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Quality of care for OA: the effect of a point-of-care consultation recording template

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Abstract

Objective. The aims of this study were to determine the feasibility of introducing a computerized template for identifying quality of care during an OA consultation, describe quality of OA care in practices in which the template was introduced and assess the effect of the template on routinely recorded clinician behaviour in those practices.

Methods. A computerized template to assist the recording of care in consultations for patients with OA was installed in eight general practices. Eligible patients were those ⩾45 years of age consulting for clinical OA during a 6 month period. The main outcomes were frequency of template triggering, achievement of quality indicators during the consultation (assessment of pain and function, assessment for first-line analgesics, provision of information, exercise advice, consideration of physiotherapy referral, weight loss advice) and change in routinely recorded clinician behaviour (diagnostic coding, prescribing, referral, use of radiography, weight records) compared with the 12 months prior to template installation.

Results. The template was triggered for 1730 patients. Achievement of indicators ranged from 36% (for consideration of physiotherapy referral) to 63% (for pain assessment), with substantial variability between clinicians. There was an increase in prescription of recommended first-line analgesics following the template installation: paracetamol [odds ratio (OR) 1.49 (95% CI 1.22, 1.82) compared with pre-template] and topical NSAIDs [OR 1.95 (95% CI 1.61, 2.35)].

Conclusion. This new template is a feasible tool for capturing data during OA consultations to aid assessment of quality of care. It was associated with significant improvements in recommended care processes. However, strategies are needed to ensure consistent approaches between clinicians.

Trial registration. http://www.controlled-trials.com/ISRCTN06984617/mosaics.

Key words: osteoarthritis, primary care, quality indicator, reminder systems, medical record systems, computerized.

Introduction

OA is a leading cause of disability: the Global Burden of Disease 2010 ranked OA 11th in the global causes of years lived with disability [1]. A recent review of the UK's health performance concluded that 'interventions are available for musculoskeletal disorders, but to what extent the health system is delivering is unclear' [2]. Guidelines recommend a range of evidence-based treatment options for OA [3–8], and yet European and other surveys have demonstrated suboptimal management compared with guideline recommendations, including underuse of non-pharmacological measures, including exercise and weight loss, and suboptimal pharmacological management [9–13]. Most health care contacts for OA occur within primary care. In the UK, 4% of adults aged ⩾45 years consult for diagnosed OA each year, with the prevalence rising with age [14]. This equates to more than a million people in the UK consulting primary care for OA in a year, and 8.75 million people in the UK have sought treatment for OA [15]. Although there are no

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agreed benchmarks for performance, there is a recognized need to improve many aspects of primary care for OA [16].

Quality of care in general practice is generally assessed using process of care measures [17]. For OA, these could relate to patient assessment, investigation, information provision, pharmacological and non-pharmacological management and referral [18]. The indicators most feasibly implemented depend on prescribing data, which in the UK is generally electronically recorded and easily audited. There are difficulties with routine use of other potential indicators due to problems with identification of those receiving the care process (numerator) and those eligible for such care (denominator). For example, the need for and use of investigations and referral are not consistently well-captured by the primary care electronic record.

Computerized templates or point-of-care reminders have been shown to have small to moderate effects in improving the quality of consultations [19–22]. This may be due partly to better recording, but it has also been attributed to improved processes of care [19]. A trend has been identified toward greater effects for reminders that require an active response from the clinician [22]. Oliver [23] described a template for the multidisciplinary assessment of OA and RA, though there is a lack of evidence to describe the implementation and effect of computer templates in the management of OA.

The objectives of this study were, through a novel implementation of some of the principles of computerized templates, to determine the feasibility of introducing such a template for identification of quality of care during an OA consultation, describe quality of care for OA consultations in practices in which the template was introduced and assess the effect of the template on clinician behaviour, including pharmacological and some non-pharmacological aspects of management.

Methods

This study was in two parts. The first was an assessment of quality of care for OA in primary care using data collected through a new point-of-care consultation recording template over a 6 month period. The second was a before-and-after study using routinely recorded management actions as a means to estimate the effect of the template on the management of OA in primary care. The study was nested within a wider research programme [the Management of Osteoarthritis in Consultations (MOSAICS) study] designed to investigate effective ways to implement national guidelines for primary care treatment of OA [3].

The study was set in eight general practices with validated data quality in the West Midlands and North West of England that varied in the size of the patient population, clinical staffing, urbanization and local deprivation [24]. The practices received funding for additional costs of participation, dependent upon their expected consultation prevalence for OA but not upon study performance.

A computerized template to record management during an OA consultation for use in general practices was developed (supplementary Fig. S1, available at *Rheumatology* Online). The content of the template was determined from a systematic review of quality indicators for the primary care of OA [18]. The quality indicators related to aspects of OA management unlikely to be captured in medical records and reflected aspects of the UK National Institute of Health and Care Excellence (NICE) 2008 guidelines for the management of OA [3]. The indicators are shown in Table 1, together with predetermined response options and criteria for achievement. The template also facilitated the entry of weight measurements to calculate BMI. Clinicians could enter data contemporaneously throughout a consultation or complete the template at the consultation end. The clinician could record entries for all the template, for selected parts or bypass the entire template.

The template was triggered by entry of an OA code, or selected joint pain codes considered to represent a working diagnosis of OA, for patients $\geqslant$45 years of age consulting at the practice, by telephone or by home visit in the 6 months after template installation. In UK primary care, morbidities are entered using the Read system of coding. Our previous work demonstrated that clinicians use Read codes in >95% of all consultations [24]. Relevant joint pain codes from the Read hierarchy were determined by a panel of six general practitioners (GPs) with an interest in musculoskeletal conditions. The template was tested for practicality in two non-study practices prior to the study. Training was provided to all clinicians in the participating practices at the time of template installation (June–August 2011). This consisted of a meeting between an academic GP from the study team and the GPs and practice nurses in the study practices. Although the wider MOSAICS study context was explained to practices, this was a brief general overview only and there was no inclusion of OA management advice or training. In orientating clinicians to the template, there was an emphasis on routine OA management and on restricting use of the template to improve recording of aspects of that routine clinical practice that were considered relevant by the clinicians. It was made clear that clinicians could fill in only those aspects considered appropriate and that the whole template could be bypassed if not considered relevant for a particular patient. A paper copy of the slide presentation and supplementary explanatory DVD were provided for future reference and to facilitate a cascade of training to other team members if required. These supplementary materials were confined to explanation of the use of the template as a recording tool. Neither practices nor clinicians were provided with copies of the NICE OA management guidance, nor were these presented or otherwise reinforced. After 3 months of use, an interim analysis of template data was undertaken to ensure that the template was triggering as expected and that associated data were captured. Feedback sessions between the practices and investigators were held after the interim analysis, but no changes were made to the template. The frequency of template

TABLE 1 Quality indicators included in the template, response options and criteria for achievement

Quality indicator	Response options	Criterion achieved if recorded as	Criterion not achieved if
Pain assessment	None Mild Moderate Severe	None or mild or moderate or severe	No entry
Functional limitation assessment	None Mild Moderate Severe	None or mild or moderate or severe	No entry
Topical NSAID use	Tried full dose Offered full dose Patient declined full dose Not appropriate Unknown	Tried full dose or offered full dose or patient declined full dose or not appropriate	No entry or unknown
Paracetamol use	Tried full dose Offered full dose Patient declined full dose Not appropriate Unknown	Tried full dose or offered full dose or patient declined full dose or not appropriate	No entry or unknown
OA information given	Verbal and written Verbal only Not appropriate Not this time	Verbal and written or verbal only or not appropriate	No entry or not this time
Weight loss advice[a]	Verbal and written Verbal only Not appropriate Not this time	Verbal and written or verbal only or not appropriate	No entry or not this time
Exercise advice	Verbal and written Verbal only Not necessary Not appropriate Not this time	Verbal and written or verbal only or not necessary or not appropriate	No entry or not this time
Consideration of physiotherapy referral	Offered Not necessary Not appropriate Not this time	Offered or not necessary or not appropriate	No entry or not this time

[a]In those with a recorded BMI $\geqslant$25 in the previous 3 years.

triggering was used as an indicator of the feasibility of template use.

Data entered through the template during the 6 months after installation were used to assess achievement of quality indicators for the care of OA in all patients whose consultation triggered the OA template. We ascertained whether each indicator on the template had been achieved for a patient at any time during the 6 months. The weight advice indicator was only assessed in overweight patients (with a most recent BMI record in the previous 3 years of $\geqslant 25\,kg/m^2$). We identified the first (index) clinician to enter a relevant OA or joint pain code for each patient during the 6 month observation period.

Changes in clinician behaviour were assessed separately from the template-collected information. We used analysis of management actions, which are routinely recorded outside of the template (see below), enabling a before-and-after template installation comparison of management. Routinely recorded medical records data relating to management actions for OA were extracted for all eligible patients with an OA diagnosis code or selected joint pain code recorded in a consultation during three time periods: (i) 12 to 6 months prior to template installation (period 1), (ii) the 6 months prior to template installation (period 2) and (iii) the 6 months after template installation (period 3). This allowed clinician behaviour in period 3 (post-installation) to be compared with a period of equivalent length immediately pre-installation (period 2), and with the identical calendar period in the previous year (period 1).

Management actions for OA included weight records, prescription data, use of radiographs and referrals, all identified from the electronic medical records within 14 days of an OA or joint pain consultation. Prescriptions for paracetamol, topical NSAIDs, opioids and oral NSAIDs were identified. Prescription data were

independent of the template but the template contained a prompt to clinicians regarding paracetamol and topical NSAIDs. In those who were prescribed oral NSAIDs, we determined whether the patient had been prescribed a proton pump inhibitor. We identified records of weight or BMI, relevant referrals (rheumatology, orthopaedics, pain clinic, physiotherapy, occupational therapist, exercise or weight loss programme) and relevant X-rays (knee, hip, hand or foot). As the template could also prompt clinicians to consider physiotherapy referral, we assessed this separately and jointly with other referrals. If a patient consulted more than once for OA or joint pain during a period, they were counted in the denominator only once but were recorded as having received a management action (the numerator) if they had received it within 14 days of any eligible consultation.

Ethical approval has been granted for this study [North West 1 Research Ethics Committee (Cheshire), reference no. 10/H1017/76].

Statistical analysis

Stability in consultation prevalence of recorded OA and joint pain before and after template installation was assessed to ensure the template did not alter morbidity recording habits. The feasibility of using the template was assessed by whether it successfully fired on entry of a relevant code, how often an entry was made after it had fired and the extent of variability in completion between clinicians.

For each template indicator the percentage of patients with recorded achievement during the 6 month period after installation was determined along with its 95% CI, accounting for clustering by practice. We determined the percentage of patients with at least one indicator achieved and with all indicators achieved. For those with a record of being overweight, there were a maximum of eight indicators, otherwise there were seven (excluding weight loss advice). Achievement of indicators was stratified in two ways: (i) by whether the patient was consulting for a new episode (defined as no recorded consultation for OA or joint pain in the 12 months prior to template installation) and (ii) by whether the patient had been given an OA or a joint pain label. Associations between receiving an OA rather than a joint pain label and indicator achievement were assessed through multilevel logistic regression, accounting for clustering within clinician and adjusting for practice. Similar analysis assessed associations of a new episode with indicator achievement. The analysis was repeated for those patients with at least one recorded entry in the template, on the premise that any template entry implies that patients were more likely to be considered by the clinician as having OA.

The monthly percentage of consultations for OA and joint pain that had each management action recorded was plotted to assess trends over the 18 months. Then the percentage of patients with the recorded management action was compared between the three 6 month time periods. Multilevel logistic regression was used to take into account clustering of patients within clinician. Results are presented as ORs with 95% CIs, using period 1 as the reference category and adjusted for patient age, gender, multiple OA consultations in the same period, whether the patient received an OA or joint pain label and practice. All multilevel models were estimated using iterative generalized least squares with second-order penalized quasi-likelihood approximation. STATA version 12.1 (StataCorp, College Station, TX, USA), MLwiN version 2.26 (Centre for Multilevel Modelling Graduate School of Education, University of Bristol, Bristol, UK) and the STATA command runmlwin were used for the analyses [25, 26].

Results

In the 6 months after installation, the template fired for 1730 (93%) of the 1851 patients with a recorded OA or joint pain code. The template fired once for 1255 patients (73%) and twice for 325 patients (19%), up to a maximum of 10 times. A total of 86 clinical staff fired the template with a median of 14 patients each (range 1–82). The consultation prevalence rate for OA or joint pain for adults aged $\geqslant$45 years in the first 6 months after template installation was 549/10 000 (95% CI 525, 574) [27], similar to estimates derived from consultation data of 12 general practices contributing to our local Consultations in Primary Care Archive consultation database [24, 28] (projected rate 500/10 000) (supplementary Table S1, available at *Rheumatology* Online).

Of the 1730 patients, 1147 (66%) patients had at least one entry on the template, with 1146 [OR 66% (95% CI 54, 79)] having at least one indicator achieved and 352 (20%) having all indicators achieved (Table 2). However, this varied greatly by index clinician: for those triggering the template in >14 (median) patients, 26% achieved at least one indicator for >88% of their patients. However, another quarter failed to achieve any indicator for more than half of their patients. Pain (63%) and function (62%) assessment indicators were achieved most frequently and consideration of physiotherapy referral the least (36%). The only difference in achievement of individual indicators between new episode and ongoing consulters was for consideration of physiotherapy referral, where a higher percentage of ongoing consulters had evidence of achievement (40% *vs* 34%, $P = 0.001$). However, patients with an OA rather than a joint pain label had higher levels of recorded achievement across the indicators (all $P < 0.05$). Those with an OA label were also more likely to achieve all indicators (28% *vs* 17%, $P < 0.001$; Table 2).

When restricted to the 1147 patients with at least one template entry, indicator achievement ranged from 96% for pain assessment to 54% for consideration of physiotherapy referral (Table 3); OR 31% (95% CI 15, 46) of patients had achievement of all indicators. However, wide variation between clinicians remained. There were differences in achievement between those with an OA label and joint pain for four indicators and for achievement of all indicators (39% *vs* 26%, $P < 0.001$).

The 6 month consultation prevalence of OA and joint pain across the eight practices increased from

Table 2 Achievement of indicators in all patients for whom the template fired ($n = 1730$)

Indicator	Patients achieving indicator[a], *n*	Patients achieving indicator, % (95% CI)	Patients achieving indicator across clinicians[b], IQR (range), %	Patients with OA label achieving indicator ($n = 588$), *n* (%)	Patients with joint pain label achieving indicator ($n = 1142$), *n* (%)	Achievement of indicator (OA label *vs* joint pain label), OR[c] (95% CI)
Pain assessment	1097	63 (50, 77)	42–87 (0–100)	403 (69)	694 (61)	1.34 (1.02, 1.74)
Function assessment	1075	62 (50, 75)	50–85 (0–100)	392 (67)	683 (60)	1.30 (1.00, 1.69)
Topical NSAID use	835	48 (35,61)	25–73 (0–100)	313 (53)	522 (46)	1.45 (1.13, 1.88)
Paracetamol use	974	56 (43, 69)	38–79 (2–98)	368 (63)	606 (53)	1.50 (1.17, 1.92)
Information given	852	49 (33, 66)	33–76 (0–100)	339 (58)	513 (45)	1.62 (1.26, 2.09)
Exercise advice	867	50 (35, 65)	27–76 (2–100)	345 (59)	522 (46)	1.60 (1.25, 2.05)
Physiotherapy referral	618	36 (22, 50)	19–53 (0–88)	244 (41)	374 (33)	1.32 (1.03, 1.69)
Weight loss advice[d]	484	45 (27, 62)	20–64 (5–94)	200 (52)	284 (41)	1.38 (1.01, 1.90)
At least one indicator achieved	1146	66 (54, 79)	50–88 (5–100)	416 (71)	730 (64)	1.32 (1.01, 1.73)
All indicators achieved	352	20 (7, 33)	6–32 (0–78)	163 (28)	189 (17)	1.87 (1.38, 2.52)

[a]Number of patients with a record of indicator achievement; [b]in those clinicians with at least 14 patients; [c]adjusting for practice and accounting for clustering by clinician; [d]in those recorded as overweight: total, $n = 1085$; OA, $n = 386$; joint pain, $n = 699$. IQR: interquartile range; OR: odds ratio.

Table 3 Achievement of indicators in patients with at least one entry on the template ($n = 1147$)

Indicator	Patients achieving indicator[a], *n*	Patients achieving indicator, % (95% CI)	Patients achieving indicator across clinicians[b], IQR (range), %	Patients with OA achieving indicator ($n = 416$), *n* (%)	Patients with joint pain achieving indicator ($n = 731$), *n* (%)	Achievement of indicator (OA label *vs* joint pain label)[c], OR (95% CI)
Pain assessment	1097	96 (93, 99)	94–100 (0–100)	403 (97)	694 (95)	—
Function assessment	1075	94 (90, 98)	86–100 (0–100)	392 (94)	683 (93)	—
Topical NSAID use	835	73 (60, 86)	50–96 (0–100)	313 (75)	522 (71)	1.55 (1.05, 2.28)
Paracetamol use	974	85 (78, 92)	78–100 (43–100)	368 (88)	606 (83)	1.59 (1.09, 2.32)
Information given	852	74 (59, 89)	50–94 (0–100)	339 (81)	513 (70)	1.91 (1.32, 2.76)
Exercise advice	867	76 (63, 88)	57–91 (19–100)	345 (83)	522 (71)	1.80 (1.25, 2.57)
Physiotherapy referral	618	54 (40, 68)	33–64 (0–100)	244 (59)	374 (51)	1.30 (0.97, 1.73)
Weight loss advice[d]	484	64 (48, 80)	36–87 (8–100)	200 (70)	284 (60)	1.32 (0.89, 1.96)
All indicators achieved	352	31 (15, 46)	12–42 (0–100)	163 (39)	189 (26)	1.95 (1.41, 2.71)

[a]Number of patients with a record of indicator achievement; [b]in those clinicians with at least 14 patients; [c]adjusting for practice and accounting for clustering by clinician; [d]in those recorded as overweight: total, $n = 758$; OA, $n = 287$; joint pain, $n = 471$. IQR: interquartile range; OR: odds ratio.

TABLE 4 Number of people consulting for OA or joint pain per 10 000 people aged ⩾45 years in each 6 month period

Time period	OA prevalence per 10 000 (95% CI)	Joint pain prevalence per 10 000 (95% CI)	OA or joint pain prevalence per 10 000 (95% CI)
6–12 months before template introduced	174 (161, 189)	384 (363, 405)	522 (498, 547)
0–6 months before template introduced	192 (177, 207)	387 (366, 408)	542 (518, 568)
0–6 months after template introduced	182 (168, 197)	392 (371, 414)	549 (524, 574)
Change[a], %	5	2	5

[a]Percentage change in consultation prevalence from 6–12 months before template to 0–6 months after template introduction.

522/10 000 registered population to 549/10 000 from periods 1 to 3, but the majority of this increase occurred between periods 1 and 2 (before template installation) (Table 4). One practice increased prevalence by 33% between periods 1 and 3 and another by 18%. Four practices increased prevalence by ⩽2% (Appendix 2). Comparison between the three periods showed no change in the likelihood of recording an OA rather than a joint pain label after template installation [period 3 *vs* 1: OR 1.01 (95% CI 0.86, 1.18)], or in age or gender distribution of patients.

A total of 4412 people consulted for OA or joint pain during the three periods of the study and 3511 (80%) of these only consulted in one of the three periods. In the various periods, 90–94 clinicians at the eight practices saw a median of 12–14 patients (range 1–82) with OA or joint pain.

Fig. 1 shows monthly trends in routinely recorded management actions. The percentage of patients receiving each action did not change between periods 1 and 2. Between periods 2 and 3, i.e. before and after template installation, there was a significant change only in management actions, which were also subject to recording prompts in the template: OR 1.95 (95% CI 1.61, 2.35) for topical NSAID prescription; OR 1.49 (95% CI 1.22, 1.82) for paracetamol prescription; OR 3.38 (95% CI 2.73, 4.19) for a weight record (Table 5). The increase in topical NSAID and paracetamol prescribing led to a smaller increase in prescribing of any analgesic between periods 1 and 3 [OR 1.35 (95% CI 1.17, 1.57)]. However, there was no increase in physiotherapy referral rates, which was also prompted for consideration on the template.

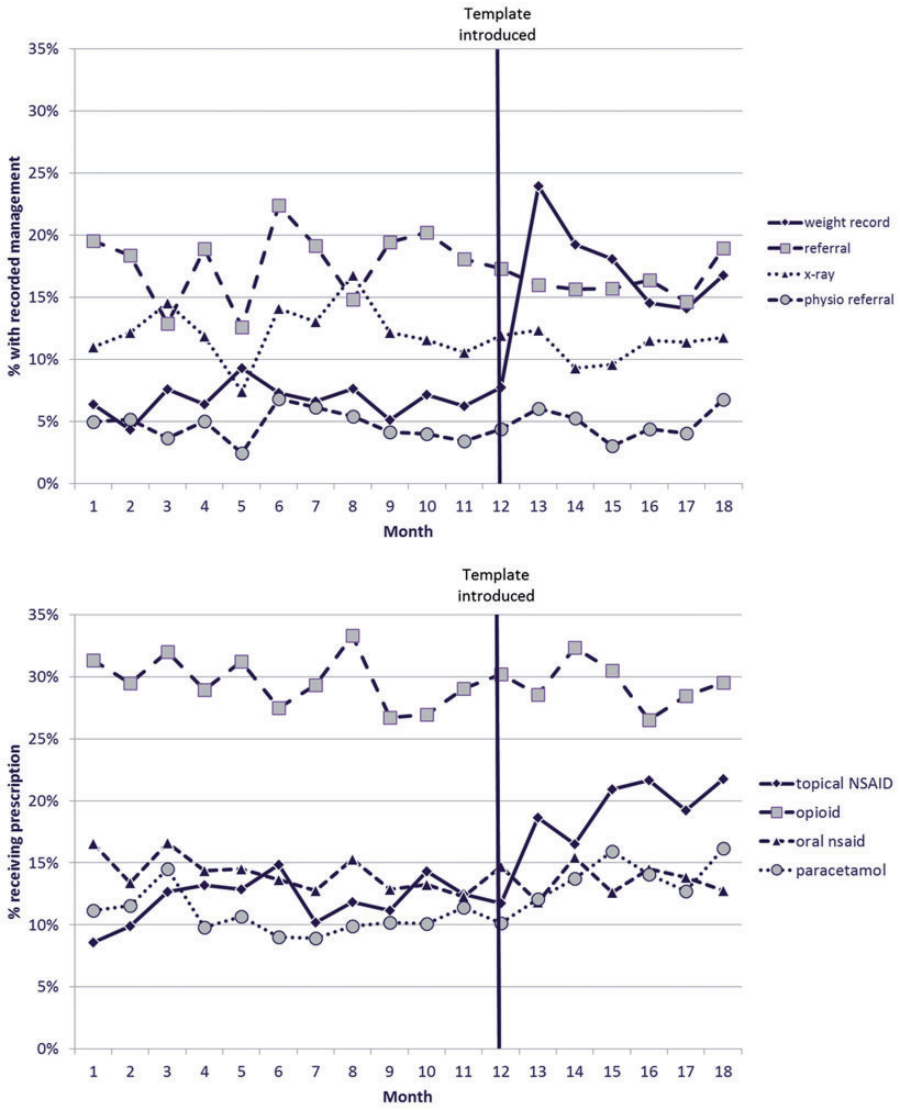
Discussion

Our study found that the principles of a computerized recording template for OA could feasibly be implemented. The general practice staff accepted the template as part of their routine work and the template triggered on 93% of expected occasions. Morbidity coding of OA and joint pain remained stable after the template was introduced, suggesting that clinicians were not avoiding the template through a change in coding behaviour. This was confirmed by the observation that the proportion of people recorded with an OA or joint pain code in the 6 months after template introduction was rather higher than expected. Although there was variation in the way clinicians completed the template, the best-performing clinicians achieved high rates of template completion and quality indicator achievement. The inclusion of prompts to consider the recommended first-line analgesics (topical NSAIDs and paracetamol) also led to an increase in their prescribing.

Despite variability between clinicians, this study has demonstrated greater levels of quality achievement using only electronically coded information than previous studies in UK general practice, which used both electronic and paper records. For example, achievement of pain (63%) and function (62%) assessment indicators compares favourably with rates of 27% and 43% in Broadbent *et al*. [29]. Assessment of indicators for first-line analgesics showed higher rates of achievement than previously reported: advice about first use of paracetamol was 56% in our study compared with 41% in Steel *et al*. and 48% by Broadbent *et al*. [29, 30].

Higher levels of quality achievement were shown when at least one item in the recording template was completed. It is feasible that some patients given a joint pain code were not considered by the recording clinician to have OA and hence the entire template was skipped. More than a quarter of patients given an OA label did not have any template entry. It is plausible that some of these would have achieved some indicator of quality of care, so the actual quality of care delivered may be slightly higher than the recorded level shown. The difference between the achievement rates of patients with an OA label and one of joint pain is partly explained by the joint pain codes' lack of specificity for OA. However, even in patients in whom a template entry had been made (and thus might be considered to have a working diagnosis of OA), the overall recorded quality of care for diagnosed OA was better than that for patients with a joint pain label. There may be a perceived difference in disease in patients with an OA label, or it may be that those clinicians more likely to make a formal diagnosis of OA are also more likely to adhere to guidelines. There may be an order effect, as pain and function assessment were the two most commonly completed entries as they were at the start of the template. Other indicators were less frequently

FIG. 1 Management occurring within 14 days of consultation for OA or joint pain by month.



achieved, with consideration of physiotherapy referral the least frequent.

The template, which reminded clinicians to consider recommended first-line pharmacological and non-pharmacological treatments, resulted in a modest increase in prescriptions of paracetamol and topical NSAIDs but not in physiotherapy referral rates. There was no effect on other interventions: prescription of opioids, oral NSAIDs, proton pump inhibitors, referrals in general or X-ray requests.

Prescriptions for paracetamol increased from 13% to 17% of patients and topical NSAIDs increased from 15% to 25%. The proportion of patients prescribed any analgesic increased after template installation. This increase is greater than might be expected from temporal trends alone [31]. None of the management actions increased in the 12 months prior to template installation, suggesting these changes were not due to temporal factors. Since questions relating to assessment or advice about paracetamol and topical NSAIDs are contained within the template, the template appears to have acted as a prompt for pharmacological management of OA. The heterogeneous nature of reminders, templates and decision support tools as interventions makes direct comparison with other studies unreliable, although these prescribing changes would be consistent with the effects reported in two systematic reviews of computer reminders [19, 22]. The management of several long-term conditions has been found to be improved through the use of reminders and templates, including assessment of cardiovascular disease risk [32]. Computer-guided consultations have also been found to improve aspects of chronic obstructive pulmonary disease management in primary care [33]. In diabetes care, computerized decision support was

TABLE 5 Characteristics of consulters for OA or joint pain and management actions within 14 days of consultation by period

	Period 1: 6–12 months before template	Period 2: 0–6 months before template	Period 3: 0–6 months after template	Period 2 *vs* period 1, OR[a] (95% CI)	Period 3 *vs* period 1, OR[a] (95% CI)
Consulters[b], *n*	1760	1829	1851		
Female, *n* (%)	1035 (59)	1131 (62)	1090 (59)		
Age, mean (S.D.), years	66.2 (11.79)	66.4 (11.79)	66.1 (11.90)		
OA diagnosis[c], *n* (%)	588 (33)	646 (35)	614 (33)	1.05 (0.90, 1.23)	1.01 (0.86, 1.18)
Prescriptions, *n* (%)					
Paracetamol	234 (13)	231 (13)	319 (17)	0.94 (0.76, 1.15)	1.49 (1.22, 1.82)*
Topical NSAID	270 (15)	275 (15)	461 (25)	0.96 (0.79, 1.17)	1.95 (1.61, 2.35)*
Opioids	573 (33)	600 (33)	588 (32)	1.02 (0.88, 1.18)	1.00 (0.86, 1.17)
Any analgesic prescription	977 (56)	1032 (56)	1129 (61)	1.04 (0.90, 1.20)	1.35 (1.17, 1.57)*
Oral NSAID	309 (18)	297 (16)	300 (16)	0.90 (0.75, 1.09)	0.90 (0.74, 1.09)
PPI[d]	102 (33)	108 (36)	101 (34)	1.23 (0.86, 1.77)	1.08 (0.75, 1.57)
Other management, *n* (%)					
Weight record	156 (9)	168 (9)	432 (23)	1.04 (0.82, 1.33)	3.38 (2.73, 4.19)*
Referral	401 (23)	417 (23)	372 (20)	1.01 (0.85, 1.19)	0.89 (0.75, 1,06)
Physiotherapy referral	110 (6)	105 (6)	125 (7)	0.90 (0.67, 1.21)	1.14 (0.86, 1.53)
Radiograph	282 (16)	310 (17)	272 (15)	1.09 (0.89, 1.34)	0.95 (0.77, 1.18)

[a]Adjusted for age, gender, coded OA or joint pain, more than one consultation for OA or joint pain during period and practice and accounting for clustering by clinician. Period 1 is the reference; [b]consultation for OA or joint pain in the period; [c]on the date of consultation; [d]in those prescribed oral NSAIDs during the same 14 day period. *$P < 0.05$. OR: odds ratio; PPI: proton pump inhibitor.

associated with improved processes of care, although patient outcomes only improved when performance feedback or case management was added to computerized decision support [34].

Increasing concern regarding the safety of paracetamol as a first-line analgesic option, coupled with long-standing concerns regarding oral NSAIDs and a wider need to reform OA management [16], means that there is a pressing requirement for strategies to improve primary care uptake of non-pharmacological management for OA. Our computerized template does not record a shift in practice towards greater use of these interventions, though the extent to which this is related to structural or process factors or lack of uptake by patients is not determined.

The diverse nature of the practices participating in the study, in terms of staffing, patient population size, urbanization and deprivation, suggests that the results should have a good level of generalizability to other UK practices. Furthermore, the participating practices, though research-active, were not selected for any particular characteristics beyond the capacity to participate in the study, and received reimbursement only to cover their additional costs associated with participation.

Our study had some limitations. The analyses did not account for repeated visits by patients in more than one period. However, we found that the majority of patients did not consult in more than one period. A sensitivity analysis further accounting for repeated visits led to convergence problems in the multilevel model, but suggested that the conclusions would not change. Prescriptions may not fall within the 14 day period used for analysis and not all X-rays and referrals are electronically recorded by practices. However, there is no reason to suspect this introduced bias in assessment of the template effect, as recording methods were unlikely to have changed during the study. When considering process of care measures, there are concerns about the extent to which improvements in care as recorded in the medical records reflect improvements in recording rather than the actual care delivered. Our study has shown significant increases in the actual prescription of some analgesic prescriptions.

We conclude that a relatively simple point-of-care on-screen recording template for OA can help address recording deficiencies in primary care. With wider uptake, such a template would be a useful basis for auditing core OA care. In addition, the template appears to prompt changes in selected aspects of clinician behaviour. Future research aimed at maximizing the benefit from this should focus on the variation in use between clinicians as well its contribution to improved patient-level outcomes.

Rheumatology key messages

- Computerized templates for OA are feasible in practice and help address recording deficiencies.
- OA recording templates are associated with an increase in the proportion of patients receiving first-line analgesics recommended by existing guidelines.
- There remains a need to improve non-pharmacological care for OA.

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Supplementary data

Supplementary data are available at *Rheumatology* Online.

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