The assessment of persistent pain after joint replacement

V. Wylde†, A. Jeffery†, P. Dieppe‡, and R. Gooberman-Hill†
†Musculoskeletal Research Unit, School of Clinical Sciences, University of Bristol, Avon Orthopaedic Centre, Southmead Hospital, Bristol, UK
‡Peninsula Medical School, Universities of Exeter and Plymouth, Exeter, UK

SUMMARY

This study used ‘think aloud’ to explore issues around using a standardised questionnaire to assess persistent pain after joint replacement. Twenty participants with moderate–extreme persistent pain in their replaced hip or knee completed the Chronic Pain Grade (CPG) while ‘thinking aloud’. The interviews were audio-recorded, transcribed and analysed using thematic analysis. Completion of the CPG by patients was influenced by four issues: challenges with the question wording or response options on the CPG items; the fluctuating nature of pain and functional limitations; the need to account for co-morbidities and pain elsewhere; and adjustment to pain. These issues reflect those that have arisen previously in patients with musculoskeletal pain, and need to be considered when assessing persistent joint pain, both before and after joint replacement.

Keywords

Hip; Knee; Arthroplasty; Pain; Assessment

Introduction

Joint replacement is widely considered an effective surgical intervention to provide relief from joint pain. However, a considerable number of patients continue to experience persistent pain in their replaced joint¹. It is important that we can adequately assess persistent pain after joint replacement to monitor its prevalence and natural history, and determine the effectiveness of interventions. Previous qualitative work in patients with musculoskeletal pain suggests that standardised questionnaires are limited in their ability to capture the pain experience²,³. The aim of this study was to explore the issues that arose
Methods

Participants who reported moderate–extreme pain in their replaced joint on the Western Ontario and McMaster Universities (WOMAC) pain scale at 1–3 years post-operative in a previous survey were purposively sampled for this study. Eligible patients were invited to participate by post at between 6 and 12 months after completing the previous survey. Sixty-nine patients were approached to take part and 20 agreed to do so. Ethics approval was provided by Southmead NHS Research Ethics Committee and all participants provided informed, written consent.

Think aloud method

Individual interviews using the ‘think aloud’ method were conducted with participants in their own home or a quiet hospital office. Think aloud is a technique from cognitive interviewing that elicits the reasoning behind participants’ answers to questions. Each participant was given a copy of the Chronic Pain Grade (CPG) and asked to read aloud each question and verbalize what they were thinking as they responded to each item. Participants were not asked to explain their reasoning, because this is thought to interfere with how questions are answered. Participants took approximately 5–10 mins to complete the CPG while thinking aloud. The interviews were audio-recorded, transcribed and then anonymised.

The CPG

This questionnaire assesses three dimensions of persistent pain; persistence, intensity and disability. The time frame is the previous 6 months and the response format is a Numeric Response Scale (NRS) of 0–10 (except one function question which is answered in the unit of days). Scoring results in respondents being classified into one of five hierarchical pain grades, ranging from 0 (pain free) to IV (high disability–severely limiting). For the purposes of this study, participants were asked to answer the CPG in relation to the pain in their replaced joint.

Data analysis

Transcripts of the interviews were anonymised and analysed independently by two researchers using thematic analysis to identify key issues that participants described as they completed the questionnaire. The issues that emerged from the data were coded and then grouped into themes. The two researchers compared their codes and through discussion arrived at a consensus.

Results

Twenty patients participated in the study, and of these 10 had a primary knee replacement and 10 had a primary hip replacement. The mean age of participants was 69 years, 10 were female and the mean length of time since surgery was 3 years. Participants had a range of CPG scores (Table I).
From analysis of the transcripts, four themes emerged: challenges with the question wording or response options of the CPG items; the fluctuating nature of pain and functional limitations; the need to account for co-morbidities and pain elsewhere; and adjustment to pain. Each theme is described in more detail below, using respondent quotations (showing patient ID number) to illustrate key points.

**Theme 1: challenges with wording and response options**

For six of the seven questions on the CPG, one or more participants verbalized difficulties when completing the question that was specific to the question wording or response options. These included confusion and misunderstanding over the wording and time frames used, and comments on the similarity between some of the questions. Details of these issues, illustrated by quotes, are presented in Table II.

**Theme 2: fluctuating nature of pain and functional limitations**

Five participants discussed the fluctuating nature of their pain and functional limitations in relation to their answers. Pain was often described as varying with activity levels, which posed problems when providing average pain ratings: “Well, I have always got pain, it’s just according to what I’m doing. If I sit down I don’t get so much pain as when I am stood up and doing things like walking” (P5); “Oh dear. Sitting here comfortably in this chair, no pain, no discomfort. But walking here from the car I should say about 7” (P13); “It’s worse when I am sat down” (P16). Pain and functional limitations varied from day to day, as well as with activity: “It all seems double Dutch, you know, trying to put it down on the form. It’s really that you get good days and bad days, good nights and bad nights” (P5); “You have good days and bad days on that one” (P9). Even across the span of a day, pain was described as variable in nature: “Sometimes I will get a 10 pain and that’s where it really burns and stabs, it’s like someone has taken a hot needle, buts it’s gone within 10 s or it could last 2–3 h. But then it just disappears. It varies, it does vary during the day” (P17).

Participants also reflected on the role of their pain medication in relation to how they defined present pain severity: “Does that account for the effect of painkillers? I mean when its saying at the present time, I obviously have taken them today and so at the moment the pain is reasonable” (P10). Functional limitations also varied depending upon social context. One participant explained that her ability to participate in social activities was influenced by the car that she travelled in “It’s according to who is taking me and what I am doing. I can’t answer it because some cars I can get out of quite easy and other cars I have to twist my guts to get out and that twists the knee and then I am 10 times worse” (P5).

**Theme 3: accounting for co-morbidities and pain elsewhere**

Three participants verbalized the importance of co-morbidities and pain elsewhere on their joint pain and disability. When asked on the CPG how many days pain kept them from their usual activities, one participant stated: “I don’t do anything, I can’t do anything. But then of course, whether that’s the hip pain or what, I don’t know” (P16). In response to the question about how much the pain has changed ability to do work or housework, one participant responded: “... It’s a bit difficult you see, because of course with my problem with my other leg, it’s a problem to tell which one is the biggest problem” (P15). After answering that she
was only ‘very slightly limited’ in everyday activities by her knee pain, one participant explained: “That is a bit difficult to answer because it has got nothing to do with the knee that is stopping me from doing my normal work, which I can’t do much of anyway. I’ll tell you why – I have hardening of the lungs and even if I am sat now, in a minute, if I talk too much I start to get breathless. So it is that is keeping me from what I normally do’ (P20).

**Theme 4: adjustment to pain**

As many participants’ had been living with their pain for a number of years, they described living and coping with pain: “I have learnt to live with it” (P4) and “I just cope with the pain” (P17). Issues with adaption and avoidance strategies also impacted on participants answers to questions, masking their true pain-related disability. When asked how many days in the last 6 months they had been kept from their usual activities because of joint pain, one respondent replied: “Nil, my usual activities involve doing things I can do without pain” (P13). Adaption to activity limitations was evident in another participant’s comment regarding how many days their pain kept them from usual activities: “Zero, it doesn’t stop me working at all… The job I do could involve a lot of bending but I work around that and sit down to do it’ (P14). In response to the same question another respondent said “I have a cleaner once a fortnight so I don’t do a lot of housework, I do what I can. I’m going to say the 7–14 days because when I’m not doing anything I’m resting” (P5).

**Discussion**

This study involved 20 patients with moderate–extreme persistent pain in their replaced joint completing the CPG whilst thinking aloud. The study found four issues that influenced participants’ answers to questions in the CPG: challenges with the question wording or response options on the CPG items; the fluctuating nature of pain and functional limitations; the need to account for co-morbidities and pain elsewhere; and adjustment to pain. These themes reflect issues that have arisen in qualitative studies with people living with musculoskeletal pain. When patients with musculoskeletal pain have been asked about their experience of completing standardised questionnaires, they have expressed difficulties because their pain is intermittent and variable, difficult to conceptualise as distinct from other bodily pains, and because they have adjusted or adapted to the pain2,3.

This study adds to the research literature by demonstrating that patients with persistent pain after joint replacement experienced difficulties in completing a standardised pain questionnaire. The clinical implications of this are that estimates of the severity and impact of this condition could be distorted because the complex and variable nature of this pain are inadequately captured. These issues need to be considered when selecting a questionnaire assess persistent pain after joint replacement. Although the CPG has the advantage of being a generic pain measure and allowing comparison across different post-surgical pain contexts, a joint-or disease-specific pain measure, such as the Intermittent and Constant Osteoarthritis Pain questionnaire (ICOAP)11,13, which has been used in a post-surgical context may reduce the issues identified in this study. Disease-specific measures are less likely to influenced by medical co-morbidities than a generic tool12. Also because they have been developed for a
specific condition, they may reduce the difficulty in providing pain ratings, for example ICOAP breaks down osteoarthritic pain into continuous and intermittent pain.

Limitations of this study include the transferability of the findings because the relatively small sample of participants was recruited from one orthopaedic centre. However, the sample included an equal representation of gender, and was selected represent a range of ages. An important factor which could have influenced participants’ interpretation and responses to the questions, but was not recorded in this study, was educational attainment. Future work to develop new assessment tools should consider educational attainment and literacy to ensure that measures do not disadvantage some people. Also previous research has found that men and women express their pain differently, and descriptions of the experience of osteoarthritis can differ between hip and knee osteoarthritis

In conclusion, this study found that people living with persistent pain after joint replacement experienced some difficulties in expressing their pain on a widely used standardised generic pain measure. The difficulties experienced by participants, and how they may be overcome, should inform decisions regarding the selection of outcome measures and be considered in the design and validation of novel questionnaires for use in this patient population.

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Table I

| ID | Sex | Age | Procedure | CPG | Other joint surgery | Duration of pre-op pain | Other joint pain | Years post-op |
|----|-----|-----|-----------|-----|---------------------|------------------------|------------------|---------------|
| P1 | F   | 78  | THR       | Grade 4 | None                | 1 year                 | Contra-lateral hip and knees | 4             |
| P2 | F   | 45  | HR        | Grade 4 | None                | 3-4 years              | Contra-lateral hip, knees, feet, upper limbs, back | 3             |
| P3 | F   | 82  | THR       | Grade 4 | TKR                 | 5 years                | Knees, back, upper limbs, feet | 2             |
| P4 | M   | 67  | TKR       | Grade 4 | None                | 2 years                | Contra-lateral knee, ankle   | 2             |
| P5 | F   | 75  | TKR       | Grade 3 | None                | 30 years               | Contra-lateral knee, hips, upper arms, back, feet | 3             |
| P6 | M   | 65  | TKR       | Grade 3 | None                | 5 years                | Contra-lateral knee, upper limbs, back | 3             |
| P7 | F   | 67  | PR        | Grade 4 | None                | 10 years               | Contra-lateral knee, hips, upper limbs, feet | 3             |
| P8 | M   | 58  | THR       | Grade 2 | THR                 | 5 years                | Knees, contra-lateral hip, upper limbs, back | 3             |
| P9 | M   | 69  | TKR       | Grade 3 | None                | 2-3 years              | Neck, upper limbs            | 3             |
| P10| F   | 64  | TKR       | Grade 2 | None                | 5 years                | Contra-lateral knee, upper limbs, feet, back | 3             |
| P11| M   | 73  | TKR       | *       | None                | 10 years               | Contra-lateral knee, upper limbs, back | 4             |
| P12| M   | 86  | THR       | Grade 4 | None                | 3 years                | Contra-lateral hip, knees, feet, neck | 2             |
| P13| M   | 76  | THR       | Grade 1 | THR                 | 1 year                 | Contra-lateral hip, ankles, upper limbs, neck | 3             |
| P14| M   | 57  | TKR       | Grade 1 | None                | 10 years               | Contra-lateral knee, ankles, feet | 2             |
| P15| F   | 85  | THR       | Grade 3 | TKR                 | 3 years                | Contra-lateral hip, knees    | 3             |
| P16| F   | 76  | THR       | Grade 4 | None                | 2 years                | Shoulder                     | 4             |
| P17| M   | 54  | TKR       | Grade 4 | None                | 25 years               | Feet, back                  | 4             |
| P18| F   | 62  | THR       | Grade 3 | None                | 18 months              | Contra-lateral hip, knees and feet, upper limbs, neck | 3             |
| P19| M   | 72  | THR       | Grade 4 | None                | 2 years                | Contra-lateral hip, upper limbs, back | 3             |
| P20| F   | 66  | TKR       | Grade 2 | None                | 20 years               | Contra-lateral knee, hips, upper limbs, neck | 2             |

THR = total hip replacement; TKR = total knee replacement; HR = hip resurfacing; PR = patellar resurfacing.

* CPG not calculated as one question was left blank.
### Challenges with wording and response options on the CPG

| Question | Problem | Illustrative quote |
|----------|---------|--------------------|
| Question 1 | Intensity of present pain | Confusion over question | “Oh dear. Sitting here comfortably in this chair, no pain, no discomfort. But walking here from the car I should say about seven. Which should I put, zero or seven?” (P13) |
| Question 2 | Intensity of worst pain | Question appears similar to previous question | “Oh god, same sort of question” (P3) |
| Question 3 | Intensity of average pain | Rated average pain as higher than worst pain | P14, P19 and P5 rated their average pain as 1-2 points higher than their worst pain |
| Question 4 | Number of days kept from usual activity | Problem with response options | “That’s a very difficult question to answer because of the 31 or more days. I will add my own. The answer to that question is every day” (P3) |
| Question 5 | Interference with daily activities | None | “I haven’t been kept out of it at all. I carry on, it’s difficult, so none of those actually leave blank?” (P11) |
| Question 6 | Change in ability to take part in social activities | Non applicable question | “I don’t do family activities. The only social I do is go up these small clubs for bingo but I can only go up them if somebody comes to drive me up and drive me back so I have to rely on other people to do it for me. So in a round about way I will just say no to that because I have to rely on other drivers” (P20) |
| Question 7 | Change in ability to do work or housework | Confusion over time frame | “I think I am doing all this wrong. I have been doing this all wrong. So those last two are no change because in the last 6 months my pain hasn’t change my ability to do activities, it’s been constant” (P10) |

“See, we had that question before. They repeat those questions along. That’s how they catch you out. I know... If you stick to the same all the time you can’t go wrong” (P17)