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GP attitudes, beliefs and behaviours regarding exercise for chronic knee pain: a questionnaire survey

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3 1 **GP attitudes, beliefs and behaviours regarding exercise for chronic**
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5 2 **knee pain: a questionnaire survey**
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31 13 questionnaires, attitude
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3 17 **ABSTRACT**
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6 18 **Objectives:**
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9 19 The aim of this study was to investigate general practitioners' (GPs) attitudes, beliefs and
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11 20 behaviours regarding the use of exercise for patients with chronic knee pain (CKP)
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13 21 attributable to osteoarthritis.
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16 22 **Setting:**
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19 23 Primary care GPs in the UK.
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22 24 **Participants:**
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25 25 5000 GPs, randomly selected from Binley's database, were mailed a cross-sectional
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27 26 questionnaire survey.
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30 27 **Outcome measures:**
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33 28 GPs' attitudes and beliefs were investigated using attitude statements, and reported
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35 29 behaviours were identified using vignette-based questions. GPs were invited to report
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37 30 barriers experienced when initiating exercise with patients with CKP.
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40 31 **Results:**
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43 32 835 (17%) GPs responded. Overall, GPs were positive about general exercise for CKP. 729
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45 33 (87%) reported using exercise, of which, 538 (74%) reported that they would use both
46
47 34 general and local (lower limb) exercises. However, only 92 (11% of all responding) GPs
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49 35 reported initiating exercise in ways aligning with best-evidence recommendations. 815 (98%)
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51 36 GPs reported barriers in using exercise for patients with CKP, most commonly, insufficient
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53 37 time in consultations (n=419; 51%) and insufficient expertise (n=337; 41%).
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56 38 **Conclusions:**
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3 39 While GPs' attitudes and beliefs regarding exercise for CKP were generally positive,
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5 40 initiation of exercise was often poorly aligned with current recommendations, and barriers
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7 41 and uncertainties were reported. GPs' use of exercise may be improved by addressing the
8
9 42 key barriers of time and expertise, by developing a pragmatic approach that supports GPs to
10
11 43 initiate individualised exercise, and/or by other professionals taking on this role.
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17 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

- 19 • This large UK survey is the first known to directly, specifically and concurrently
20 investigate the attitudes, beliefs and behaviours of GPs regarding exercise for
21 patients with CKP. Exercise initiation did not concur with best-evidence
22 recommendations and GPs reported uncertainties and barriers in relation to
23 using exercise.
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25
- 26 • The use of a pre-tested vignette to investigate this topic ensured a consistent
27 patient scenario to all GPs and minimised the confounders inherent in
28 observational research using real patients.
29
- 30 • Limitations of this study include the likely over-estimation of exercise use among
31 GPs given the low response rate (response bias), the self-report nature of the
32 questionnaire (social desirability bias) and the relatively uncomplicated vignette
33 case. However, as GPs should be using exercise for all patients with CKP, the
34 results of this survey are valuable for indicating an apparent evidence-practice
35 gap in the way in which GPs employ exercise with this patient group.
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54 55 56 46 **ABBREVIATIONS**

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3 47 CI = confidence interval; CKP = chronic knee pain; EULAR = European League Against
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5 48 Rheumatism; GP = general practitioners; HCP = healthcare professional; MDS = minimum
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7 49 data set; NICE = National Institute for Health and Care Excellence; OA = osteoarthritis;
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9 50 OARSI = Osteoarthritis Research Society International; OR = odds ratio; UK = United
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52 INTRODUCTION

53 General practitioners (GPs) are the most frequently accessed source of formal medical
54 advice and treatment for patients in the UK with chronic knee pain (CKP).[1-3] CKP is
55 defined in this study as being synonymous with clinical knee osteoarthritis (OA),[4] that is;
56 mechanical knee pain, with or without loss of function, and with or without radiographic
57 changes consistent with OA, that has lasted for at least three months in people aged 45
58 years and older,[5] and for which an alternative diagnosis is unlikely.[4] Globally, OA is
59 among the leading causes of years lived with disability,[6] thus it is unsurprising that CKP is
60 a common presentation to GPs.[7,8] Exercise, comprising of both local (lower limb focused)
61 and general (aerobic) exercise, is recommended as core treatment for CKP,[4,9] its
62 provision is one of the eight UK OA quality standards[10] and international OA experts
63 recognise provision of information about regular physical activity and individualised exercise
64 to patients as essential.[11] Empirical research evidence now unequivocally demonstrates
65 that general aerobic, local strengthening and flexibility exercises improve pain and function
66 in patients with CKP.[12] In line with wider self-management strategies, best practice with
67 regards to integrating exercise into the management of patients with CKP involves providing
68 verbal advice about both general and local exercise (which should be specific and
69 individualised[4,13]) supported with written information.[4] Where GPs feel unable to provide
70 specific and individualised advice, referral of patients to appropriate exercise specialists (e.g.
71 physiotherapist) would be appropriate.

72 To maximise patient outcomes, GPs should align their management with best-evidence
73 recommendations. As sociocognitive behavioural theories suggest an association between
74 individuals' attitudes and beliefs and their behaviours,[14-16] concurrent investigation of
75 attitudes, beliefs and behaviours of GPs was undertaken. A systematic review revealed a
76 paucity of data specifically examining GPs use of exercise for patients with CKP, however
77 attitudes regarding exercise were variable, it appeared to be underused and its
78 implementation by GPs was unclear.[5] The aim of this cross-sectional questionnaire survey

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3 79 was to identify the attitudes, beliefs and behaviours of UK GPs regarding the use of exercise
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5 80 for patients with CKP.
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7 81 **METHODS**

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10 82 A cross-sectional survey was used to investigate GPs attitudes, beliefs and behaviours
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12 83 regarding exercise for CKP. The survey tool had previously been developed through pre-
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14 84 testing by a local group of GPs and a subsequent pilot study with 172 UK GPs,[17] which
15
16 85 was designed to investigate the likely response to the questionnaire, to finalise the survey
17
18 86 tool and to test methods to maximise quantity and quality of responses.
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20
21 87 In this main study, GPs were mailed an eight-page questionnaire (see Supplementary File
22
23 88 1), a cover letter and a postage-paid reply envelope in January 2014. Non-responders were
24
25 89 sent a reminder postcard after two weeks and, four weeks after the initial mailing, persistent
26
27 90 non-responders were mailed a second copy of the questionnaire with a cover letter and
28
29 91 postage-paid reply envelope. At each stage non-responders who did not wish to complete
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31 92 the full questionnaire were invited to provide minimum data sets (MDS; gender, year of
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33 93 qualification, practice size and setting). Attitude statements associated with a five-point Likert
34
35 94 scale explored GPs' attitudes and beliefs about exercise for CKP. These were minimally
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37 95 adapted from the work of Holden and colleagues who investigated this among
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39 96 physiotherapists[18] and older adults with CKP[19] and were derived from the MOVE
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41 97 consensus recommendations, designed to help healthcare professionals (HCPs) to initiate
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43 98 exercise in the management of a patient with lower limb OA[20]. GPs' reported clinical
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45 99 behaviour was investigated using multiple response questions associated with a vignette
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47 100 case (see Table 1). GPs reporting to use exercise were requested to indicate the type of
48
49 101 exercise and how this was initiated. A multiple response item, with space for free-text,
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51 102 investigated GPs' experiences of barriers to using exercise for CKP. Completion and return
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53 103 of the questionnaire by the GP was interpreted as consent to participate in the study.
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106 **Table 1 Vignette used in the questionnaire to assess GPs' reported behaviours**

Patient:	Mrs Jones, 58-year-old Prison Officer
History:	First presentation of gradually worsening bilateral knee pain (right worse than left) over 2 years No history of trauma Pain always present when walking and at rest, worst when climbing stairs. No night pain. Managing activities of daily living. Difficulty gardening. Stopped going to gym – thinks was making pain worse Only treatment tried is ibuprofen once or twice when pain “really bad” – no benefit. Came today finding work increasingly difficult due to the stairs Usually well – no comorbidities
Medication:	Nil
Examination:	Body Mass Index 33 Knees – bilaterally no effusions. Joint tenderness upon palpation. Bilateral coarse crepitations. Slightly reduced flexion of the right knee. Hips – no abnormality detected

107 A minimum sample size of 288 responding GPs was required to estimate the use of
 108 exercise, based on a conservative estimate of 75% reporting exercise use informed by the
 109 pilot study[17] and a margin of error of <5%.[21] After increasing the minimum sample size
 110 to adjust for other planned regression analyses (exploring associations between reported
 111 exercise use and attitudes/beliefs (paper in preparation)) and anticipating a response rate of
 112 20%,[17] 5000 UK GPs were randomly selected from Binley's database; a database
 113 containing the contact details of GPs in the UK which is updated quarterly. Binley's extracted
 114 a simple random sample of GPs from their database and removed and replaced any GPs
 115 included in the sample used for the previous pilot study. Study exclusion criteria were not
 116 being a GP and not having managed someone with CKP in the previous six months.

117 GPs' practice postcodes from each UK country were transformed into their corresponding
 118 Index of Multiple Deprivation rank[22-25] and split into quintiles (1=most deprived, 5=least
 119 deprived). Free-text responses underwent thematic analysis and responses to the GP
 120 attitude statements were condensed into three categories ((strongly) disagree, neither
 121 disagree nor agree, and (strongly) agree) before commencing descriptive analyses.
 122 Responses to GP attitude statements were interpreted as follows: unanimity = 100%,
 123 consensus = 75-99%, majority view = 51-74%, no consensus = 0-50%[18]. To assess for

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3 124 possible response bias in questionnaire respondents versus MDS responders, demographic
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5 125 data of each type of responders were compared using logistic regression to obtain
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7 126 unadjusted odds ratio with 95% confidence interval (CI; gender, practice area deprivation
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9 127 and practice type) and mean difference with 95% CI (mean years since qualification and
10
11 128 mean number of GPs in respondents practice). An *a posteriori* analysis was undertaken due
12
13 129 to the timing of the main survey coinciding with publication of the revised version of the NICE
14
15 130 OA guidelines on 12th February 2014 (four weeks after the baseline mailing of the survey).
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17 131 To establish whether the publication of these guidelines, and the publicity associated with
18
19 132 this event had an impact on the proportion of GPs using exercise, logistic regression was
20
21 133 used to compare the use of exercise among responses received before the date of
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23 134 publication of the revised guideline with those responses received after. All analyses were
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25 135 performed using IBM SPSS Statistics (Version 20).

136 **RESULTS**

137 **Response**

138 Of the 5000 GPs sent the questionnaire, 58 responders met one or more exclusion criteria
139 and 835 returned a completed questionnaire (adjusted response 17%). A further 470
140 provided MDS. The characteristics of GPs responding with a MDS were similar to those
141 responding with a full questionnaire, except they had been qualified for longer and were
142 more likely to work in practices in the most deprived areas (Table 2). When compared to
143 GPs with practice postcodes in the mid-deprived quintile (OR (95% CI)), those in the
144 most deprived (0.72 (0.60,0.87)) and second most deprived (0.76 (0.62,0.92)) were
145 significantly less likely to respond in any way (completed questionnaire or MDS),
146 although the absolute difference in the proportions responding were small.

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149 **Table 2 Demographic details of questionnaire respondents versus those providing minimum**
 150 **data sets**

Variable	Category	Response type		OR/mean difference (95% CI)
		MDS (n=470)	Completed questionnaire (n=835)	
Gender	Male	247 (53%)	401 (49%)	OR 1.00
	Female	219 (47%)	417 (51%)	OR 1.17 (0.93,1.47)
Practice area deprivation	Most deprived	121 (26%)	181 (22%)	OR 0.63 (0.45,0.89)
	Second most deprived	106 (23%)	156 (19%)	OR 0.62 (0.44,0.88)
	Mid-deprived	85 (18%)	202 (24%)	OR 1.00
	Second least deprived	84 (18%)	160 (19%)	OR 0.80 (0.56,1.16)
	Least deprived	73 (16%)	135 (16%)	OR 0.78 (0.53,1.14)
Practice type	Urban	254 (56%)	449 (54%)	OR 1.00
	Semi-rural	155 (34%)	275 (33%)	OR 1.00 (0.78,1.29)
	Rural	43 (10%)	103 (13%)	OR 1.36 (0.92,2.00)
Mean (SD) years since qualification		21.64 (10.03)	18.40 (10.33)	Mean difference = -3.24 (-2.06,-4.42)
Mean (SD) number of GPs in respondent's practice		6.44 (3.67)	6.44 (3.20)	Mean difference = <0.01 (-0.38,0.39)
Information only requested in questionnaire				
Type of GP	GP partner	---	656 (79%)	---
	Salaried GP	---	151 (18%)	---
	Locum GP	---	20 (2%)	---
	Other	---	5 (1%)	---
GP with special interest in musculoskeletal conditions		---	50 (6%)	---
Received postgraduate education about CKP		---	319 (39%)	---
Personal experience of CKP		----	166 (20%)	---
Maximum missing data for any cell was 6%. CI = confidence interval; CKP = chronic knee pain, GP = general practitioner; MDS = minimum data set; OR = odds ratio; SD = standard deviation				

151 **Attitudes of GPs regarding exercise for CKP**

152 Table 3 summarises responses to GP exercise attitude statements, none were unanimous.
 153 Generally, GPs were more positive about general exercise than local exercise, particularly
 154 with regards to safety and efficacy. However, more GPs agreed that increasing the strength
 155 of the muscles around the knee stops the knee problem getting worse compared with those
 156 who agreed that increasing overall physical activity would do the same. No consensus was
 157 reached regarding the statement '*exercise works just as well for everybody, regardless of*
 158 *the amount of pain they have*', however the greatest proportion of respondents disagreed.
 159 GPs recognised the need to tailor exercises to individual patients, acknowledged the

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3 160 importance of adherence with exercise but placed responsibility for adherence on the
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5 161 patient.
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162 Table 3 Responses to GP attitude statements derived from the MOVE consensus recommendations [20]

Attitude statement	(Strongly) disagree	Neither disagree or agree	(Strongly) agree
Items relating to the benefits of exercise (number of respondents)			
GPs should prescribe quadriceps strengthening exercises to every patient with CKP (n=822)	8%	22%	69%
GPs should prescribe general exercise, for example, walking or swimming, for every patient with CKP (n=824)	3%	8%	89%
Knee problems are improved by quadriceps strengthening exercises (n=824)	<1%	11%	88%
Knee problems are improved by general exercise, for example, walking or swimming (n=824)	1%	7%	93%
Quadriceps strengthening exercises for the knee are safe for everybody to do (n=821)	15%	30%	56%
General exercise, for example, walking or swimming, is safe for everybody to do (n=820)	13%	16%	71%
Exercise is effective for patients if an x-ray shows severe knee osteoarthritis (n=822)	16%	32%	52%
Exercise works just as well for everybody, regardless of the amount of pain they have (n=823)	49%	29%	22%
Increasing the strength of the muscles around the knee stops the knee problem getting worse (n=824)	16%	29%	55%
Increasing the overall activity levels stops the knee problem getting worse (n=822)	19%	38%	43%
Items relating to the delivery of, and adherence to, exercise (number of respondents)			
Exercise for CKP is most beneficial when it is tailored to meet individual patient needs (n=823)	1%	9%	90%
A standard set of exercises is sufficient for every patient with chronic knee problems (n=821)	51%	36%	13%
GPs should educate CKP patients about how to change their lifestyle for the better (n=823)	1%	6%	93%
It is important that people with CKP increase their overall activity levels (n=824)	1%	10%	89%
How well a patient complies with their exercise programme determines how effective it will be (n=825)	3%	11%	86%
GPs should follow-up patients to monitor extent of continuation of exercises (n=823)	30%	37%	34%
It is the patient's own responsibility to continue doing their exercise programme (n=826)	1%	6%	93%
Consensus categorised according to: unanimity = 100%, consensus = 75-99%, majority view = 51-74%, no consensus = 0-50% (18,26). CKP = chronic knee pain; GP = general practitioner. Maximum missing data for any item was 2%.			

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4 163 **GPs' reported use of exercise for CKP**
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6 164 Of the 835 respondents, 729 (87%) reported using exercise of some type for the vignette
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8 165 case. Figure 1 summarises the types of exercise and initiation methods that GPs reported
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10 166 that they would use. Among GPs reporting to suggest general exercise (n=347), the most
11
12 167 common recommendations were swimming (49%), walking (41%) and cycling (34%). Only
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14 168 17 (5%) GPs explicitly stated that general exercise should be tailored to patient's abilities
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16 169 and/or interests. Among GPs reporting to use exercise, 413 (57%) stated they would achieve
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18 170 this by referring the patient to a physiotherapist. Table 4 cross-tabulates the exercise
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20 171 initiation strategies GPs reported to use for both general and local exercise and shows the
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22 172 most common combinations of approaches were *suggesting* general exercise and
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24 173 *demonstrating* local exercise, and giving the patient a leaflet about both exercise types.
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26 174 Thirty-two (6%) GPs reporting to use both exercise types stated they would achieve this
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28 175 solely by referring the patient to another HCP. Ninety-two GPs (11% of all respondents)
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30 176 reported to use strategies aligned with evidence-based recommendations;^[4] they advised,
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32 177 or referred for, local and general exercise and provided written information for both exercise
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34 178 types (Table 4). The use of exercise was not significantly different among responses
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36 179 received after the publication of the revised NICE OA guidelines (273/314, 87%) when
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38 180 compared with those received before (456/521, 88%; OR 0.95 (95% CI 0.62,1.44)).
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41 181 **[INSERT Figure 1 Flow-chart summarising the exercise types and initiation methods used by**
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43 182 **GPs' for the vignette patient with CKP]**
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183 Table 4 Methods used to initiate local and general exercise by GPs using both exercise types

Methods used to include general exercises	Methods used to include local exercises							
	<i>Does not demonstrate, give leaflet nor refer</i>	<i>Refers only</i>	<i>Leaflet only</i>	<i>Demonstrate only</i>	<i>Demonstrate and refers</i>	<i>Leaflet and refers</i>	<i>Demonstrate and leaflet</i>	<i>Demonstrate, leaflet and refer</i>
<i>Does not suggest, give leaflet nor refer</i>	0%	<1%	0%	<1%	0%	0%	<1%	0%
<i>Refers only</i>	<1%	6%	<1%	2%	<1%	<1%	<1%	<1%
<i>Leaflet only</i>	0%	1%	11%	2%	<1%	<1%	7%	1%
<i>Suggest only</i>	0%	5%	5%	13%	2%	<1%	3%	<1%
<i>Suggest and refer</i>	<1%	1%	<1%	2%	2%	0%	<1%	0%
<i>Leaflet and refer</i>	0%	<1%	1%	1%	<1%	3%	2%	2%
<i>Suggest and leaflet</i>	<1%	<1%	3%	2%	<1%	<1%	8%	<1%
<i>Suggest, leaflet and refer</i>	0%	<1%	1%	<1%	<1%	<1%	1%	<1%

Management strategies used by >5% GPs are emboldened. The responses in the box are those that are consistent with evidence-based recommendations (i.e. providing advice and written information about both types of exercise and/or referring if needed). **n=535**

184 Use of follow-up

185 Of the 729 GPs reporting to use of exercise, 494 (68%) stated that they would follow-up the
186 vignette patient to establish ongoing engagement with regular exercise. This was most
187 commonly achieved through opportunistic follow-up (n=303, 61%) which most GPs (n=253,
188 84%) suggested would occur if the vignette patient failed to improve and re-consulted.

189 Barriers to exercise use

190 Most GPs (n=815, 98%) reported having experienced barriers when using exercises for
191 patients with CKP which included: 1) service-related, 2) GP-related and 3) (perceived)
192 patient-related barriers (Figure 2). The most frequently reported barriers were insufficient
193 time (n=419, 51%), insufficient expertise (n=337, 41%) and the perception that patients
194 prefer other management options (n=291, 36%).

195 [INSERT Figure 2 Barriers to using exercise reported by GPs]

196 DISCUSSION

197 Summary

198 While most GPs agreed that they should 'prescribe' local and general exercise to all patients
199 with CKP, believed that CKP is improved by local and general exercise, and reported that
200 they would use exercise in the management of the vignette patient, only a tenth of
201 responding GPs reported initiating exercise in a way that matches best-evidence
202 recommendations.[4] This evidence-practice gap is perhaps unsurprising given that most
203 GPs reported key barriers of time and expertise. A small number of GPs reported relying
204 solely on referring the vignette patient to another HCP for both exercise types. This
205 approach delays commencement of exercise as patients are not equipped to start exercising
206 immediately after the consultation with the GP, relies on the receiving HCP delivering best
207 practice and may not represent efficient use of services, if this is representative of GPs'
208 usual approach for patients with CKP.

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3 209 **Comparison with existing literature**
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5 210 Variable GP attitudes regarding exercise for CKP were recognised in an earlier systematic
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7 211 review[5] and the uncertainty regarding exercise efficacy identified by the current study
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9 212 supports this. GPs' responses to the MOVE attitude statements from the current study were
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11 213 compared to those from physiotherapists[18] and older adults with CKP.[19] In contrast to
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13 214 GPs being generally more positive regarding general exercise when compared to local
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15 215 exercise, physiotherapists were generally more positive about the safety and efficacy of local
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17 216 exercise,[18] and older adults with CKP reported low levels of agreement about the safety
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19 217 and efficacy of both types of exercise.[19] Although GPs were more positive about the
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21 218 efficacy and safety of both exercise types than either physiotherapists or those with CKP, the
22
23 219 timing of the respective surveys must be considered. In the time between the previous and
24
25 220 current surveys, new and/or revised versions of NICE,[4] Osteoarthritis Research Society
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27 221 International (OARSI)[9] and European League Against Rheumatism (EULAR)[27] guideline
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29 222 recommendations for OA have been published; thus familiarity with best-evidence
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31 223 recommendations may have increased.

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34 224 GPs' reported behaviour was consistent with higher estimates from other physician
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36 225 questionnaire studies; between 9-89% of GPs advising exercise[5,28-30] and 10-77%
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38 226 referring patients with CKP to physiotherapy[5,28-30]. Given that estimates of GPs' exercise
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40 227 use are similar internationally, for example, advice to exercise was 46-76% in the UK[31,32]
41
42 228 and 12-59% in the USA[30,33-36], the results are likely to be relevant beyond the UK. The
43
44 229 most common general exercise suggestions (swimming, walking and cycling) were clinically
45
46 230 appropriate. Walking is acceptable to patients[37] and it improves function [38], whilst it is
47
48 231 also low impact, easily accessible,[38] adaptable to patient preferences and easy to
49
50 232 incorporate into everyday life. However, it is unclear how acceptable or realistic it is for
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52 233 patients with CKP to engage in cycling or swimming.[39,40] For example, having to pay (e.g.
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54 234 for equipment or instructors) is a recognised barrier to physical activity engagement.[13,41]
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56 235 Combining the findings of uncertain appropriateness of (some) suggested modes of exercise
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3 236 with only 5% of GPs using general exercise explicitly stating that their advice should be
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5 237 tailored to their patients' interests and abilities, suggests a need for greater focus on
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7 238 individualising exercise. As many GPs reported having insufficient time and expertise to use
8
9 239 exercise, referral to other HCPs may be appropriate. However physiotherapists report similar
10
11 240 uncertainties about the safety and efficacy of exercise[18] and suboptimal use of both
12
13 241 exercise types.[42] Therefore, relying on physiotherapists to deliver exercise interventions
14
15 242 may not ensure all patients receive tailored, specific instruction on both exercise types.
16
17 243 Finally, a third of respondents reported that they would opportunistically follow-up the
18
19 244 vignette patient to check adherence to exercise. However, previous research examining the
20
21 245 consultation behaviour of patients with CKP has shown that while many patients may consult
22
23 246 again with other health problems, CKP is often not recorded again.[43] Thus the GPs'
24
25 247 reported intentions regarding follow-up are likely to be unrealistically optimistic.

27 248 **Strengths and limitations**

29
30 249 This large UK survey is the first known to directly, specifically and concurrently investigate
31
32 250 the attitudes, beliefs and behaviours of GPs regarding exercise for patients with CKP.
33
34 251 Employing a vignette provided a consistent patient scenario to all GPs[44-47] and minimised
35
36 252 the confounders inherent in observational research using real patients.[45,46] Limitations of
37
38 253 this study include the likely over-estimation of exercise use among GPs given the low
39
40 254 response rate (response bias), the self-report nature of the questionnaire (social desirability
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42 255 bias) and the relatively uncomplicated vignette case. However, as GPs should be using
43
44 256 exercise for all patients with CKP, the results of this survey are valuable for indicating an
45
46 257 apparent evidence-practice gap in the way in which GPs employ exercise with this patient
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48 258 group.

51 259 **Implications for future practice**

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54 260 To deliver best practice for patients with CKP, strategies which target both GPs and the
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56 261 wider primary care team are needed. Two key areas should be addressed: i) development of

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3 262 a pragmatic approach for GPs to initiate individualised local and general exercise and ii)
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5 263 identification of additional methods of initiating exercise and/or supporting patients to
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7 264 continue with exercise that do not solely rely on GPs. Given that theoretical patient
8
9 265 behaviour change models[48] often involve a balance of perceived value and risks/burdens
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11 266 of undertaking the new behaviour, a pragmatic approach for GPs initiating exercise among
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13 267 patients with CKP would need to highlight the value of exercise to patients, its role relative to
14
15 268 other interventions and practical ways to undertake specific and individualised exercise.
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17 269 Such a best practice approach was suggested by Khan et al[49] who recommended that
18
19 270 GPs should encourage the use of exercise (e.g. by asking about physical activity at each
20
21 271 consultation), consider the '5 A's' of physical activity counselling (assess, advise, agree,
22
23 272 assist and arrange),[50] write an exercise prescription,[51-53] and refer or signpost to
24
25 273 appropriate professionals or resources for exercise support and/or follow-up. Supplementary
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27 274 written leaflets or 'guidebooks' seem to be acceptable and useful[54] and can be accessed
28
29 275 or signposted within consultations; for example, the Keele University OA guidebook[55] and
30
31 276 the Arthritis Research UK knee OA booklet.[56] Given that CKP patients commonly have
32
33 277 comorbidities[37,57,58] and multiple joint pain, GPs could use this opportunity to detect and
34
35 278 manage comorbid conditions that may directly impact the use of exercise (e.g.
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37 279 cardiovascular disease, depression[59]), to relay the synergistic benefits of exercise for all
38
39 280 relevant morbidities, and to make explicit that CKP should not prevent exercise for other
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41 281 conditions. Practical methods to help GPs provide the above information, in limited available
42
43 282 time, need to be developed and may include personalised written care plans.[60] Given that
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45 283 time was the most frequently reported barrier to GPs initiating exercise, service delivery
46
47 284 models may need to change such that exercise initiation, support and/or follow-up is
48
49 285 primarily undertaken by other professionals such as physiotherapists,[61,62] practice
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51 286 nurses,[63] health trainers or local gym personnel. Direct access may enhance patients'
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53 287 utilisation of physiotherapists[64] and alternative, low GP burden, strategies could be
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55 288 explored to promote exercise use and/or follow-up. For example, technology enabled care
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3 289 services[65] have shown promise when used to support exercise interventions among
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5 290 patients with cardiac[66] and chronic lung disease.[67]
6

7 291 **CONCLUSIONS**

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10 292 Although the majority of UK GPs who responded to the questionnaire survey were positive
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12 293 about exercise for patients with CKP and used exercise in their clinical management, this
13
14 294 survey identified GP uncertainties with respect to the safety and efficacy of exercise and
15
16 295 suboptimal approaches to the initiation of exercise with patients. GPs' use of exercise may
17
18 296 be improved by addressing the key barriers of time and expertise, by developing a pragmatic
19
20 297 approach that supports GPs to initiate individualised exercise with patients, and/or by other
21
22 298 professionals taking on this role.
23

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31

32 302 **CONTRIBUTORSHIP STATEMENT**

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35 303 EC, NF, MP, TR, and ER participated in the design of the study, analysis of the results and
36
37 304 helped to draft the manuscript. All authors read and approved the final manuscript.
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40 305 **COMPETING INTERESTS**

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42
43 306 The authors declare that they have no competing interests.
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45

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48
49 308 The datasets analysed during the current study available from the corresponding author on
50
51 309 reasonable request.
52

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12
13 316 necessarily those of the NHS, the NIHR or the Department of Health.

15 317 **ETHICAL APPROVAL**

18 318 Ethical approval for the study was obtained from Keele University (UK) Ethical Review
19
20 319 Panel.

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13 508 25;16(1):26-016-0264-9.

14
15 509 **FIGURES**

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17
18 510 Figure 1 Flow-chart summarising the exercise types and initiation methods used by GPs' for
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20 511 the vignette patient with CKP

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23 512 Figure 2 Barriers to using exercise reported by GPs
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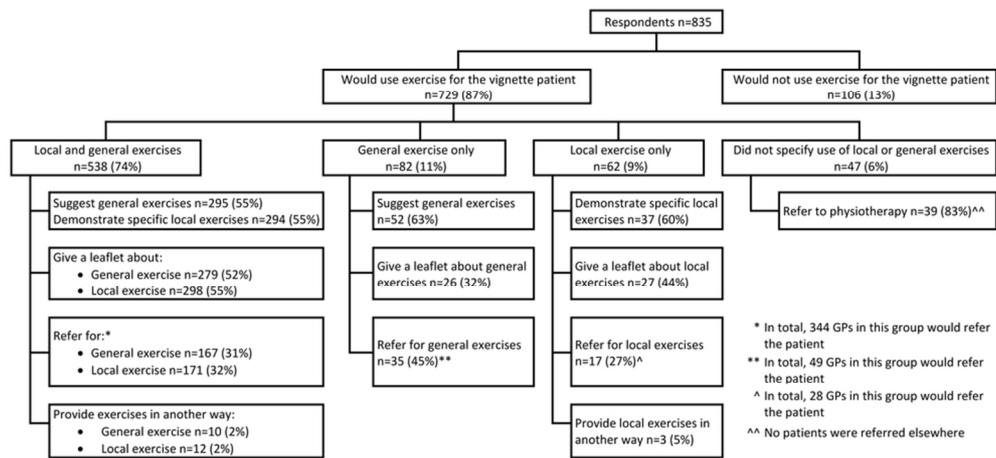
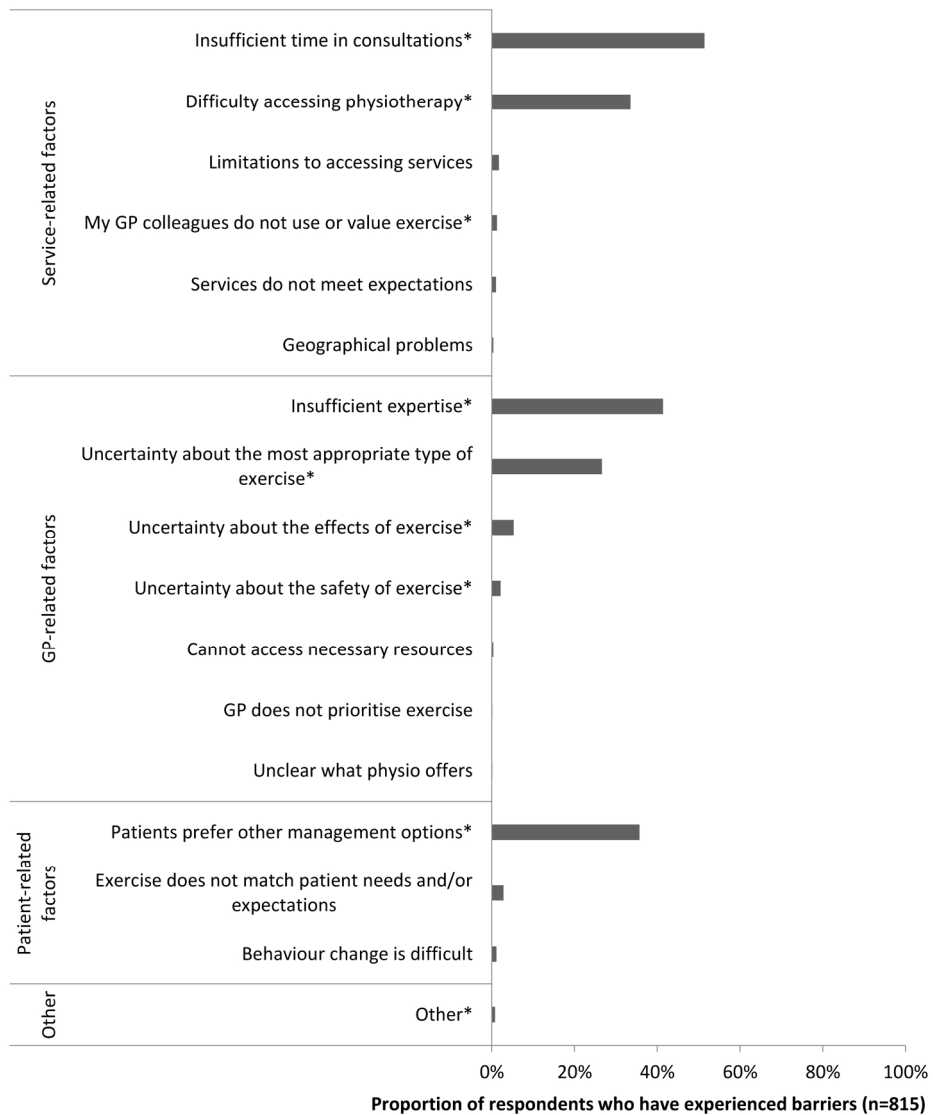


Figure 1 Flow-chart summarising the exercise types and initiation methods used by GPs' for the vignette patient with CKP

Figure 1

84x40mm (300 x 300 DPI)



Responses were not mutually exclusive

Figure 2 Barriers to using exercise reported by GPs [asterisks denote barriers provided as a multiple response option in the questionnaire]

Figure 2
169x209mm (300 x 300 DPI)

Management of Chronic Knee Pain Study

We are seeking the views of general practitioners who treat patients over 45 years old, with chronic knee pain.

If you **are not** a general practitioner, please tick this box and return the questionnaire without completing it any further

If you **have not** managed someone with chronic knee pain in the last 6 months, please tick this box and return the questionnaire without completing it any further.

This questionnaire should take no more than **20 minutes** to complete.

Return of your completed questionnaire will be interpreted as you providing your consent to participate in this study.

If you would like to participate in this study please either:

- Complete this paper version of the questionnaire and return it to Dr Elizabeth Cottrell, Academic Clinical Fellow GP Specialty Trainee, at the Arthritis Research UK Primary Care Centre, Keele University, Staffordshire, ST5 5BG using the enclosed FREEPOST envelope.
OR
- Complete the online version of this questionnaire accessible at https://www.surveymonkey.com/s/Management_CKP

If you have any questions about this questionnaire or the study in general you can email Dr Elizabeth Cottrell at e.cottrell@keele.ac.uk

Instructions for completing this questionnaire

- When completing the questionnaire, please try and provide answers that most accurately reflect your usual clinical practice. There are no 'correct' or 'incorrect' answers.
- Where relevant please answer questions by ticking a box e.g.
- Please do not consult any literature while completing this questionnaire.

Thank you for your help with this study

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Section 1: About you

1.1 Please state the year in which you qualified as a General Practitioner

1.2 How many General Practitioners work in your practice (including yourself)?

1.3 How do you best **describe yourself** (please tick **one box** only)

- GP Partner Salaried GP Locum GP
 Other, please specify

1.4 Is your practice Urban Semi-rural Rural

1.5 Are you Male Female

1.6 Are you a **GP with a special interest (GPwSI)** in musculoskeletal conditions?

- Yes No

1.7 Do you remember receiving any specific postgraduate musculoskeletal training which contained education about chronic knee pain? (By this we do not mean clinical placements or jobs in rheumatology or orthopaedics)

- Yes No

1.8 Do you have, or have you ever suffered from chronic knee pain **yourself**?

- Yes No

Section 2: Clinical scenario of a patient with chronic knee pain

Presented below is a clinical scenario of a patient **with chronic knee pain** who presents to you with this problem for the first time. All questions that follow relate to the care you would give this particular patient. Think about the patient's first consultation with you.

Patient: Mrs Jones, 58-year-old Prison Officer

History: First presentation of gradually worsening bilateral knee pain (right worse than left) over 2 years
 No history of trauma
 Pain always present when walking and at rest, worst when climbing stairs. No night pain.
 Managing activities of daily living. Difficulty gardening.
 Stopped going to gym – thinks was making pain worse
 Only treatment tried is Ibuprofen once or twice when pain "really bad" – no benefit.
 Came today finding work increasingly difficult due to the stairs
 Usually well – no comorbidities

Medication: Nil

Examination: Body Mass Index 33
 Knees – bilaterally no effusions. Joint tenderness upon palpation. Bilateral coarse crepitations.
 Slightly reduced flexion of the right knee.
 Hips – no abnormality detected

2.1 What **diagnosis** would you make at this point?

2.2 Using the words you would use with the patient, **briefly** state how you would **describe your diagnosis** to the patient

2.3 The patient's **symptoms** are: (please tick the **one** box that best reflects your opinion)

Very severe Severe Moderate Mild Very mild

2.4 It is most likely that this patient's symptoms result from **knee damage** that is: (please tick the **one** box that best reflects your opinion)

Very severe Severe Moderate Mild Very mild

2.5 Using the words you would use with the patient, **briefly** describe **what the future is likely to hold** with regards to her knee problem

2.6 What **investigation(s)/assessment(s)** would you do/order for this patient **at this point** and for what reason?

Please tick all you would undertake	Please indicate the reason for choosing this investigation (tick all that apply)					
	Reassure patient	To meet referral criteria	Confirm diagnosis	Inform treatment	Rule out other diagnoses	Inform prognosis
<input type="checkbox"/> None	---	---	---	---	---	---
<input type="checkbox"/> Blood tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Oxford knee score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Knee x-ray	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other - please state _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.7 **At this consultation**, what approaches would you use, or suggest, to manage this patient? (please tick **all** that apply)

- | | | | |
|--------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> Ice | <input type="checkbox"/> Keep active | <input type="checkbox"/> Weak opioids (e.g. codeine) | <input type="checkbox"/> Topical NSAID |
| <input type="checkbox"/> Heat | <input type="checkbox"/> Provision of walking stick(s) | <input type="checkbox"/> COX II inhibitor | <input type="checkbox"/> Paracetamol |
| <input type="checkbox"/> Acupuncture | <input type="checkbox"/> Advice on footwear | <input type="checkbox"/> Antidepressants | <input type="checkbox"/> Glucosamine/chondroitin |
| <input type="checkbox"/> Rest | <input type="checkbox"/> Exercise | <input type="checkbox"/> Injection of steroids | <input type="checkbox"/> Topical capsaicin |
| <input type="checkbox"/> Weight loss | <input type="checkbox"/> Bed rest | <input type="checkbox"/> Oral non-selective NSAIDs (e.g. Ibuprofen) | <input type="checkbox"/> Strong opioids (e.g. morphine, Tramadol) |
| <input type="checkbox"/> None | <input type="checkbox"/> Transcutaneous electrical nerve stimulation | | |
| <input type="checkbox"/> Other (please state)
_____ | | | |

If you ticked "Exercise" in question 2.7 please go on to answer question 2.8. If not, please move straight on to question 2.9

2.8 There are a variety of approaches that can be used to manage chronic knee pain in general practice.

Of the following different approaches, **which, if any, would you use for this patient at this point?**

a) General exercises or increasing physical activity

I would use If you **would use** this strategy, please give details about what you would **actually do** (please tick any that apply)

Suggest general exercises Please state type of exercise _____

Give a leaflet _____

Refer _____

Other Please state what other actions you would do _____

I would **not** use If you **would not use** the strategy **but would like to**, please tell us **what prevents** you (please tick any that apply)

Insufficient expertise Insufficient time

Other Please state what other reasons prevent you (e.g. patient factors, access difficulties, uncertainty of benefit etc) _____

b) Local knee or quadriceps strengthening exercises

I would use If you **would use** this strategy, please give details about what you would **actually do** (please tick any that apply)

Demonstrate specific exercises

Give a leaflet _____

Refer _____

Other Please state what other actions you would do _____

I would **not** use If you **would not use** the strategy **but would like to**, please tell us **what prevents** you (please tick any that apply)

Insufficient expertise Insufficient time

Other Please state what other reasons prevent you (e.g. patient factors, access difficulties, uncertainty of benefit etc) _____

c) Follow up patient to check to see if she is undertaking exercise on a regular basis

I would use If you **would use** this strategy, please give details about what you would **actually do** (please tick any that apply)

Planned follow-up When Please define number of days/weeks/months _____

How Face to face Via telephone

With whom Yourself Another professional or service – please state _____

Opportunistic follow-up When If patient fails to improve Check when patient is next seen with this or any problem

Other Please state what other actions you would do _____

I would **not** use If you **would not use** the strategy **but would like to**, please tell us **what prevents** you (please tick any that apply)

Insufficient expertise Insufficient time

Other Please state what other reasons prevent you _____

2.9 Would you refer the patient to see someone else, either in the primary or community team or into secondary care, at this point? Yes No

If yes, to whom would you refer her?

2.10 Do you usually provide **written information** for patients in this situation? Yes No

If yes, please state the source of your written information

Patient.co.uk or Emis Mentor Arthritis Research UK (previously known as ARC) or Arthritis Care Other, please state _____

If you would provide written information, it would be very helpful to see a copy by returning it in the freepost envelope provided (**please write on your unique survey ID**) or by providing us with the link for any online information you access.

We are interested in your clinical opinion about patients **aged 45 years and over** with **chronic knee pain**. In this age group chronic knee pain is almost always due to knee osteoarthritis. Please answer all of the following questions using the definition of chronic knee pain as follows: knee pain and associated symptoms that have been present for more than 3 months not resulting from a fracture, infection, systemic rheumatological problem, metastases or surgery.

Section 3: Chronic knee pain in general practice

	I have never heard about or read it	I have heard of it but not seen it	I have seen it but not read it	I have read the full guideline and/or summary	I have read and consider the guideline when planning management
3.1 How much have you heard about or read the guideline published by NICE in 2008 for the care and management of osteoarthritis in adults? (please tick one box)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please consider **your role** in managing patients aged over 45 years old with chronic knee pain. Please indicate the extent to which you agree or disagree with the statements given by ticking **one** box per row.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
3.2 It is part of my job to manage people with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3 I have enough time to manage patients with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4 Managing patients with chronic knee pain is a priority for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5 Managing patients with chronic knee pain is of clinical interest to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6 It is part of my job to reassure patients about the safety of exercise for chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 It is part of my job to provide patients with chronic knee pain with a written management plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	I have no role in including exercise in the management	I inform patients that exercise is a management option	I advise patients to use exercise to manage their knee pain	I recommend the types of exercise patients could use	I give information on the type, frequency and duration of specific exercises
3.8 Which statement best describes your role in including exercise in the management plan of a patient with chronic knee pain? (please tick one box)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9 We are interested to hear about your experiences of barriers which might prevent the use of exercise in your management of chronic knee pain. Please tick all of the barriers that you have experienced					
<input type="checkbox"/> Insufficient time in consultations	<input type="checkbox"/> Insufficient expertise to give detailed information	<input type="checkbox"/> Difficulty accessing physiotherapy	<input type="checkbox"/> Uncertainty about the effects of exercise		
<input type="checkbox"/> Patients prefer other management options	<input type="checkbox"/> My GP colleagues do not use or value exercise	<input type="checkbox"/> Uncertainty about the most appropriate type of exercise	<input type="checkbox"/> Uncertainty about the safety of exercise		
<input type="checkbox"/> Other (please state)	_____				

Section 4: Your views about chronic knee pain

Below is a list of **possible causes** for a patient developing chronic knee pain. Please indicate the extent to which you agree or disagree with these causes by ticking **one** box in each row.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
4.1 Hereditary/runs in the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2 Being overweight/obese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3 A person's own mental attitude e.g. thinking about life negatively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4 A person's emotional state e.g. feeling down, anxious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5 Ageing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.6 Accident or injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.7 Manual work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.8 Sport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.9 Osteoarthritis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10 Changes consistent with osteoarthritis seen on x-ray	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

When completing the following questions, please consider patients **aged over 45 years old** with **chronic knee pain**. Please indicate the extent to which you agree or disagree with the statements given by ticking one box per row.

		Totally disagree	Largely disagree	Disagree to some extent	Agree to some extent	Largely agree	Totally agree
4.11	Mental stress can cause chronic knee pain even in the absence of tissue damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.12	The cause of chronic knee pain is unknown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.13	Pain is a nociceptive stimulus, indicating tissue damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.14	A patient suffering from severe chronic knee pain will benefit from physical exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.15	Functional limitations associated with chronic knee pain are the result of psychosocial factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.16	Patients with chronic knee pain should preferably practice only pain free movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.17	Therapy may have been successful even if pain remains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.18	Chronic knee pain indicates the presence of organic injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.19	If chronic knee pain increases in severity, I immediately adjust the intensity of my treatment accordingly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.20	If therapy does not result in a reduction in chronic knee pain, there is a high risk of severe restrictions in the long term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.21	Pain reduction is a precondition for the restoration of normal functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.22	Increased pain indicates new tissue damage or the spread of existing damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.23	There is no effective treatment to eliminate chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.24	Even if the pain has worsened, the intensity of the next treatment can be increased	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.25	If patients complain of pain during exercise, I worry that damage is being caused	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.26	The severity of tissue damage determines the level of pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.27	Learning to cope with stress promotes recovery from chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.28	Exercises that may be knee straining should <u>not</u> be avoided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.29	In the long run, patients with chronic knee pain have a higher risk of developing severe functional impairments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 5: Your views about the role of exercise in treating chronic knee pain

We are interested in your views about the **role of exercise** in the treatment of **chronic knee pain in patients over 45 years old**. Please indicate the extent to which you agree or disagree with the statements given by ticking one box per row.

		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
5.1	GPs should prescribe quadriceps strengthening exercises to every patient with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2	GPs should prescribe general exercise, for example, walking or swimming, for every patient with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3	Knee problems are improved by quadriceps strengthening exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4	Knee problems are improved by general exercise, for example walking or swimming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5	Quadriceps strengthening exercises for the knee are safe for everybody to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6	General exercise, for example walking or swimming is safe for everybody to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.7	Exercise for chronic knee pain is most beneficial when it is tailored to meet individual patient needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.8	A standard set of exercises is sufficient for every patient with chronic knee problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.9	GPs should educate chronic knee pain patients about how to change their lifestyle for the better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.10	It is important that people with chronic knee pain increase their overall activity levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.11	How well a patient complies with their exercise programme determines how effective it will be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.12	GPs should follow up patients to monitor extent of continuation of exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.13	It is the patient's own responsibility to continue doing their exercise programme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.14	Exercise is effective for patients if an x-ray shows severe knee osteoarthritis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.15	Exercise works just as well for everybody, regardless of the amount of pain they have	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.16	Increasing the strength of the muscles around the knee stops the knee problem getting worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.17	Increasing overall activity levels stops the knee problem getting worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.18	Exercise for chronic knee pain is more effectively provided by physiotherapists than GPs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.19	Time constraints prevent GPs from providing advice on individual exercises for chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.20	Exercise for chronic knee pain should preferably be used after drug treatment has been tried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.21	Exercise for chronic knee pain would be used more frequently if access to physiotherapy was easier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 **Would you be happy for us to contact you again in the future regarding this study?**

2

3 Yes

4

5 No

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7 **If you answered YES to the question above please provide your name and contact details**
8 **below (these details will be kept separately from your responses to the questionnaire):**
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10 Name:	
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16 Address:	
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26 Email:	
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31 **End of Questionnaire**

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33 You have reached the end of the questionnaire. Please return the questionnaire in the
34 **FREEPOST** envelope provided.

35
36 If you have any questions about this questionnaire or the study in general, you can email
37 Dr Elizabeth Cottrell at e.cottrell@keele.ac.uk
38

39
40 **Thank you for taking the time to complete this questionnaire. Your**
41 **time and participation is greatly appreciated.**
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GP attitudes, beliefs and behaviours regarding exercise for chronic knee pain: a questionnaire survey

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3 1 **GP attitudes, beliefs and behaviours regarding exercise for chronic**
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5 2 **knee pain: a questionnaire survey**
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7

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30

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33

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3 18 **ABSTRACT**
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6 19 **Objectives:**
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9 20 The aim of this study was to investigate general practitioners' (GPs) attitudes, beliefs and
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11 21 behaviours regarding the use of exercise for patients with chronic knee pain (CKP)
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13 22 attributable to osteoarthritis.
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16 23 **Setting:**
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19 24 Primary care GPs in the UK.
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22 25 **Participants:**
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25 26 5000 GPs, randomly selected from Binley's database, were mailed a cross-sectional
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27 27 questionnaire survey.
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30 28 **Outcome measures:**
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33 29 GPs' attitudes and beliefs were investigated using attitude statements, and reported
34
35 30 behaviours were identified using vignette-based questions. GPs were invited to report
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37 31 barriers experienced when initiating exercise with patients with CKP.
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40 32 **Results:**
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43 33 835 (17%) GPs responded. Overall, GPs were positive about general exercise for CKP. 729
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45 34 (87%) reported using exercise, of which, 538 (74%) reported that they would use both
46
47 35 general and local (lower limb) exercises. However, only 92 (11% of all responding) GPs
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49 36 reported initiating exercise in ways aligning with best-evidence recommendations. 815 (98%)
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51 37 GPs reported barriers in using exercise for patients with CKP, most commonly, insufficient
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53 38 time in consultations (n=419; 51%) and insufficient expertise (n=337; 41%).
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56 39 **Conclusions:**
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3 40 While GPs' attitudes and beliefs regarding exercise for CKP were generally positive,
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5 41 initiation of exercise was often poorly aligned with current recommendations, and barriers
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7 42 and uncertainties were reported. GPs' use of exercise may be improved by addressing the
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9 43 key barriers of time and expertise, by developing a pragmatic approach that supports GPs to
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11 44 initiate individualised exercise, and/or by other professionals taking on this role.
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STRENGTHS AND LIMITATIONS OF THIS STUDY

- This large UK survey is the first known to directly, specifically and concurrently investigate the attitudes, beliefs and behaviours of GPs regarding exercise for patients with CKP. Exercise initiation did not concur with best-evidence recommendations and GPs reported uncertainties and barriers in relation to using exercise.
- The questionnaire was pre-tested and piloted before being used in this main study. Use of a vignette to investigate clinical management ensured a consistent patient scenario to all GPs and minimised the confounders inherent in observational research using real patients.
- Limitations of this study include the likely over-estimation of exercise use among GPs given the low response rate (response bias), the self-report nature of the questionnaire (social desirability bias), inability to explore underlying reasons for responses and the relatively uncomplicated vignette case. However, as GPs should be using exercise for all patients with CKP, the results of this survey are valuable for indicating an apparent evidence-practice gap in the way in which GPs employ exercise with this patient group.

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3 46 **ABBREVIATIONS**
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6 47 CI = confidence interval; CKP = chronic knee pain; EULAR = European League Against
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8 48 Rheumatism; GP = general practitioners; HCP = healthcare professional; MDS = minimum
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10 49 data set; NICE = National Institute for Health and Care Excellence; OA = osteoarthritis;
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12 50 OARSI = Osteoarthritis Research Society International; OR = odds ratio; UK = United
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52 INTRODUCTION

53 General practitioners (GPs) are the most frequently accessed source of formal medical
54 advice and treatment for patients in the UK with chronic knee pain (CKP).[1-3] CKP is
55 defined in this study as being synonymous with clinical knee osteoarthritis (OA),[4] that is;
56 mechanical knee pain, with or without loss of function, and with or without radiographic
57 changes consistent with OA, that has lasted for at least three months in people aged 45
58 years and older,[5] and for which an alternative diagnosis is unlikely.[4] Globally, OA is
59 among the leading causes of years lived with disability,[6] thus it is unsurprising that CKP is
60 a common presentation to GPs.[7,8] Exercise, comprising of both local (lower limb focused)
61 and general (aerobic) exercise, is recommended as core treatment for CKP,[4,9] its
62 provision is one of the eight UK OA quality standards[10] and international OA experts
63 recognise provision of information about regular physical activity and individualised exercise
64 to patients as essential.[11] Empirical research evidence now unequivocally demonstrates
65 that general aerobic, local strengthening and flexibility exercises improve pain and function
66 in patients with CKP.[12] In line with wider self-management strategies, best practice
67 outlined by the National Institute for Health and Care Excellence (NICE) OA guidelines with
68 regards to integrating exercise into the management of patients with CKP involves providing
69 verbal advice about both general and local exercise (which should be specific and
70 individualised[4,13]) supported with written information.[4] Where GPs feel unable to provide
71 specific and individualised advice, referral of patients to appropriate exercise specialists (e.g.
72 physiotherapist) would be appropriate. While it is recognised that delivery of care for CKP is
73 multidisciplinary, the exact roles and explicit expectations of GPs (and other professionals)
74 regarding the delivery of core management approaches is not provided within current
75 guidelines. This could have the consequence that no professional undertakes certain
76 activities in the belief that others will.

77 To maximise patient outcomes, GPs should align their management with best-evidence
78 recommendations. As sociocognitive behavioural theories suggest an association between

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3 79 individuals' attitudes and beliefs and their behaviours,[14-16] concurrent investigation of
4 80 attitudes, beliefs and behaviours of GPs was undertaken. A systematic review revealed a
5 81 paucity of data specifically examining GPs use of exercise for patients with CKP, however
6 82 attitudes regarding exercise were variable, it appeared to be underused and its
7 83 implementation by GPs was unclear.[5] The role that GPs perceive themselves to have in
8 84 delivering these management approaches was also not clear. The aim of this cross-sectional
9 85 questionnaire survey was to identify the attitudes, beliefs and behaviours of UK GPs
10 86 regarding the use of exercise for patients with CKP. Analysis of factors associated with the
11 87 use of exercise among this group have been published elsewhere.[17]

21 88 **METHODS**

22 89 A cross-sectional survey was used to investigate GPs attitudes, beliefs and behaviours
23 90 regarding exercise for CKP. The survey tool had previously been developed through pre-
24 91 testing by a local group of GPs and a subsequent pilot study with 172 UK GPs,[18] which
25 92 was designed to investigate the likely response to the questionnaire, to finalise the survey
26 93 tool and to test methods to maximise quantity and quality of responses.

27 94 In this main study, GPs were mailed an eight-page questionnaire (see Supplementary File
28 95 1), a cover letter and a postage-paid reply envelope in January 2014. Non-responders were
29 96 sent a reminder postcard after two weeks and, four weeks after the initial mailing, persistent
30 97 non-responders were mailed a second copy of the questionnaire with a cover letter and
31 98 postage-paid reply envelope. At each stage non-responders who did not wish to complete
32 99 the full questionnaire were invited to provide minimum data sets (MDS; gender, year of
33 100 qualification, practice size and setting) and a reason for non-response. Attitude statements
34 101 associated with a five-point Likert scale explored GPs' attitudes and beliefs about exercise
35 102 for CKP. These were minimally adapted from the work of Holden and colleagues who
36 103 investigated this among physiotherapists[19] and older adults with CKP[20] and were
37 104 derived from the MOVE consensus recommendations, designed to help healthcare

105 professionals (HCPs) to initiate exercise in the management of a patient with lower limb
 106 OA[21]. GPs' reported clinical behaviour was investigated using multiple response questions
 107 associated with a vignette case (see Table 1). GPs reporting to use exercise were requested
 108 to indicate the type of exercise and how this was initiated. A multiple response item, with
 109 space for free-text, investigated GPs' experiences of barriers to using exercise for CKP.
 110 Completion and return of the questionnaire by the GP was interpreted as consent to
 111 participate in the study.

112 **Table 1 Vignette used in the questionnaire to assess GPs' reported behaviours**

Patient:	Mrs Jones, 58-year-old Prison Officer
History:	First presentation of gradually worsening bilateral knee pain (right worse than left) over 2 years No history of trauma Pain always present when walking and at rest, worst when climbing stairs. No night pain. Managing activities of daily living. Difficulty gardening. Stopped going to gym – thinks was making pain worse Only treatment tried is ibuprofen once or twice when pain “really bad” – no benefit. Came today finding work increasingly difficult due to the stairs Usually well – no comorbidities
Medication:	Nil
Examination:	Body Mass Index 33 Knees – bilaterally no effusions. Joint tenderness upon palpation. Bilateral coarse crepitations. Slightly reduced flexion of the right knee. Hips – no abnormality detected

113 A minimum sample size of 288 responding GPs was required to estimate the use of
 114 exercise, based on a conservative estimate of 75% reporting exercise use informed by the
 115 pilot study[18] and a margin of error of <5%.[22] After increasing the minimum sample size
 116 to adjust for other planned regression analyses (exploring associations between reported
 117 exercise use and attitudes/beliefs (paper in preparation)) and anticipating a response rate of
 118 20%,[18] 5000 UK GPs were randomly selected from Binley's database; a database
 119 containing the contact details of GPs in the UK which is updated quarterly. Binley's extracted
 120 a simple random sample of GPs from their database and removed and replaced any GPs
 121 included in the sample used for the previous pilot study. Study exclusion criteria were not
 122 being a GP and not having managed someone with CKP in the previous six months.

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3 123 GPs' practice postcodes from each UK country were transformed into their corresponding
4
5 124 Index of Multiple Deprivation rank[23-26] and split into quintiles (1=most deprived, 5=least
6
7 125 deprived). Responses to the GP attitude statements were condensed into three categories
8
9 126 ((strongly) disagree, neither disagree nor agree, and (strongly) agree) and free-text
10
11 127 responses (associated "other" responses and regarding type of exercise the GPs would use)
12
13 128 underwent thematic analysis, categorising responses into pre-defined categories that
14
15 129 emerged from responses to the pilot study and developing new categories as appropriate,
16
17 130 before commencing descriptive analyses. Responses to GP attitude statements were
18
19 131 interpreted as follows: unanimity = 100%, consensus = 75-99%, majority view = 51-74%, no
20
21 132 consensus = 0-50%[19,27]. To assess for possible response bias in questionnaire
22
23 133 respondents versus MDS responders, demographic data of each type of responders were
24
25 134 compared using logistic regression to obtain unadjusted odds ratio with 95% confidence
26
27 135 interval (CI; gender, practice area deprivation and practice type) and mean difference with
28
29 136 95% CI (mean years since qualification and mean number of GPs in respondents practice).
30
31 137 An *a posteriori* analysis was undertaken due to the timing of the main survey coinciding with
32
33 138 publication of the revised version of the NICE OA guidelines on 12th February 2014 (four
34
35 139 weeks after the baseline mailing of the survey). To establish whether the publication of these
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37 140 guidelines, and the publicity associated with this event had an impact on the proportion of
38
39 141 GPs using exercise, logistic regression was used to compare the use of exercise among
40
41 142 responses received before the date of publication of the revised guideline with those
42
43 143 responses received after. All analyses were performed using IBM SPSS Statistics (Version
44
45 144 20).

145 **RESULTS**

146 **Response**

147 Of the 5000 GPs sent the questionnaire, 58 responders met one or more exclusion criteria
148 and 835 returned a completed questionnaire (adjusted response 17%). A further 470

149 provided MDS. The most common reason for returning MDS, rather than a full response
 150 was, having insufficient time (n=408, 87%). The characteristics of GPs responding with a
 151 MDS were similar to those responding with a full questionnaire, except they had been
 152 qualified for longer and were more likely to work in practices in the most deprived areas
 153 (Table 2). When compared to GPs with practice postcodes in the mid-deprived quintile
 154 (OR (95% CI)), those in the most deprived (0.72 (0.60,0.87)) and second most deprived
 155 (0.76 (0.62,0.92)) were significantly less likely to respond in any way (completed
 156 questionnaire or MDS), although the absolute difference in the proportions responding
 157 were small.

158 **Table 2 Demographic details of questionnaire respondents versus those providing minimum**
 159 **data sets**

Variable	Category	Response type		OR/mean difference (95% CI)
		MDS (n=470)	Completed questionnaire (n=835)	
Gender	Male	247 (53%)	401 (49%)	OR 1.00
	Female	219 (47%)	417 (51%)	OR 1.17 (0.93,1.47)
Practice area deprivation	Most deprived	121 (26%)	181 (22%)	OR 0.63 (0.45,0.89)
	Second most deprived	106 (23%)	156 (19%)	OR 0.62 (0.44,0.88)
	Mid-deprived	85 (18%)	202 (24%)	OR 1.00
	Second least deprived	84 (18%)	160 (19%)	OR 0.80 (0.56,1.16)
	Least deprived	73 (16%)	135 (16%)	OR 0.78 (0.53,1.14)
Practice type	Urban	254 (56%)	449 (54%)	OR 1.00
	Semi-rural	155 (34%)	275 (33%)	OR 1.00 (0.78,1.29)
	Rural	43 (10%)	103 (13%)	OR 1.36 (0.92,2.00)
Mean (SD) years since qualification		21.64 (10.03)	18.40 (10.33)	Mean difference = -3.24 (-2.06,-4.42)
Mean (SD) number of GPs in respondent's practice		6.44 (3.67)	6.44 (3.20)	Mean difference = <0.01 (-0.38,0.39)
Information only requested in questionnaire				
Type of GP	GP partner	---	656 (79%)	---
	Salaried GP	---	151 (18%)	---
	Locum GP	---	20 (2%)	---
	Other	---	5 (1%)	---
GP with special interest in musculoskeletal conditions		---	50 (6%)	---
Received postgraduate education about CKP		---	319 (39%)	---
Personal experience of CKP		---	166 (20%)	---
Maximum missing data for any cell was 6%. CI = confidence interval; CKP = chronic knee pain, GP = general practitioner; MDS = minimum data set; OR = odds ratio; SD = standard deviation				

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3 161 **Attitudes of GPs regarding exercise for CKP**
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5 162 Table 3 summarises responses to GP exercise attitude statements, none were unanimous.
6
7 163 Generally, GPs were more positive about general exercise than local exercise, particularly
8
9 164 with regards to safety and efficacy. However, more GPs agreed that increasing the strength
10
11 165 of the muscles around the knee stops the knee problem getting worse compared with those
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13 166 who agreed that increasing overall physical activity would do the same. No consensus was
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15 167 reached regarding the statement '*exercise works just as well for everybody, regardless of*
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17 168 *the amount of pain they have*', however the greatest proportion of respondents disagreed.
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19 169 GPs recognised the need to tailor exercises to individual patients, acknowledged the
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21 170 importance of adherence with exercise but placed responsibility for adherence on the
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23 171 patient.
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172 Table 3 Responses to GP attitude statements derived from the MOVE consensus recommendations [21]

MOVE consensus proposition	Attitude statement	(Strongly disagree)	Neither disagree or agree	(Strongly agree)
Items relating to the benefits of exercise (number of respondents)				
Prescription of both general (aerobic fitness training) and local (strengthening) exercises is an essential, core aspect of management for every patient with hip or knee OA	GPs should prescribe quadriceps strengthening exercises to every patient with CKP (n=822)	8%	22%	69%
	GPs should prescribe general exercise, for example, walking or swimming, for every patient with CKP (n=824)	3%	8%	89%
Both strengthening and aerobic exercise can reduce pain and improve function and health status in patients with knee and hip OA	Knee problems are improved by quadriceps strengthening exercises (n=824)	<1%	11%	88%
	Knee problems are improved by general exercise, for example, walking or swimming (n=824)	1%	7%	93%
There are few contraindications to the prescription of strengthening or aerobic exercise in patients with hip or knee OA	Quadriceps strengthening exercises for the knee are safe for everybody to do (n=821)	15%	30%	56%
	General exercise, for example, walking or swimming, is safe for everybody to do (n=820)	13%	16%	71%
	Exercise works just as well for everybody, regardless of the amount of pain they have (n=823)	49%	29%	22%
The effectiveness of exercise is independent of the presence or severity of radiographic findings	Exercise is effective for patients if an x-ray shows severe knee osteoarthritis (n=822)	16%	32%	52%
Improvements in muscle strength and proprioception gained from exercise programmes may reduce the progression of knee and hip OA	Increasing the strength of the muscles around the knee stops the knee problem getting worse (n=824)	16%	29%	55%
	Increasing the overall activity levels stops the knee problem getting worse (n=822)	19%	38%	43%
Items relating to the delivery of, and adherence to, exercise (number of respondents)				
Exercise therapy for OA of the hip or knee should be individualised and patient-centred taking into account factors such as age, comorbidity and overall mobility	Exercise for CKP is most beneficial when it is tailored to meet individual patient needs (n=823)	1%	9%	90%
	A standard set of exercises is sufficient for every patient with chronic knee problems (n=821)	51%	36%	13%
To be effective, exercise programmes should include...advice and education to promote a positive lifestyle change with an increase in physical activity	GPs should educate CKP patients about how to change their lifestyle for the better (n=823)	1%	6%	93%
	It is important that people with CKP increase their overall activity levels (n=824)	1%	10%	89%

Adherence is the principal predictor of long-term outcome from exercise in patients with knee or hip OA	How well a patient complies with their exercise programme determines how effective it will be (n=825)	3%	11%	86%
Strategies to improve and maintain adherence should be adopted, e.g. long-term monitoring/review and inclusion of spouse/family in exercise	GPs should follow-up patients to monitor extent of continuation of exercises (n=823)	30%	37%	34%
	It is the patient's own responsibility to continue doing their exercise programme (n=826)	1%	6%	93%
Consensus categorised according to: unanimity = 100%, consensus = 75-99%, majority view = 51-74%, no consensus = 0-50% (19,27). CKP = chronic knee pain; GP = general practitioner. Maximum missing data for any item was 2%.				

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4 173 **GPs' reported use of exercise for CKP**
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6 174 Of the 835 respondents, 729 (87%) reported using exercise of some type for the vignette
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8 175 case. Figure 1 summarises the types of exercise and initiation methods that GPs reported
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10 176 that they would use. Among GPs reporting to suggest general exercise (n=347), the most
11
12 177 common recommendations were swimming (49%), walking (41%) and cycling (34%). Only
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14 178 17 (5%) GPs explicitly stated that general exercise should be tailored to patient's abilities
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16 179 and/or interests. Among GPs reporting to use exercise, 413 (57%) stated they would achieve
17
18 180 this by referring the patient to a physiotherapist. Table 4 cross-tabulates the exercise
19
20 181 initiation strategies GPs reported to use for both general and local exercise and shows the
21
22 182 most common combinations of approaches were *suggesting* general exercise and
23
24 183 *demonstrating* local exercise, and giving the patient a leaflet about both exercise types.
25
26 184 Thirty-two (6%) GPs reporting to use both exercise types stated they would achieve this
27
28 185 solely by referring the patient to another HCP. Ninety-two GPs (17% of those using both
29
30 186 local and general exercise, 11% of all respondents) reported to use strategies aligned with
31
32 187 evidence-based recommendations;^[4] they advised, or referred for, local and general
33
34 188 exercise and provided written information for both exercise types (Table 4). The use of
35
36 189 exercise was not significantly different among responses received after the publication of
37
38 190 the revised NICE OA guidelines (273/314, 87%) when compared with those received
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40 191 before (456/521, 88%; OR 0.95 (95% CI 0.62,1.44)).
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43 192 **[INSERT Figure 1 Flow-chart summarising the exercise types and initiation methods used by**
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45 193 **GPs' for the vignette patient with CKP]**
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198 **Table 4 Methods used to initiate local and general exercise by GPs using both exercise types**

Methods used to include general exercises	Methods used to include local exercises			
	<i>Does not demonstrate, give leaflet nor refer</i>	<i>Refers and/or demonstrates</i>	<i>Leaflet only</i>	<i>Leaflet and demonstrates, and/or refer</i>
<i>Does not suggest, give leaflet nor refer</i>	0%	1%	0%	<1%
<i>Refers and/or suggests only</i>	<1%	33%	6%	7%
<i>Leaflet only</i>	0%	4%	11%	7%
<i>Leaflet, suggests and/or refers</i>	<1%	6%	6%	17%

Management strategies used by >5% GPs are emboldened. The responses in the box are those that are consistent with evidence-based recommendations (i.e. providing advice and written information about both types of exercise and/or referring if needed). n=535

199 **Use of follow-up**

200 Of the 729 GPs reporting to use of exercise, 494 (68%) stated that they would follow-up the
 201 vignette patient to establish ongoing engagement with regular exercise. This was most
 202 commonly achieved through opportunistic follow-up (n=303, 61%) which most GPs (n=253,
 203 84%) suggested would occur if the vignette patient failed to improve and re-consulted.

204 **Barriers to exercise use**

205 Most GPs (n=815, 98%) reported having experienced barriers when using exercises for
 206 patients with CKP which included: 1) service-related, 2) GP-related and 3) (perceived)
 207 patient-related barriers (Figure 2). The most frequently reported barriers were insufficient
 208 time (n=419, 51%), insufficient expertise (n=337, 41%) and the perception that patients
 209 prefer other management options (n=291, 36%).

210 **[INSERT Figure 2 Barriers to using exercise reported by GPs]**

211 **DISCUSSION**212 **Summary**

213 This cross-sectional questionnaire survey sought to identify the attitudes, beliefs and
 214 behaviours of UK GPs regarding the use of exercise for patients with CKP. While most GPs

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3 215 agreed that they should *'prescribe'* local and general exercise to all patients with CKP,
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5 216 believed that CKP is improved by local and general exercise, and reported that they would
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7 217 use exercise in the management of the vignette patient, only a tenth of responding GPs
8
9 218 reported initiating exercise in a way that matches best-evidence recommendations.[4] This
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11 219 evidence-practice gap is perhaps unsurprising given that most GPs reported key barriers of
12
13 220 time and expertise. A small number of GPs reported relying solely on referring the vignette
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15 221 patient to another HCP for both exercise types. This approach delays commencement of
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17 222 exercise as patients are not equipped to start exercising immediately after the consultation
18
19 223 with the GP, relies on the receiving HCP delivering best practice and may not represent
20
21 224 efficient use of services, if this is representative of GPs' usual approach for patients with
22
23 225 CKP.

226 **Comparison with existing literature**

227 Variable GP attitudes regarding exercise for CKP were recognised in an earlier systematic
228 review[5] and the uncertainty regarding exercise efficacy identified by the current study
229 supports this. GPs' responses to the MOVE attitude statements from the current study were
230 compared to those from physiotherapists[19] and older adults with CKP.[20] In contrast to
231 GPs being generally more positive regarding general exercise when compared to local
232 exercise, physiotherapists were generally more positive about the safety and efficacy of local
233 exercise,[19] and older adults with CKP reported low levels of agreement about the safety
234 and efficacy of both types of exercise.[20] Although GPs were more positive about the
235 efficacy and safety of both exercise types than either physiotherapists or those with CKP, the
236 timing of the respective surveys must be considered. In the time between the previous and
237 current surveys, new and/or revised versions of NICE,[4] Osteoarthritis Research Society
238 International (OARSI)[9] and European League Against Rheumatism (EULAR)[28] guideline
239 recommendations for OA have been published; thus familiarity with best-evidence
240 recommendations may have increased.

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3 241 GPs' reported behaviour was consistent with higher estimates from other physician
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5 242 questionnaire studies; between 9-89% of GPs advising exercise[5,29-31] and 10-77%
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7 243 referring patients with CKP to physiotherapy[5,29-31]. Given that estimates of GPs' exercise
8
9 244 use are similar internationally, for example, advice to exercise was 46-76% in the UK[32,33]
10
11 245 and 12-59% in the USA[31,34-37], the results are likely to be relevant beyond the UK. While
12
13 246 the most common general exercise suggestions (swimming, walking and cycling) were
14
15 247 clinically appropriate, the extent to which this advice would be translated into action may be
16
17 248 questionable from previous literature. Walking is acceptable to patients[38] and it improves
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19 249 function [39], whilst it is also low impact, easily accessible,[39] adaptable to patient
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21 250 preferences and easy to incorporate into everyday life. However, it is unclear how
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23 251 acceptable or realistic it is for patients with CKP to engage in cycling or swimming.[40,41]
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25 252 For example, having to pay (e.g. for equipment or instructors) is a recognised barrier to
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27 253 physical activity engagement.[13,42] Combining the findings of uncertain appropriateness of
28
29 254 (some) suggested modes of exercise with only 5% of GPs using general exercise explicitly
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31 255 stating that their advice should be tailored to their patients' interests and abilities, suggests a
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33 256 need for greater focus on individualising exercise. As many GPs reported having insufficient
34
35 257 time and expertise to use exercise, referral to other HCPs may be appropriate. However
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37 258 physiotherapists report similar uncertainties about the safety and efficacy of exercise[19] and
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39 259 suboptimal use of both exercise types, favouring local more than general exercise
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41 260 approaches.[43] Further, it is unlikely to be an economically viable approach for GPs to
42
43 261 manage all patients with CKP by referring them to physiotherapists. It is possible therefore,
44
45 262 that solely relying on physiotherapists to deliver exercise interventions may not ensure all
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47 263 patients receive tailored, specific instruction on both exercise types. Finally, a third of
48
49 264 respondents reported that they would opportunistically follow-up the vignette patient to check
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51 265 adherence to exercise. However, previous research examining the consultation behaviour of
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53 266 patients with CKP has shown that while many patients may consult again with other health
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55 267 problems, CKP is often not recorded again.[44] Thus the GPs' reported intentions regarding
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57 268 follow-up are likely to be unrealistically optimistic.

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3 269 **Strengths and limitations**
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5 270 This large UK survey is the first known to directly, specifically and concurrently investigate
6
7 271 the attitudes, beliefs and behaviours of GPs regarding exercise for patients with CKP. The
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9 272 questionnaire was pre-tested and piloted before being used in this main study. Employing a
10
11 273 vignette provided a consistent patient scenario to all GPs[45-48] and minimised the
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13 274 confounders inherent in observational research investigating clinical management using real
14
15 275 patients.[46,47] Limitations of this study include the likely over-estimation of exercise use
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17 276 among GPs given the low response rate (response bias), the self-report nature of the
18
19 277 questionnaire (social desirability bias) and the relatively uncomplicated vignette case. Due to
20
21 278 the use of survey methodology, we could not explore the reasons underlying GPs
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23 279 responses. However, as GPs should be using exercise for all patients with CKP, the results
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25 280 of this survey are valuable for indicating an apparent evidence-practice gap in the way in
26
27 281 which GPs employ exercise with this patient group.
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30 282 **Implications for future practice**
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33 283 Implementation of current evidence-based recommendations for the management of CKP
34
35 284 needs to be improved among GPs in the UK. It is possible that at least part of the problem in
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37 285 implementing the recommendations is the lack of explicit guidance regarding the role of
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39 286 GPs, and other members of the multidisciplinary team who may be involved in, managing
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41 287 patients with this condition. This is perhaps reflected by the variable perceptions among GPs
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43 288 regarding their role in managing CKP and the extent to which they believe they should
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45 289 provide exercise advice or prescription. However, given the apparent association between
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47 290 perceived role and behaviour among the GPs who responded to the survey (reported
48
49 291 elsewhere [17]), greater clarity of roles and expectations of all professional groups would be
50
51 292 a good starting point for improving implementation of guidelines.
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53 293 To deliver best practice for patients with CKP, strategies which target both GPs and the
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55 294 wider primary care team are needed. Two key areas should be addressed: i) development of
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3 295 a pragmatic approach for GPs to initiate individualised local and general exercise and ii)
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5 296 identification of additional methods of initiating exercise and/or supporting patients to
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7 297 continue with exercise that do not solely rely on GPs. Given that theoretical patient
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9 298 behaviour change models[49] often involve a balance of perceived value and risks/burdens
10
11 299 of undertaking the new behaviour, a pragmatic approach for GPs initiating exercise among
12
13 300 patients with CKP would need to highlight the value of exercise to patients, its role relative to
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15 301 other interventions and practical ways to undertake specific and individualised exercise.
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17 302 Such a best practice approach was suggested by Khan et al[50] who recommended that
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19 303 GPs should encourage the use of exercise (e.g. by asking about physical activity at each
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21 304 consultation), consider the '5 A's' of physical activity counselling (assess, advise, agree,
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23 305 assist and arrange),[51] write an exercise prescription,[52-54] and refer or signpost to
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25 306 appropriate professionals or resources for exercise support and/or follow-up. Supplementary
26
27 307 written leaflets or 'guidebooks' seem to be acceptable and useful[55] and can be accessed
28
29 308 or signposted within consultations; for example, the Keele University OA guidebook[56] and
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31 309 the Arthritis Research UK knee OA booklet.[57] Given that CKP patients commonly have
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33 310 comorbidities[38,58,59] and multiple joint pain, GPs could use this opportunity to detect and
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35 311 manage comorbid conditions that may directly impact the use of exercise (e.g.
36
37 312 cardiovascular disease, depression[60]), to relay the synergistic benefits of exercise for all
38
39 313 relevant morbidities, and to make explicit that CKP should not prevent exercise for other
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41 314 conditions. Practical methods to help GPs provide the above information, in limited available
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43 315 time, need to be developed and may include personalised written care plans.[61] Given that
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45 316 time was the most frequently reported barrier to GPs initiating exercise, service delivery
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47 317 models may need to change such that exercise initiation, support and/or follow-up is
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49 318 primarily undertaken by other professionals such as physiotherapists,[62,63] practice
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51 319 nurses,[64] health trainers or local gym personnel. Direct access may enhance patients'
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53 320 utilisation of physiotherapists[65] and alternative, low GP burden, strategies could be
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55 321 explored to promote exercise use and/or follow-up. For example, technology enabled care
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3 322 services[66] have shown promise when used to support exercise interventions among
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5 323 patients with cardiac[67] and chronic lung disease.[68]
6

7 324 **CONCLUSIONS**

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10 325 Although the majority of UK GPs who responded to the questionnaire survey were positive
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12 326 about exercise for patients with CKP and used exercise in their clinical management, this
13
14 327 survey identified GP uncertainties with respect to the safety and efficacy of exercise and
15
16 328 suboptimal approaches to the initiation of exercise with patients. GPs' use of exercise may
17
18 329 be improved by addressing the key barriers of time and expertise, by developing a pragmatic
19
20 330 approach that supports GPs to initiate individualised exercise with patients, and/or by other
21
22 331 professionals taking on this role.
23

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26
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29
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31
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33

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35
36
37 337 EC, NF, MP, TR, and ER participated in the design of the study, analysis of the results and
38
39 338 helped to draft the manuscript. All authors read and approved the final manuscript.
40

41 339 **COMPETING INTERESTS**

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45 340 The authors declare that they have no competing interests.
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47

48 341 **DATA SHARING**

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50
51 342 The datasets analysed during the current study available from the corresponding author on
52
53 343 reasonable request.
54

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12
13 350 and not necessarily those of the NHS, the NIHR or the Department of Health.

15 351 **ETHICAL APPROVAL**

17
18 352 Ethical approval for the study was obtained from Keele University (UK) Ethical Review
19
20 353 Panel.

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19 546 **FIGURES**

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22 547 Figure 1 Flow-chart summarising the exercise types and initiation methods used by GPs' for
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24 548 the vignette patient with CKP
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27 549 Figure 2 Barriers to using exercise reported by GPs
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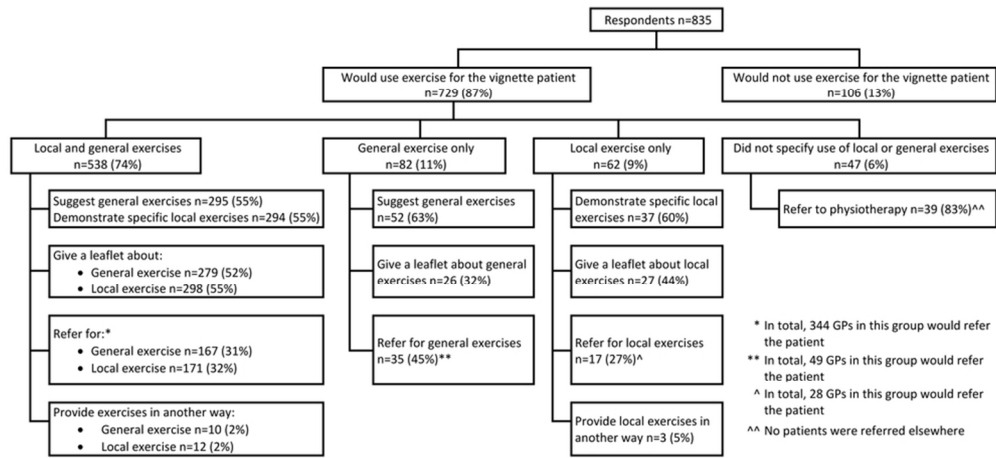


Figure 1 Flow-chart summarising the exercise types and initiation methods used by GPs' for the vignette patient with CKP

84x40mm (300 x 300 DPI)

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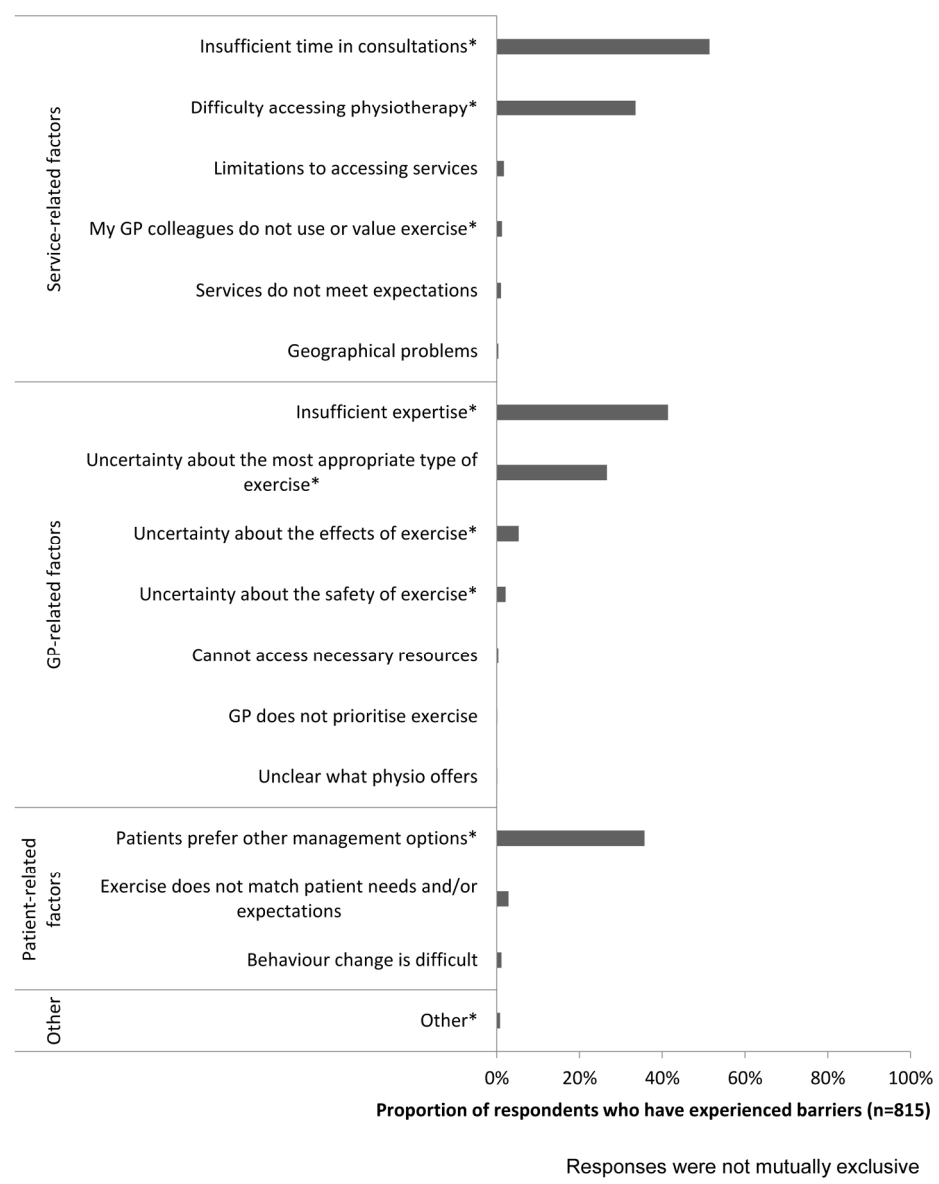


Figure 2 Barriers to using exercise reported by GPs [asterisks denote barriers provided as a multiple response option in the questionnaire]

169x209mm (300 x 300 DPI)

Management of Chronic Knee Pain Study

We are seeking the views of general practitioners who treat patients over 45 years old, with chronic knee pain.

If you **are not** a general practitioner, please tick this box and return the questionnaire without completing it any further

If you **have not** managed someone with chronic knee pain in the last 6 months, please tick this box and return the questionnaire without completing it any further.

This questionnaire should take no more than **20 minutes** to complete.

Return of your completed questionnaire will be interpreted as you providing your consent to participate in this study.

If you would like to participate in this study please either:

- Complete this paper version of the questionnaire and return it to Dr Elizabeth Cottrell, Academic Clinical Fellow GP Specialty Trainee, at the Arthritis Research UK Primary Care Centre, Keele University, Staffordshire, ST5 5BG using the enclosed FREEPOST envelope.
OR

- Complete the online version of this questionnaire accessible at https://www.surveymonkey.com/s/Management_CKP

If you have any questions about this questionnaire or the study in general you can email Dr Elizabeth Cottrell at e.cottrell@keele.ac.uk

Instructions for completing this questionnaire

- When completing the questionnaire, please try and provide answers that most accurately reflect your usual clinical practice. There are no 'correct' or 'incorrect' answers.
- Where relevant please answer questions by ticking a box e.g.
- Please do not consult any literature while completing this questionnaire.

Thank you for your help with this study

Unique
survey ID

Section 1: About you

1.1 Please state the year in which you qualified as a General Practitioner

1.2 How many General Practitioners work in your practice (including yourself)?

1.3 How do you best **describe yourself** (please tick **one box** only)

- GP Partner Salaried GP Locum GP
 Other, please specify

1.4 Is your practice Urban Semi-rural Rural

1.5 Are you Male Female

1.6 Are you a **GP with a special interest (GPwSI)** in musculoskeletal conditions?

- Yes No

1.7 Do you remember receiving any specific postgraduate musculoskeletal training which contained education about chronic knee pain? (By this we do not mean clinical placements or jobs in rheumatology or orthopaedics)

- Yes No

1.8 Do you have, or have you ever suffered from chronic knee pain **yourself**?

- Yes No

Section 2: Clinical scenario of a patient with chronic knee pain

Presented below is a clinical scenario of a patient **with chronic knee pain** who presents to you with this problem for the first time. All questions that follow relate to the care you would give this particular patient. Think about the patient's first consultation with you.

Patient: Mrs Jones, 58-year-old Prison Officer

History: First presentation of gradually worsening bilateral knee pain (right worse than left) over 2 years
 No history of trauma
 Pain always present when walking and at rest, worst when climbing stairs. No night pain.
 Managing activities of daily living. Difficulty gardening.
 Stopped going to gym – thinks was making pain worse
 Only treatment tried is Ibuprofen once or twice when pain "really bad" – no benefit.
 Came today finding work increasingly difficult due to the stairs
 Usually well – no comorbidities

Medication: Nil

Examination: Body Mass Index 33
 Knees – bilaterally no effusions. Joint tenderness upon palpation. Bilateral coarse crepitations.
 Slightly reduced flexion of the right knee.
 Hips – no abnormality detected

2.1 What **diagnosis** would you make at this point?

2.2 Using the words you would use with the patient, **briefly** state how you would **describe your diagnosis** to the patient

2.3 The patient's **symptoms** are: (please tick the **one** box that best reflects your opinion)

- Very severe Severe Moderate Mild Very mild

2.4 It is most likely that this patient's symptoms result from **knee damage** that is: (please tick the **one** box that best reflects your opinion)

- Very severe Severe Moderate Mild Very mild

2.5 Using the words you would use with the patient, **briefly** describe **what the future is likely to hold** with regards to her knee problem

2.6 What **investigation(s)/assessment(s)** would you do/order for this patient **at this point** and for what reason?

Please tick all you would undertake	Please indicate the reason for choosing this investigation (tick all that apply)					
	Reassure patient	To meet referral criteria	Confirm diagnosis	Inform treatment	Rule out other diagnoses	Inform prognosis
<input type="checkbox"/> None	---	---	---	---	---	---
<input type="checkbox"/> Blood tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Oxford knee score	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Knee x-ray	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other - please state _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.7 **At this consultation**, what approaches would you use, or suggest, to manage this patient? (please tick **all** that apply)

- | | | | |
|--------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> Ice | <input type="checkbox"/> Keep active | <input type="checkbox"/> Weak opioids (e.g. codeine) | <input type="checkbox"/> Topical NSAID |
| <input type="checkbox"/> Heat | <input type="checkbox"/> Provision of walking stick(s) | <input type="checkbox"/> COX II inhibitor | <input type="checkbox"/> Paracetamol |
| <input type="checkbox"/> Acupuncture | <input type="checkbox"/> Advice on footwear | <input type="checkbox"/> Antidepressants | <input type="checkbox"/> Glucosamine/chondroitin |
| <input type="checkbox"/> Rest | <input type="checkbox"/> Exercise | <input type="checkbox"/> Injection of steroids | <input type="checkbox"/> Topical capsaicin |
| <input type="checkbox"/> Weight loss | <input type="checkbox"/> Bed rest | <input type="checkbox"/> Oral non-selective NSAIDs (e.g. Ibuprofen) | <input type="checkbox"/> Strong opioids (e.g. morphine, Tramadol) |
| <input type="checkbox"/> None | <input type="checkbox"/> Transcutaneous electrical nerve stimulation | | |
| <input type="checkbox"/> Other (please state)
_____ | | | |

If you ticked "Exercise" in question 2.7 please go on to answer question 2.8. If not, please move straight on to question 2.9

2.8 There are a variety of approaches that can be used to manage chronic knee pain in general practice.

Of the following different approaches, **which, if any, would you use for this patient at this point?**

- a) General exercises or increasing physical activity
- I would use If you **would use** this strategy, please give details about what you would **actually do** (please tick any that apply)
- Suggest general exercises Please state type of exercise _____
- Give a leaflet _____
- Refer _____
- Other Please state what other actions you would do _____

I would **not** use If you **would not use** the strategy **but would like to**, please tell us **what prevents** you (please tick any that apply)

Insufficient expertise Insufficient time

Other Please state what other reasons prevent you (e.g. patient factors, access difficulties, uncertainty of benefit etc) _____

- b) Local knee or quadriceps strengthening exercises
- I would use If you **would use** this strategy, please give details about what you would **actually do** (please tick any that apply)
- Demonstrate specific exercises
- Give a leaflet _____
- Refer _____
- Other Please state what other actions you would do _____

I would **not** use If you **would not use** the strategy **but would like to**, please tell us **what prevents** you (please tick any that apply)

Insufficient expertise Insufficient time

Other Please state what other reasons prevent you (e.g. patient factors, access difficulties, uncertainty of benefit etc) _____

- c) Follow up patient to check to see if she is undertaking exercise on a regular basis
- I would use If you **would use** this strategy, please give details about what you would **actually do** (please tick any that apply)
- Planned follow-up When Please define number of days/weeks/months _____
- How Face to face Via telephone
- With whom Yourself Another professional or service – please state _____

Opportunistic follow-up When If patient fails to improve Check when patient is next seen with this or any problem

Other Please state what other actions you would do _____

I would **not** use If you **would not use** the strategy **but would like to**, please tell us **what prevents** you (please tick any that apply)

Insufficient expertise Insufficient time

Other Please state what other reasons prevent you _____

2.9 Would you refer the patient to see someone else, either in the primary or community team or into secondary care, at this point? Yes No

If yes, to whom would you refer her?

2.10 Do you usually provide **written information** for patients in this situation? Yes No

If yes, please state the source of your written information

Patient.co.uk or Emis Mentor Arthritis Research UK (previously known as ARC) or Arthritis Care Other, please state _____

If you would provide written information, it would be very helpful to see a copy by returning it in the freepost envelope provided (**please write on your unique survey ID**) or by providing us with the link for any online information you access.

We are interested in your clinical opinion about patients **aged 45 years and over** with **chronic knee pain**. In this age group chronic knee pain is almost always due to knee osteoarthritis. Please answer all of the following questions using the definition of chronic knee pain as follows: knee pain and associated symptoms that have been present for more than 3 months not resulting from a fracture, infection, systemic rheumatological problem, metastases or surgery.

Section 3: Chronic knee pain in general practice

	I have never heard about or read it	I have heard of it but not seen it	I have seen it but not read it	I have read the full guideline and/or summary	I have read and consider the guideline when planning management
3.1 How much have you heard about or read the guideline published by NICE in 2008 for the care and management of osteoarthritis in adults? (please tick one box)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please consider **your role** in managing patients aged over 45 years old with chronic knee pain. Please indicate the extent to which you agree or disagree with the statements given by ticking **one** box per row.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
3.2 It is part of my job to manage people with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3 I have enough time to manage patients with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4 Managing patients with chronic knee pain is a priority for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5 Managing patients with chronic knee pain is of clinical interest to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6 It is part of my job to reassure patients about the safety of exercise for chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 It is part of my job to provide patients with chronic knee pain with a written management plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- | | I have no role in including exercise in the management | I inform patients that exercise is a management option | I advise patients to use exercise to manage their knee pain | I recommend the types of exercise patients could use | I give information on the type, frequency and duration of specific exercises |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------|
| 3.8 | Which statement best describes your role in including exercise in the management plan of a patient with chronic knee pain? (please tick one box) | | | | |
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3.9 | We are interested to hear about your experiences of barriers which might prevent the use of exercise in your management of chronic knee pain. Please tick all of the barriers that you have experienced | | | | |
| | <input type="checkbox"/> Insufficient time in consultations | <input type="checkbox"/> Insufficient expertise to give detailed information | <input type="checkbox"/> Difficulty accessing physiotherapy | <input type="checkbox"/> Uncertainty about the effects of exercise | |
| | <input type="checkbox"/> Patients prefer other management options | <input type="checkbox"/> My GP colleagues do not use or value exercise | <input type="checkbox"/> Uncertainty about the most appropriate type of exercise | <input type="checkbox"/> Uncertainty about the safety of exercise | |
| | <input type="checkbox"/> Other (please state) _____ | | | | |
| | _____ | | | | |

Section 4: Your views about chronic knee pain

Below is a list of **possible causes** for a patient developing chronic knee pain. Please indicate the extent to which you agree or disagree with these causes by ticking **one** box in each row.

		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
4.1	Hereditary/runs in the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Being overweight/obese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3	A person's own mental attitude e.g. thinking about life negatively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4	A person's emotional state e.g. feeling down, anxious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5	Ageing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.6	Accident or injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.7	Manual work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.8	Sport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.9	Osteoarthritis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10	Changes consistent with osteoarthritis seen on x-ray	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

When completing the following questions, please consider patients **aged over 45 years old** with **chronic knee pain**. Please indicate the extent to which you agree or disagree with the statements given by ticking one box per row.

		Totally disagree	Largely disagree	Disagree to some extent	Agree to some extent	Largely agree	Totally agree
4.11	Mental stress can cause chronic knee pain even in the absence of tissue damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.12	The cause of chronic knee pain is unknown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.13	Pain is a nociceptive stimulus, indicating tissue damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.14	A patient suffering from severe chronic knee pain will benefit from physical exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.15	Functional limitations associated with chronic knee pain are the result of psychosocial factors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.16	Patients with chronic knee pain should preferably practice only pain free movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.17	Therapy may have been successful even if pain remains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.18	Chronic knee pain indicates the presence of organic injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.19	If chronic knee pain increases in severity, I immediately adjust the intensity of my treatment accordingly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.20	If therapy does not result in a reduction in chronic knee pain, there is a high risk of severe restrictions in the long term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.21	Pain reduction is a precondition for the restoration of normal functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.22	Increased pain indicates new tissue damage or the spread of existing damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.23	There is no effective treatment to eliminate chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.24	Even if the pain has worsened, the intensity of the next treatment can be increased	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.25	If patients complain of pain during exercise, I worry that damage is being caused	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.26	The severity of tissue damage determines the level of pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.27	Learning to cope with stress promotes recovery from chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.28	Exercises that may be knee straining should <u>not</u> be avoided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.29	In the long run, patients with chronic knee pain have a higher risk of developing severe functional impairments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 5: Your views about the role of exercise in treating chronic knee pain

We are interested in your views about the **role of exercise** in the treatment of **chronic knee pain in patients over 45 years old**. Please indicate the extent to which you agree or disagree with the statements given by ticking one box per row.

		Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
5.1	GPs should prescribe quadriceps strengthening exercises to every patient with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2	GPs should prescribe general exercise, for example, walking or swimming, for every patient with chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3	Knee problems are improved by quadriceps strengthening exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4	Knee problems are improved by general exercise, for example walking or swimming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5	Quadriceps strengthening exercises for the knee are safe for everybody to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.6	General exercise, for example walking or swimming is safe for everybody to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.7	Exercise for chronic knee pain is most beneficial when it is tailored to meet individual patient needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.8	A standard set of exercises is sufficient for every patient with chronic knee problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.9	GPs should educate chronic knee pain patients about how to change their lifestyle for the better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.10	It is important that people with chronic knee pain increase their overall activity levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.11	How well a patient complies with their exercise programme determines how effective it will be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.12	GPs should follow up patients to monitor extent of continuation of exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.13	It is the patient's own responsibility to continue doing their exercise programme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.14	Exercise is effective for patients if an x-ray shows severe knee osteoarthritis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.15	Exercise works just as well for everybody, regardless of the amount of pain they have	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.16	Increasing the strength of the muscles around the knee stops the knee problem getting worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.17	Increasing overall activity levels stops the knee problem getting worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.18	Exercise for chronic knee pain is more effectively provided by physiotherapists than GPs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.19	Time constraints prevent GPs from providing advice on individual exercises for chronic knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.20	Exercise for chronic knee pain should preferably be used after drug treatment has been tried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.21	Exercise for chronic knee pain would be used more frequently if access to physiotherapy was easier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 **Would you be happy for us to contact you again in the future regarding this study?**

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3 Yes

4

5 No

6
7 **If you answered YES to the question above please provide your name and contact details**
8 **below (these details will be kept separately from your responses to the questionnaire):**
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10 Name:	
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31 **End of Questionnaire**

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33 You have reached the end of the questionnaire. Please return the questionnaire in the
34 **FREEPOST** envelope provided.

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36 If you have any questions about this questionnaire or the study in general, you can email
37 Dr Elizabeth Cottrell at e.cottrell@keele.ac.uk
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40 **Thank you for taking the time to complete this questionnaire. Your**
41 **time and participation is greatly appreciated.**
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