

# Why should we exercise when our knees hurt?

## A qualitative study of primary care patients with osteoarthritis of the knee

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**Background.** Osteoarthritis (OA) of the knee is common and disabling. Exercise is effective in reducing pain and disability, but long-term adherence to exercise regimens is disappointing, and motivation to exercise in those with OA knee is poorly understood.

**Objectives.** To examine the views of primary care patients with OA knee towards exercise, explore factors that determine the acceptability and motivation to exercise, and to identify barriers that limit its use.

**Method.** Semi-structured interviews were conducted with 22 primary care patients with OA knee, six of whom also participated in a focus group for triangulation. Transcripts were coded into categories and themes to develop a conceptual framework and typology of exercise behaviour.

**Results.** Exercise behaviour depended upon physical capacity to exercise; exercise beliefs and other factors such as enjoyment, social support, priority setting and context. Four types of patients were identified: 'long-term sedentary' who had never exercised; 'long-term active' who continued to exercise; 'exercise retired' who used to exercise, but had stopped because of their symptoms, and because they believed that exercise was damaging their joints; and 'exercise converted' who recently started to exercise, and preferred a gym because of the supervision and social support they received there.

**Conclusions.** Several physical, cognitive and contextual factors, and a typology of exercise behaviour were identified that could be addressed in primary care consultations. The importance of gyms and GP referral schemes for people who are exercising for the first time, and the high level of patient satisfaction associated with these were highlighted.

**Keywords.** Rheumatology, orthopaedics, qualitative research, pain.

### Background

Osteoarthritis (OA) of the knee is common, costly and disabling, whether diagnosed by radiographic or clinical criteria.<sup>1,2</sup> Previous knee injury, obesity and a history of regular sports participation or heavy physical activity have been identified as risk factors for OA knee,<sup>3–6</sup> but moderate physical exercise is associated with a decreased risk.<sup>7</sup> Although the main

determinants of disability are quadriceps weakness and psychosocial factors,<sup>8–11</sup> primary care management is mainly focused on pain relief. Systematic reviews of non-pharmacological interventions have highlighted the efficacy of exercise in reducing pain and disability.<sup>12–15</sup> Despite these benefits, long-term adherence to exercise regimens is disappointing,<sup>16,17</sup> and if exercise is not maintained its beneficial effects decline over time and finally disappear.<sup>18</sup> The important

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factors associated with regular exercise among older adults are exercise history, exercise attitude, self-efficacy, social support and perceived benefits to activity, which correlate positively with regular exercise; perceived frailty, and poor health, which act as barriers to exercise adoption and adherence.<sup>19</sup>

A variety of interventions have been used to promote exercise in primary care patients, including taught exercises by a physiotherapist,<sup>20</sup> group education<sup>21</sup> and exercise prescription schemes;<sup>22</sup> but their effect on long-term exercise behaviour is uncertain. A qualitative study nested within a randomised controlled trial of physiotherapy exercises for OA knee found that long-term adherence to the exercise programme was influenced by a positive attitude to exercise in general, and the perceived effectiveness of the exercise programme in particular; participants' ideas about the cause of arthritis, and the perceived severity of knee symptoms.<sup>20</sup> It is not known if these exercise interventions are acceptable and helpful to all of those with knee arthritis or only to subgroups. The aims of this study were to examine the views of primary care patients with OA of the knee towards exercise, to explore factors that determine the acceptability and motivation to exercise and to identify barriers that limit its use that could be addressed in primary care consultations.

## Method

A qualitative method was chosen as most appropriate for exploring experiences, opinions and feelings. Five general practices across North Wales were recruited to represent as far as possible the geographic and socio-economic diversity of the region. One practice was urban, one rural, one in an ex-mining village and two in seaside towns. The objective was to recruit a purposive sample of at least 20 patients labelled with a diagnosis of OA knee from these practices' disease registers (however diagnosed) in order to include those managed conservatively and those awaiting knee replacement; those with recent onset of symptoms and those with longstanding symptoms; and those who had participated in an exercise scheme and those who had not. In this manner we aimed to reflect the full range of experience and attitudes of people with OA knee. Potential participants were identified to the researchers by their GP and invited by letter to take part. As it proved difficult to identify patients who had been referred to an exercise scheme in this way, posters were used to recruit participants directly from the gyms that operated the schemes. A semi-structured interview lasting 45–60 minutes was conducted with each participant.

A topic guide was developed from a literature review and during pilot interviews and continually

refined in an iterative manner throughout the interviews (Appendix 1). Participants were encouraged to express any views or ideas related to their experience of OA knee, particularly with regard to the effect of exercise on their OA symptoms and vice versa. The pilot interviews revealed widely differing views about the definition of 'exercise'. In order to be inclusive, exercise was broadly defined to include attending a gym, brisk walking, cycling or participating in sports as well as 'therapeutic exercises' prescribed by a health professional. 'Physical activity' was defined as active work, housework, gardening or hobbies.

The interviews, conducted in participants' homes by MH, were recorded and fully transcribed. The transcripts were transferred to the QSR NUD\*IST computer programme,<sup>23</sup> which aids the management and indexing of qualitative data. Transcripts were initially read and coded independently by MH and NHW into categories, themes and sub-themes after each interview had taken place. Disagreements were resolved by discussion and previously coded transcripts were reviewed in an iterative fashion as themes developed. Further analysis was conducted after the completion of all the interviews mainly by MH with regular discussion with NHW and contributions from the other authors. Subsequently, all of the interviewees were invited to participate in a focus group where emerging themes were presented using Microsoft PowerPoint, and participants were invited to give feedback. The focus group discussion was recorded, fully transcribed and coded in the same way as the interviews. The purpose of the focus group was to enhance the validity of the study by using a different method to triangulate the findings.<sup>24</sup> As well as confirming the interview findings, the focus group generated additional accounts from individual perspectives within the group, thus adding to the richness of the data and extending the comprehensiveness of the study.<sup>24</sup> The key points of each piece of coded data were summarised in a thematic chart, retaining the context and language in which it was expressed, according to the principles of the Framework method of qualitative analysis.<sup>25</sup> The chart was then used to describe the relationship between the themes in a conceptual framework; followed by a typology of exercise behaviour.

## Results

### *Sample description*

Forty eligible patients were identified by GPs. Twenty of these agreed to participate and were interviewed; two more were recruited from gyms. Of the 22 who were interviewed, 16 were women. Their age range was 52–86 years, and the duration of symptoms between 6 months and 25 years. The severity of their

TABLE 1 *Participants' characteristics*

ID	Sex	Age	Symptom years	Pain <sup>a</sup>	Disability <sup>a</sup>	For knee surgery?	Goes to gym?	Focus group	
1	F	66	3	Severe and constant	Severe	Yes	No	No	
2	F	59	1.5	Mild	Slight	No	No	No	
3	F	64	5 or 6	Mild; severe in acute episodes	Slight	No	No	No	
4	M	77	1	Moderate	Moderate	No	No	Yes	
5	M	77	Interview not included because of recording equipment failure						
6	M	52	6 or 7	Severe and constant	Severe	Yes	No	No	
7	F	47	Interview cancelled because of participant's work commitments						
8	F	56	18	Moderate	Moderate	No	No	No	
9	F	55	Several	Moderate to severe	Slight to moderate	No	Self-referral	No	
10	M	67	15	Moderate; severe in acute episodes	Moderate	No	No	Yes	
11	F	73	Several	Moderate	Moderate	No	No	Yes	
12	M	68	8	Mild; severe in acute episodes	Slight	No	No	No	
13	F	72	2 or 3	Moderate; severe in acute episodes	Slight	No	No	No	
14	F	89	25	Moderate to severe	Severe	No	No	No	
15	F	51	8	Moderate; severe in acute episodes	Moderate	No	No	Yes	
16	F	75	20	Moderate to severe	Severe	No	No	No	
17	M	70	10–15	Moderate	Moderate	No	No	No	
18	F	73	5	Moderate	Severe	No	No	No	
19	M	67	Interview cancelled because of participant's admission to hospital						
20	F	65	10	Moderate	Slight to moderate	No	GP referral	Yes	
21	M	75	2	Moderate	Slight to moderate	No	GP referral	No	
22	F	61	Several	Moderate	Slight	No	GP referral	No	
23	F	55	5	Moderate	Moderate	No	GP referral	Yes	
24	F	57	10	Mild	Slight	No	No	No	
25	F	56	12	Mild; severe in acute episodes	slight	No	Self referral	No	

<sup>a</sup> Assessed from participants' description of their symptoms.

knee problem varied from relatively mild, requiring occasional pain relief, to more severe symptoms that had led to referral for knee replacement surgery. The degree of disability varied from minor restrictions in activity to being housebound. Six agreed to participate in the focus group (Table 1).

#### *Emerging categories and themes*

Three main categories emerged that explained exercise behaviour. These were physical capacity, beliefs about exercise and motivating factors (Tables 2–4).

#### *Perception of physical capacity (Table 2)*

Participants' ability to exercise was limited by the pain and stiffness in their knees, which restricted both the type and amount of exercise that was possible. Ability was also limited by a perceived general lack of physical fitness, sometimes attributed to old age, as well as co-morbidity including angina, lymphoedema, congenitally malformed hip and osteoporosis.

#### *Beliefs about exercise (Table 3)*

Participants' beliefs about the role of exercise and its effect on OA knee were influenced by three main factors:

*Personal experience.* Some found that exercise was helpful for relieving pain; others found that pain persisted, but stiffness and mobility improved; others

TABLE 2 *Themes of the perception of physical capacity category*

CATEGORY
Theme
Element paraphrased from raw data (participant ID number)
PHYSICAL CAPACITY
Knee-specific limitations to exercise
I can't walk as fast or as far as I used to because my knee hurts. (2, 4, 6, 11, 12, 17, 20, 21)
My knee is stiff, especially first thing in the morning or after resting. (3, 4, 6, 8, 9, 11, 20)
Going downhill or downstairs is particularly painful. (2, 6, 8, 12, 16, 71, 21, 22)
Anything that would jog or jar my knee would really hurt. (1, 2)
I can't swim any more because breaststroke is bad for my knee. (3, 15)
It's hard to get going on a bike and very painful. (20, 22)
It's absolute agony in spite of painkillers, so any activity is very limited. (1, 6)
General limitations to exercise
I've reached an age where exercise doesn't help, I just get tired. (4, 21)
I'm not fit and agile enough to do exercises. (14, 16, 18)

found no improvement in knee symptoms. Some commented on an improvement in general well-being.

“You just feel great when you've done it... so this is why I persevere, painful knees or not... you know, they say exercise releases happy something in your brain and it certainly does...” (22)

TABLE 3 Themes of the beliefs about exercise category

CATEGORY
Theme
Sub-theme
Element paraphrased from raw data (participant ID number)
<b>BELIEFS ABOUT EXERCISE</b>
Personal experience
Exercise for OA knee
Exercise is the best thing for relieving the pain (2, 3)
Exercise doesn't help pain but it gets it going, improves stiffness and mobility. (12, 15, 20, 23)
Exercise doesn't help my knees at all. (4, 6, 18)
Exercise for health and well-being
You feel great when you exercise, it gives you a buzz.(9, 22, 25)
Exercise is part of a healthy lifestyle, it improves fitness and I feel better for it. (10, 21, 22, 24, 25)
Exercise advice
In favour of exercise
My doctor told me to keep exercising and not to stop. (9)
The physiotherapist told me to exercise. (3, 10, 11, 15, 18)
My doctor showed me how to do quads exercises to strengthen the muscles. (2, 16, 20)
My doctor gave me a referral to the gym. (20, 21, 22, 23)
I was given advice about exercise at the gym. (6, 15)
Against exercise
At the hospital they told me I shouldn't overdo exercise, I should look after my knees. (3, 8)
Vague advice or no advice
He told me to take painkillers and keep my knees moving but he didn't advise any particular kind of exercise. (22)
I haven't had any advice about exercising and what exercises to do. (1, 17)
Doctors could give you more encouragement to exercise; I had to get the referral form from the gym myself and ask him to sign it. (20, 25)
Aetiology of arthritis
Wear and tear
It's caused by heavy work, always being on your feet or doing a lot of sport when young. (1, 2, 6, 9, 10, 11, 13, 17, 18, 20)
If it's caused by wear and tear, exercise is only going to make it worse. (1, 4, 6, 9, 11, 16, 17)
Pain is a reminder to slow down, a warning sign. (4, 15)
Excess weight
Being overweight has made my knee problem worse. (20, 23, 24)
It's a vicious circle; you put on weight because you don't want to exercise when your knees hurt and then they hurt more because of the extra weight. (15, 20)

*Exercise advice.* Advice from health professionals was mainly in favour of exercise and consisted of encouragement to exercise, advice about specific exercises, and referral to a gym. Sometimes the advice was vague or absent,

“I think they would have told me in the clinic if I should be exercising and what exercises to do.” (1)

Occasionally exercise was discouraged,

“...they [hospital doctors] said, ‘the walking’s agitating you, your joints, so stop it’.” (3)

*Aetiology of arthritis.* Many participants were worried that exercise was wearing out their joints. Some believed that their joint problems were a direct result of excessive sport or heavy manual work when younger. They reasoned that if OA is caused by wear and tear, then exercise would exacerbate the disease process.

“If it’s wear and tear on the bone, is it helping to do all this exercising, walking and that?” (11)

Analgesics were used warily, as there was concern that they might disguise the warning function of pain.

“I’m not keen to take things because they’re not going to cure it, and I mean to hide it is not strictly a good idea because you do things and it makes it worse.” (4)

Excess weight not only aggravated the knee symptoms, but was partly caused by lack of exercise. A vicious circle was created, whereby exercise was restricted by the knee symptoms, which encouraged weight gain, which in turn aggravated the knee problem.

#### *Motivational factors (Table 4)*

*Enjoyment and social support.* Not surprisingly, people who enjoyed exercising were likely to continue; those that disliked it stopped. Those that enjoyed exercise often appreciated the social benefits of companionship and meeting others whilst exercising.

TABLE 4 Themes of the motivational factors category

## CATEGORY

## Theme

## Sub-theme

Element paraphrased from raw data (participant ID number)

## MOTIVATIONAL FACTORS

## Enjoyment

## Positive

I like cycling/swimming/walking. (2, 6, 8, 15, 20, 25)

I really do enjoy the gym; I look forward to going. (9, 20, 21, 22, 23, 25)

I enjoy dancing. (9, 22)

## Negative

I'm not keen on swimming/walking/going to the gym. (2, 11, 12, 21)

I didn't like exercising on the machines at the gym. I think they're really boring. (24)

I can't enjoy exercise because it's so painful. (2, 11)

## Social support

I like the gym referral scheme because you're in a group of people who all have problems. (20, 23)

I go walking/swimming/cycling to the gym with my husband/wife/friend. (6, 10, 11, 15, 21, 23, 24)

You meet people at the gym and make friends. (20, 23, 25)

I go out for walks with my dog. (2, 22)

## Taking control of disability

## Positive

I'm determined not to let my knee problem stop me from doing the things I want to do. (2, 9, 10, 13, 20, 23, 24)

I realised my mobility would get worse if I didn't do something about it so I started exercising. (2, 3, 20, 25)

I asked my GP to refer me to the gym. (20, 24, 25)

The idea of becoming immobile made me determined to lose weight. (20, 23, 24)

The doctor can give advice but it's my body, it's up to me to do something about it. (15)

## Negative

I've accepted my limitations and said goodbye to going out. (14)

There's no cure, only pain relief. (8)

## Priority setting

## Positive

I try to fit exercise into my weekly routine. (25)

I'm on a gym referral scheme, so I have a set time to go and that helps. (20, 23)

## Negative

I do my exercises when I remember but when I'm busy I forget. (15, 11)

I don't have enough self-discipline to make me exercise regularly. (11)

Finding the time to go to the gym is a problem. (2, 21, 24)

## Context

## Amount of exercise

I get enough exercise leading an active life. (2, 4, 8, 10, 11, 12)

You can't do too much exercise; take painkillers, if you need to, and keep going. (10)

There's a basic level of exercise that I have to do to keep the joints flexible, so I can get up and move around. (20)

Day-to-day activity isn't enough to keep you mobile. (15, 20)

You should do moderate exercise; overdoing it could make things worse. (17, 20)

## Location

I'm happy to go to the gym. (9, 20, 21, 23, 25)

I'd be too embarrassed to go to a gym. (1, 8)

I would go to a gym if my doctor referred me. (11, 13, 16)

I imagined the people at the gym would all be young and fit and that I would feel out of place but it wasn't like that at all. (23, 25)

The bikes at the gym are easier to use and safer than cycling in traffic. (10, 20)

The gym is safer for women than going out walking alone. (24)

I prefer to do outdoor exercise like cycling or walking. (10, 15)

I would rather do exercises at home. (1)

## Supervision

I think the physiotherapist or someone with a medical background is the best person to supervise exercise. (3, 8)

The gym instructors advise you and give you confidence that you're not going to make things worse. (9, 20, 23, 24, 25)

At the gym they give you one-to-one attention and an individual programme that's right for your body. (20, 23, 24, 25)

The supervision at the gym is very good; they monitor what you do. (9, 21, 23, 25)

*Taking control of disability.* Some participants were determined to take control of their disability and used exercise as a means of actively maintaining or improving their mobility. In some cases this determination was such that they continued to exercise in

spite of a belief that OA was caused by 'wear and tear'.

"So your movement is important; this is why I want to get back into a regular exercise routine, so I can do more to help myself." (15)

However others had become resigned to their physical limitations.

“I’ve had to realise that there is a limit... you can say goodbye to sort of just going off out.” (14)

*Priority setting.* Prioritising exercise and making it part of a weekly routine helped some people to maintain their exercise habit.

“...I try and say, ‘OK well I’ll go there [gym], have a shower and go shopping’. I also work in a charity shop on a Saturday so I can go before I go there you know... I try to fit it in.” (25)

For others finding time to exercise was a low priority; some because they did not consider exercise to be important or appropriate, whilst others freely admitted to being lazy or lacking motivation.

*Context.* There was a broad range of opinion as to the appropriate level of exercise. Some felt that keeping active was sufficient; others that this was insufficient. One participant felt that it was not possible to do too much exercise, but others felt that excessive exercise would make the knee problem worse. The location of exercise was important. Some preferred exercising at home; others preferred outdoors. Some who had tried exercising at a gym did not enjoy it.

“I wasn’t keen on doing things on the machines ‘cause I think that they’re so boring.” (24)

Gyms were sometimes viewed as inappropriate places.

“They’re mostly young people that go to those aren’t they? I think I’d feel out of place... They don’t want to be dragged down by somebody that’s not up to their standard I would think.” (1)

Others found by experience that this was not the case.

“I imagined... all these fit people you know, bodies like Adonis... I thought that I would be old, that I would show myself up, but in fact it wasn’t like that at all... the people who were sort of totally 100% fit were very few and far between.” (25)

The expert advice and supervision available in gyms or from physiotherapists was valued.

“...I had to stick rigidly to what he had said, the weights that he had specified... the idea was to stretch it that little bit further than I normally would do in order to support the joint more... but too much would... cause more damage and not enough wouldn’t do any good... I was quite impressed actually by his knowledge... and I did exactly what he said and I did notice an improvement, a definite improvement.” (25)

A conceptual framework was constructed from the thematic matrix. Its elements were compared with the charted comments for each participant, confirming that the framework was grounded in the data and that its categories were linked as shown in the diagram (Fig. 1).

*Exercise behaviour typology*

The onset or worsening of symptoms resulted in different exercise behaviour in different participants. A typology constructed from the thematic matrix identified four groups. Two groups had unchanged behaviour and were either ‘long-term sedentary’ or

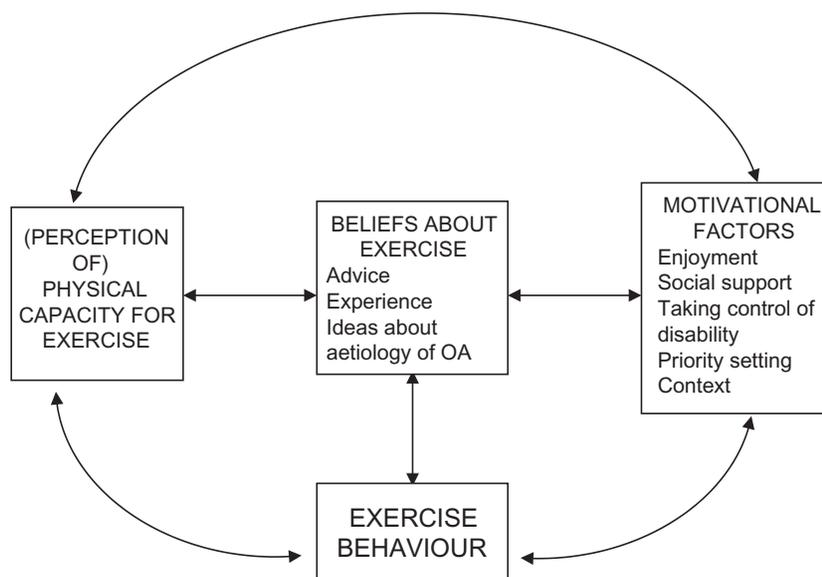


FIGURE 1 Conceptual framework of the relationship between the categories and themes

TABLE 5 *Typology of exercise behaviour*

Type	Characteristics	Exercise behaviour (ID)
Long-term sedentary	No history of exercise Little or no recent experience of exercise Little or no advice about exercise Belief that exercise may be harmful Think gym inappropriate or not appealing	None (1, 11, 13, 18, 24) Walks short distance to work daily (8) Gentle, non-weight bearing exercises (17)
Long-term active	Past history of exercise Positive experience of exercise Encouraged to exercise Enjoyment of exercise Positive attitude Social support for exercise	Quads exercises, dog walking (2) Keep fit 3 times a week (3) Regular gym, dancing (9) Cycling, active work, building, chopping wood etc. (10) Walking, cycling, gym, something every day (15) Regular gym on GP referral, swimming, quads exercises daily (20)
Retired from exercise	Exercised previously Pain and disability, prevent exercise or prevent <i>preferred</i> activity No advice to exercise Negative experience of exercise Belief that exercise doesn't do any good or may be harmful Gym inappropriate or not appealing	Plays bowls weekly (4) Occasional gentle swimming (6) Bowls in summer (12) None (14)
Converted to exercise	Limited previous experience of exercise Positive experience of exercise Encouraged to exercise Enjoyment of exercise Social support for exercise Gym appropriate and appealing	Gym weekly (21) Gym twice weekly, 2 mile walk daily (22) Gym weekly on GP referral, swimming occasionally (23) Gym weekly on GP referral, walking (25)

'long-term active'; whilst two groups changed their behaviour in different directions, either 'retired from exercise' or 'converted to exercise' (Table 5).

*Long-term sedentary.* These individuals had never been inclined to exercise. They had not exercised in their adult lives and had no recent exercise experience. They had been given scant encouragement to exercise and were likely to believe that exercise might be harmful for OA knee. Where they expressed views on exercising in a gym, they thought that this was inappropriate or unappealing. They did little or no exercise other than the activities of daily living.

*Long-term active.* These people had exercised throughout their adult lives. They enjoyed exercising and they had social support for it. They were more likely to have noticed beneficial effects on their OA knee, or general health and well-being as a result of exercise, and they had been encouraged to exercise by health professionals. They maintained a positive attitude and were determined not to allow OA knee to prevent them from doing the activities they enjoyed. The type or amount of exercise they did may have been modified or reduced because of limitations imposed by their OA knee but they continued to exercise regularly and their motivation was not diminished.

*Retired from exercise.* People of this type also had a history of exercise during their adult lives, but their physical capacity was adversely affected by OA knee to a degree that prevented them from exercising or at

least from participating in their preferred activity. In the latter case, they had previously enjoyed a particular activity (e.g. golf) and had not found an acceptable alternative. They did not consider exercising in a gym an appropriate or appealing activity. They were not encouraged by health professionals to exercise and did not perceive any health benefit from exercising; indeed they were likely to consider exercise to be potentially harmful. They tended to do a little gentle exercise.

*Converted to exercise.* This group had limited past experience of exercise. They had started exercising more recently, either because of the onset of knee symptoms, to improve their general health, or to lose weight. They had received varying levels of encouragement to exercise from health professionals but, more importantly they had experienced improvements in their health and sense of well-being as a result of exercising; they enjoyed exercising and had social support for doing so. They had all chosen to exercise at a gym, either independently or on a GP referral programme. They had overcome any initial reservations and considered the gym to be an appropriate and appealing setting for exercise.

There was an even spread of participants throughout all four groups according to age, gender and symptom duration. However, participants with the worst pain and disability were unable to exercise and were only found in the 'long-term sedentary' (1, 14) and 'retired

from exercise' (6) groups. One participant did not fit the typology (16); she had some of the characteristics of the retired from exercise type, as she had been active when younger but reduced the amount of exercise she did because of ill health, and at the time of the interview only performed quadriceps strengthening exercises. However, she had been advised to exercise, thought it would be beneficial, and was interested in the idea of supervised exercises at the gym. At the end of the interview she expressed an intention to contact her practice nurse to ask for a gym referral and, if this plan was carried out, she would fit more closely into the 'converted to exercise' type.

## Discussion

### *Summary of results*

Exercise behaviour depended upon physical capacity to exercise; exercise beliefs and motivational factors including social support, priority setting and context. Four types of exercise behaviour were identified comprising long-term sedentary, long-term active, retired from exercise and converted to exercise. Those that had stopped exercising did so because of their symptoms, because they had not adapted their exercise habit and because they believed that exercise was damaging to their joints. In contrast, those that had started to exercise did so because worsening symptoms and disability prompted positive action to improve their health. This group preferred to use a gym because they appreciated the supervision from the increasingly professionalised gym staff and the social support they found there, which differentiated it from other forms of exercise.

### *Strengths and weaknesses*

The purposive sample was successful in achieving diversity of age, gender, duration of symptoms, disease severity and exercise experience; however participating general practices were unable to identify patients referred to a gym *specifically for OA knee*. There was potentially a missed group who might have been referred for OA knee but had not attended the gym. Participants on GP referral schemes were recruited from the gyms but had been referred, often at their own request, for other health problems. Although we did not purposively sample a specific group who had been referred for physiotherapy, physiotherapists had prescribed and supervised therapeutic exercise for five of the participants.

The focus group permitted a degree of respondent validation of the emerging themes, as well as clarifying and adding depth. The participants agreed with the emerging themes and were able to illustrate them with further examples from their own experiences.

Three of the authors were clinicians (NHW, CW and PM) and one was a sports psychologist (DM), who

were all in favour of exercise provision for this patient group. The clinicians frequently refer such patients to exercise referral schemes as part of their usual practice. We were aware of this potential for investigator bias and actively sought any negative comments about such schemes.

### *Comparison with other studies*

These findings agree with those from a previous qualitative study examining adherence to an exercise programme,<sup>20</sup> but this study adds a typology of exercise behaviour that sheds light on patients' reasons for giving up or starting exercise. A notable finding is the importance of gyms for some people who are starting to exercise for the first time in later life, and the high level of satisfaction found with these.

Both aerobic and quadriceps strengthening exercises are effective in OA knee<sup>12-15</sup> and have been included in management guidelines.<sup>26,27</sup> The finding that many patients consulting a primary care clinician did not receive advice about exercise has been described previously, and blamed on lack of time, negative practitioner attitudes towards exercise, more emphasis on other health promotion issues such as smoking and diet, perceived poor compliance by patients and lack of confidence in counselling skills.<sup>15</sup> The most effective strategy for promoting exercise in this group is not known, but according to the more developed literature for lower back pain, it could include individually designed exercise programmes with a supervised format that encourage adherence to achieve a high dosage.<sup>28</sup>

The importance of exercise beliefs as determinants of exercise behaviour has been found previously in a survey of outpatients with arthritis, where perceived benefits of exercise were a significant predictor of exercise participation.<sup>29</sup> Fear avoidance beliefs are important in patients with low back pain,<sup>30</sup> and advice to keep active has been shown to augment the effectiveness of exercise programmes in chronic low back pain.<sup>28</sup>

## Conclusions

In this study several physical, cognitive and contextual factors, and a typology of exercise behaviour, were identified that could be addressed in primary care consultations. The converts to exercise could provide a model for those prematurely retired from exercise. In particular, more patients in the sedentary and retired from exercise groups could be advised that exercise would benefit OA knee. Primary care clinicians need to engage more with these groups, and training should be directed towards this. Training should emphasise the importance of word-labels, such as 'wear and tear', in shaping patients' understanding of the aetiology

of OA and decreasing their motivation to exercise. Further research is needed of primary care interventions that aim to increase uptake of exercise in this group and in those with OA of other joints. In particular, studies are needed to examine whether 'exercise prescription' schemes and gym referral are the best interventions for the 'long-term sedentary' and 'retired from exercise' groups, resulting in long-term change in exercise behaviour.

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## Appendix 1 Topic Guide

- How long have you had arthritis?
  - How did it start?
  - What do you think caused or triggered your arthritis?
  - Can you describe how it feels to have arthritis? What are the symptoms?
  - What do you think makes it better?
  - What do you think makes it worse?
  - What treatments have you had for your arthritis? How useful were they? How do you think they work? (e.g. if rubbing in the cream, is it the cream or the massage?)
  - Is there any other kind of treatment or therapy you have heard of or would like to try?
  - Where do you get information/ideas about arthritis? (doctor, family, books, self—help group etc.)
  - Can you describe how arthritis affects your life?—Physical, mental, emotional
- What would you say is the worst thing about having arthritis?
  - What are your views on activity? (Including, work, housework, gardening, hobbies)
  - Is it good/bad for your arthritis?
  - Are you less active now than you used to be?
  - Is there any particular activity that you've given up/think you shouldn't do?
  - What about rest—is it good/bad for your arthritis?
  - What do you think about exercise? (Including gym, walking, cycling, sports etc.)
  - Did your GP refer you to the gym? Why?
  - Had you been to a gym before? If not, what did you expect?
  - Did this gym match your expectations—if not, what was different?
  - What do you do at the gym? Do you enjoy it? Have there been any noticeable effects? If so, what? What is good/bad about it?
  - How do you see the future?