and psychological factors that have an effect on their quality of life and the ability to carry out activities of daily living, employment-related activities, family commitments, relationships and hobbies (Conaghan *et al.*, 2008). In line with these recommendations, nearly all GPs reported the assessment of pain and function for patients presenting with OA, and the majority also reported to assess quality of life and effect on independent living. However, less than half assessed depression, and only 22% of GPs reported to assess the effect on relationships with family and friends. Anxiety and depression are

very common in OA patients and are associated with increased pain and disability (Axford *et al.*, 2010; Kim *et al.*, 2011) and increased risk of functional decline (Dunlop *et al.*, 2005; Mallen *et al.*, 2007). People with depression are also three times more likely to be noncompliant with medical treatment recommendations (DiMatteo *et al.*, 2000). The strong interrelationship between mental health, pain and disability underlines the importance of a multidisciplinary approach to the treatment of OA and suggests that assessment of anxiety and depression should form a core part of primary care management of OA.

Compared with data reported in 2004 from a GP survey on the use of conventional and complementary treatments for OA (Jordan *et al.*, 2004), the incidence of physiotherapy referral and paracetamol prescription in our survey is increased, whereas the incidence of NSAID prescription is reduced, as might be expected with changes in prescription following growing awareness of NSAID complications in the mid-2000s (Sun *et al.*, 2007). In contrast, a 2007 survey of adults aged 50 years or over suffering from knee pain found similar rates of patient-reported paracetamol prescription, recommendation for dieting and referral to a physiotherapist (Porchet *et al.*, 2007). However, in our survey, recommendation for exercise was much higher, probably reflecting government initiatives to encourage increased physical activity (Health Scotland, 2008; Department of Health, 2009; Foster *et al.*, 2009), whereas NSAID and opioid prescription and recommendation of walking aids were reduced.

It is particularly noteworthy that GPs indicated lack of time to spend with patients to be one of the main challenges to OA management and the factor that, if addressed, would make the biggest difference in terms of their ability to optimally care for people with OA. The issue of time also reportedly hampered the provision of information to patients. Lack of time is an issue that has frequently been highlighted by GPs in other UK and European-based studies as a reason for not practising evidence-based medicine (McColl *et al.*, 1998; Al-Ansary and Khoja, 2002) or health promotion (McKinlay *et al.*, 2005), as well as for not researching or implementing research findings (Robinson and Gould, 2000; Lionis *et al.*, 2004). The Royal College of General Practitioners 'Manifesto for Patient Care 2010' has also

highlighted this point, calling for an increase in the length of GP consultations to cope with the rising demand of the ageing population with their long-term and increasingly complex conditions (Manifesto for Patient Care, 2010). In addition, better collaboration with a specialist team was highlighted as a key need to improve primary care OA management.

### Strengths and limitations of the study

This study had certain limitations. Only 23% of those invited completed the online survey and this may have introduced bias. GP response to survey requests is acknowledged to vary widely and is often low. It is also known to be influenced by questionnaire length, insufficient background information, volume of requests and financial information (McAvoy and Kaner, 1996). However, the GP population in this study is broadly reflective of the UK GP population as a whole, with similar gender and age distribution and geographic spread (Health Policy and Economic Research Unit, 2009 UK Medical Workforce, 2010) and only a small proportion reporting a special interest in musculoskeletal conditions. Although the option of recording additional answers not covered by the set text was offered for most questions in the survey, the set answers offered may have influenced GP responses and thus the results of this survey. For example, the use of topical NSAIDs and capsaicin, which are recommended as therapeutic options in the NICE guidelines, were not offered as answers to the question regarding treatment options offered to patients, and therefore the relative use of these treatment modalities cannot be assessed.

This study used clinician self-report as a proxy for clinician behaviour. Although direct measurement of clinical practice may be considered the 'gold-standard' measure of performance, these measures are often intrusive, time-consuming and expensive and may introduce bias through positive promotion of desired behaviour in observed individuals. The use of proxy measures is therefore considered a useful means of determining behaviour in an effective and less expensive manner. Studies on clinical behaviour have used a number of proxy measures including clinician self-report (Salmon *et al.*, 2007), patient self-report (Steel *et al.*, 2008) and medical record review (Broadbent *et al.*, 2008); however, the evidence base for these measures is

still limited (Hrisos *et al.*, 2009). Further work to refine the findings of this study may therefore examine the potential for using a combination of proxy measures to obtain an all round picture of clinical behaviour.

### Implications for future research or clinical practice

With the continual ageing of the UK population, the existing massive social and economic burden of OA is set to grow considerably over the coming decades. Developing and delivering strategies to optimise management of OA at the primary care level is therefore essential. Although the use of national guidelines to guide OA management by the majority of responding GPs in this survey is promising, it is evident that further provision is needed to enable GPs to satisfactorily manage their OA patients and aid patients in managing their own condition. Recent trials of self-help material are encouraging, and further studies to develop and validate such material will benefit both GPs and patients. Adequate management of pain is still a concern for GPs. This may well reflect issues with existing analgesic therapies; most clinical trials report group-level or mean pain responses, whereas the response in individuals is quite variable (Moore *et al.*, 2010). The results of this survey also emphasise a need to revisit the duration of GP consultations or to develop novel methods of front-line clinician involvement in OA management, perhaps in line with management of other chronic conditions such as diabetes and cardiovascular disease, in which nurse-led management has proved effective (Woodward *et al.*, 2010; Berra *et al.*, 2011; Clark *et al.*, 2011; Wallymahmed *et al.*, 2011). It may be that such changes to practice might centre on patient self-management with intermittent multi-disciplinary intervention, with a focus on the global needs and psychological well-being of individuals. Improved links between primary care and specialist colleagues constitute a much needed focus for future health service research (Ham *et al.*, 2011).

### Additional information

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### Supplementary materials

For supplementary material referred to in this article, please visit <http://dx.doi.org/doi:10.1017/S1463423612000072>

### References

- 2003: Arthritis Care; OA Nations Survey. <http://www.arthritiscare.org.uk/@3235/Forhealthprofessionals/OANation>
- 2010a: Health Policy and Economic Research Unit. 2009 UK Medical Workforce. London: British Medical Association.
- 2010b: Leading the way high-quality care for all through general practice: a manifesto for patient care 2010. *Royal College of General Practitioners*. [http://www.rcgp.org.uk/pdf/1146-1510\\_Political\\_Manifesto\\_Web\\_key\\_documents.pdf](http://www.rcgp.org.uk/pdf/1146-1510_Political_Manifesto_Web_key_documents.pdf)
- Al-Ansary, L.A.** and **Khoja, T.A.** 2002: The place of evidence-based medicine among primary health care physicians in Riyadh region, Saudi Arabia. *Family Practice* 19, 537–42.
- Arden, N.** and **Nevitt, M.C.** 2006: Osteoarthritis: epidemiology. *Best Practice and Research Clinical Rheumatology* 20, 3–25.
- Axford, J., Butt, A., Heron, C., Hammond, J., Morgan, J., Alavi, A., Bolton, J.** and **Bland, M.** 2010: Prevalence of anxiety and depression in osteoarthritis: use of the hospital anxiety and depression scale as a screening tool. *Clinical Rheumatology* 29, 1277–83.
- Berra, K., Miller, N.H.** and **Jennings, C.** 2011: Nurse-based models for cardiovascular disease prevention: from research to clinical practice. *European Journal of Cardiovascular Nursing: Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology* 10 (Suppl 2), S42–50.
- Breivik, H., Collett, B., Ventafridda, V., Cohen, R.** and **Gallacher, D.** 2006: Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *European Journal of Pain* 10, 287–333.

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- Broadbent, J., Maisey, S., Holland, R. and Steel, N.** 2008: Recorded quality of primary care for osteoarthritis: an observational study. *The British journal of General Practice: the Journal of the Royal College of General Practitioners* 58, 839–43.
- Clark, C.E., Smith, L.F., Taylor, R.S. and Campbell, J.L.** 2011: Nurse-led interventions used to improve control of high blood pressure in people with diabetes: a systematic review and meta-analysis. *Diabetic Medicine: a Journal of the British Diabetic Association* 28, 250–61.
- Conaghan, P.G., Dickson, J. and Grant, R.L.** 2008: Care and management of osteoarthritis in adults: summary of NICE guidance. *British Medical Journal* 336, 502–503.
- Department of Health.** 2009: Be active, be healthy. A plan for getting the nation moving. [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_094358](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_094358)
- DiMatteo, M.R., Lepper, H.S. and Croghan, T.W.** 2000: Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Archives of Internal Medicine* 160, 2101–2107.
- Dunlop, D.D., Semanik, P., Song, J., Manheim, L.M., Shih, V. and Chang, R.W.** 2005: Risk factors for functional decline in older adults with arthritis. *Arthritis and Rheumatism* 52, 1274–82.
- Foster, J., Thompson, K., and Harkin, J.** 2009: Let's get moving, commissioning guidance. A new physical activity care pathway for the NHS. [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_105945](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_105945)
- Ham, C., Imison, C., Goodwin, N., Dixon, A. and South, P.** 2011: Where next for NHS reforms? The case for integrated care. *The Kings Fund*. [http://www.kingsfund.org.uk/publications/articles/nhs\\_pause\\_paper.html](http://www.kingsfund.org.uk/publications/articles/nhs_pause_paper.html)
- Health Scotland.** 2008. Energising lives. A guide to promoting physical activity in primary care. <http://www.healthscotland.com/documents/2759.aspx>
- Hrisos, S., Eccles, M.P., Francis, J.J., Dickinson, H.O., Kaner, E.F., Beyer, F. and Johnston, M.** 2009: Are there valid proxy measures of clinical behaviour? A systematic review. *Implementation Science: IS* 4, 37.
- Jordan, K., Clarke, A.M., Symmons, D.P., Fleming, D., Porcheret, M., Kadam, U.T. and Croft, P.** 2007: Measuring disease prevalence: a comparison of musculoskeletal disease using four general practice consultation databases. *British Journal of General Practice* 57, 7–14.
- Jordan, K.M., Arden, N.K., Doherty, M., Bannwarth, B., Bijlsma, J.W., Dieppe, P., Gunther, K., Hauselmann, H., Herrero-Beaumont, G., Kakkamanis, P., Lohmander, S., Leeb, B., Lequesne, M., Mazieres, B., Martin-Mola, E., Pavelka, K., Pendleton, A., Punzi, L., Serni, U., Swoboda, B., Verbruggen, G., Zimmerman-Gorska, I. and Dougados, M.** 2003: EULAR Recommendations 2003: an evidence based approach to the management of knee osteoarthritis: Report of a Task Force of the Standing Committee for International Clinical Studies Including Therapeutic Trials (ESCISIT). *Annals of the Rheumatic Diseases* 62, 1145–55.
- Jordan, K.M., Sawyer, S., Coakley, P., Smith, H.E., Cooper, C. and Arden, N.K.** 2004: The use of conventional and complementary treatments for knee osteoarthritis in the community. *Rheumatology (Oxford)* 43, 381–84.
- Kim, K.W., Han, J.W., Cho, H.J., Chang, C.B., Park, J.H., Lee, J.J., Lee, S.B., Seong, S.C. and Kim, T.K.** 2011: Association between comorbid depression and osteoarthritis symptom severity in patients with knee osteoarthritis. *The Journal of Bone and Joint Surgery, American Volume* 93, 556–63.
- Lionis, C., Stoffers, H.E., Hummers-Pradier, E., Griffiths, F., Rotar-Pavlic, D. and Rethans, J.J.** 2004: Setting priorities and identifying barriers for general practice research in Europe. Results from an EGPRW meeting. *Family Practice* 21, 587–93.
- Mallen, C.D., Peat, G., Thomas, E., Lacey, R. and Croft, P.** 2007: Predicting poor functional outcome in community-dwelling older adults with knee pain: prognostic value of generic indicators. *Annals of the Rheumatic Diseases* 66, 1456–61.
- McAvoy, B.R. and Kaner, E.F.** 1996: General practice postal surveys: a questionnaire too far? *British Medical Journal* 313, 732–33; discussion 733–34.
- McCull, A., Smith, H., White, P. and Field, J.** 1998: General practitioner's perceptions of the route to evidence based medicine: a questionnaire survey. *British Medical Journal* 316, 361–65.
- McKinlay, E., Plumridge, L., McBain, L., McLeod, D., Pullon, S. and Brown, S.** 2005: "What sort of health promotion are you talking about?": a discourse analysis of the talk of general practitioners. *Social Science & Medicine* 60, 1099–1106.
- Moore, R.A., Moore, O.A., Derry, S., Peloso, P.M., Gammaitoni, A.R. and Wang, H.** 2010: Responder analysis for pain relief and numbers needed to treat in a meta-analysis of etoricoxib osteoarthritis trials: bridging a gap between clinical trials and clinical practice. *Annals of the Rheumatic Diseases* 69, 374–79.
- Murray, C.J. and Lopez, A.D.** 1997a: Alternative projections of mortality and disability by cause 1990–2020: global burden of disease study. *Lancet* 349, 1498–504.
- Murray, C.J. and Lopez, A.D.** 1997b: Global mortality, disability, and the contribution of risk factors: global burden of disease study. *Lancet* 349, 1436–42.
- Porcheret, M., Jordan, K., Jinks, C. and Croft, P.** 2007: Primary care treatment of knee pain – a survey in older adults. *Rheumatology (Oxford)* 46, 1694–700.
- Robinson, G. and Gould, M.** 2000: What are the attitudes of general practitioners towards research? *The British Journal of General Practice: The Journal of the Royal College of General Practitioners* 50, 390–92.
- Salmon, P., Peters, S., Rogers, A., Gask, L., Clifford, R., Iredale, W., Dowrick, C. and Morriss, R.** 2007: Peering through the barriers in GPs' explanations for declining to participate in research: the role of professional autonomy and the economy of time. *Family Practice* 24, 269–75.

- Steel, N., Bachmann, M., Maisey, S., Shekelle, P., Breeze, E., Marmot, M. and Melzer, D.** 2008: Self reported receipt of care consistent with 32 quality indicators: national population survey of adults aged 50 or more in England. *British Medical Journal* 337, a957.
- Sun, S.X., Lee, K.Y., Bertram, C.T. and Goldstein, J.L.** 2007: Withdrawal of COX-2 selective inhibitors rofecoxib and valdecoxib: impact on NSAID and gastroprotective drug prescribing and utilization. *Current Medical Research and Opinion* 23, 1859–66.
- van Soest, E.M., Valkhoff, V.E., Mazzaglia, G., Schade, R., Molokhia, M., Goldstein, J.L., Hernandez-Diaz, S., Trifiro, G., Dieleman, J.P., Kuipers, E.J. and Sturkenboom, M.C.** 2011: Suboptimal gastroprotective coverage of NSAID use and the risk of upper gastrointestinal bleeding and ulcers: an observational study using three European databases. *Gut* 60, 1650–9.
- Wallymahmed, M.E., Morgan, C., Gill, G.V. and Macfarlane, I.A.** 2011: Nurse-led cardiovascular risk factor intervention leads to improvements in cardiovascular risk targets and glycaemic control in people with Type 1 diabetes when compared with routine diabetes clinic attendance. *Diabetic Medicine: a Journal of the British Diabetic Association* 28, 373–79.
- Williams, N.H., Amoakwa, E., Belcher, J., Edwards, R.T., Hassani, H., Hendry, M., Burton, K., Lewis, R., Hood, K., Jones, J., Bennett, P., Linck, P., Neal, R.D. and Wilkinson, C.** 2011: Activity Increase Despite Arthritis (AIDA): phase II randomised controlled trial of an active management booklet for hip and knee osteoarthritis in primary care. *The British Journal of General Practice: The Journal of the Royal College of General Practitioners* 61, 452–58.
- Woodward, A., Wallymahmed, M., Wilding, J.P. and Gill, G.V.** 2010: Nurse-led clinics for strict hypertension control are effective long term: a 7 year follow-up study. *Diabetic Medicine: a Journal of the British Diabetic Association* 27, 933–37.
- Zhang, W., Doherty, M., Arden, N., Bannwarth, B., Bijlsma, J., Gunther, K.P., Hauselmann, H.J., Herrero-Beaumont, G., Jordan, K., Kaklamanis, P., Leeb, B., Lequesne, M., Lohmander, S., Mazieres, B., Martin-Mola, E., Pavelka, K., Pendleton, A., Punzi, L., Swoboda, B., Varatojo, R., Verbruggen, G., Zimmermann-Gorska, I. and Dougados, M.** 2005: EULAR evidence based recommendations for the management of hip osteoarthritis: Report of a task force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCSIT). *Annals of the Rheumatic Diseases* 64, 669–81.
- Zhang, W., Doherty, M., Leeb, B.F., Alekseeva, L., Arden, N.K., Bijlsma, J.W., Dincer, F., Dziedzic, K., Hauselmann, H.J., Herrero-Beaumont, G., Kaklamanis, P., Lohmander, S., Maheu, E., Martin-Mola, E., Pavelka, K., Punzi, L., Reiter, S., Sautner, J., Smolen, J., Verbruggen, G. and Zimmermann-Gorska, I.** 2007: EULAR evidence based recommendations for the management of hand osteoarthritis: report of a Task Force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCSIT). *Annals of the Rheumatic Diseases* 66, 377–88.
- Zhang, W., Nuki, G., Moskowitz, R.W., Abramson, S., Altman, R.D., Arden, N.K., Bierma-Zeinstra, S., Brandt, K.D., Croft, P., Doherty, M., Dougados, M., Hochberg, M., Hunter, D.J., Kwoh, K., Lohmander, L.S. and Tugwell, P.** 2010: OARSI recommendations for the management of hip and knee osteoarthritis: part III: changes in evidence following systematic cumulative update of research published through January 2009. *Osteoarthritis Cartilage* 18, 476–99.