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Case report

Illness perceptions and activity limitations in osteoarthritis of the knee: A case report intervention study

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ABSTRACT

This case report describes the process and outcome of an intervention where illness perceptions (IPs) were targeted in order to reduce limitations in daily activities. The patient was a 45-year-old woman diagnosed with posttraumatic secondary osteoarthritis of the lateral patella-femoral cartilage of the right knee. At baseline, the patient reported maladaptive IPs on the Brief Illness Perception Questionnaire Dutch Language Version and limitations in walking stairs, cycling and walking. Fewer limitations in daily activities are hypothesized by changing maladaptive IPs into more favourable IPs. In this case report, discussing maladaptive IPs with the patient was the main intervention. A participatory decision making model was used as a design by which the maladaptive IP were discussed. Six out of eight maladaptive IPs changed favourably and there was a clinically relevant decrease in limitations of daily activities. The Global Perceived Effect was rated as much improved.

1. Introduction

Osteoarthritis (OA) is the most common joint disease in The Netherlands (Vogels et al., 2005). Activities in daily life (ADL) are negatively affected by OA. Limitations in ADL as a consequence of osteoarthritis cannot be explained by biomedical or socio-demographic factors alone. Ever since the introduction of Engel's Biopsychosocial Model (Engel, 1977) emotions, thoughts, beliefs and behaviours are more and more accepted as important factors of health (Alonso, 2004). The suggestion has been made that interventions on these factors should be part of physical therapy treatment (Dziedzic et al., 2009).

In the literature Illness Perceptions (IPs) are seen as an important psychological factor. Perceptions about increased consequences, chronic timeline and negative emotions are predictive for more limitations in ADL after 6 years in patients with OA (Hagger and Orbell, 2003; Bijsterbosch et al., 2009).

IPs belong to the core concepts in the Common-Sense Model of Self-Regulation (CSM) (Leventhal et al., 1980). In this model, a health threat is theorized to generate both cognitive representations (danger control) and emotional states of fear and distress (fear control). Five dimensions of illness perceptions have been identified;

1. Identity
2. Timeline,
3. Consequences,
4. Causal beliefs,
5. Control beliefs.

IPs can be seen as maladaptive if they lead to limitations in ADL. An example is when a patient thinks that physical activity is harmful, but findings from physical assessment do not underscore such belief.

Changing patients' maladaptive IPs can be seen as a patient centred approach in which communication is the most important pathway (Bensing et al., 2000). This means that communication plays an important role in changing IPs. In this case report, discussing maladaptive IPs with the patient was the main intervention. A participatory decision making (PDM) model by Epstein et al. (2004) was used as a design by which the maladaptive IPs were discussed.

PDM is associated with better outcomes in patients with a chronic illness such as diabetes (Williams et al., 1998; Hurtado et al., 2001; Heisler et al., 2002).

This case report describes the process and outcome of an intervention study. Maladaptive IPs were targeted and it was

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hypothesized that changing maladaptive IPs would reduce limitations in ADL.

2. Case description

2.1. Patient history

The patient was a 45-year-old female with posttraumatic secondary osteoarthritis of the lateral patella-femoral cartilage of the right knee based on magnetic resonance imaging (MRI). The treatment by the orthopaedic surgeon consisted of non-steroid anti-inflammatory drugs and advice to stay active. After one year, because of on-going pain and activity limitations the patient consulted a physiotherapist.

2.1.1. Examination

At baseline the patient's (weight 86.5 kg, height 176 cm, no comorbidity), signs and symptoms were recorded (Table 2, Fig. 1) (Steiner et al., 2002).

2.1.1.1. Tests and measures. At baseline IPs, activity limitations, knee pain, knee flexion and extension strength, passive flexion and extension mobility and the use of medication were recorded. Also the algo-functional indices for hip and knee osteoarthritis were administered and recorded as part of the Dutch Osteoarthritis knee-hip Guideline (Lequesne and Samson, 1991; Vogels et al., 2005).

The IPs were assessed using the Brief Illness Perception Questionnaire Dutch Language Version (Brief IPQ-DLV) (de Raaij et al., 2012). The Brief IPQ-DLV covers the five IP dimensions and has nine items. Eight of these items are rated using a 0–10 Numeric Rating Scale (NRS) of which five items assess cognitive illness perceptions: consequences (Item 1), timeline (Item 2), Personal Control (Item 3), Treatment Control (Item 4), and Identity (Item 5). Two of the items assess emotional perceptions: concern (Item 6) and emotions (Item 8) and one item assesses illness comprehensibility (Item 7). The ninth item assesses causal perception, which asks the patient to list the three most important causal factors in their illness and is rated as an open-ended response (Item 9). The Brief IPQ-DLV has a Smallest Detectable Change (SDC) of 3 points for items 1–8 for individual evaluation purpose. Reliability has a Kappa of $K = 0.57–0.75$ (de Raaij et al., 2012). Responses to the causal item (item 9) can be grouped into 4 categories;

1. psychological attribution
2. risk factors
3. immunity
4. accident or chance

Activity limitations were assessed by using the Patient Specific Functional Scale (PSFS) (Beurskens et al., 1999). The SDC of the PSFS is 2.5 points. The PSFS is known to be reliable (Beurskens et al., 1996). Present knee pain was assessed using an NRS. The NRS varies from zero indicating no pain to 10 the worst pain imaginable.

Table 1
Steps for shared decision making adapted from Epstein et al., (2004).

Steps for shared decision making
1. Understand the patient's experience and expectations (including illness perceptions EdR)
2. Build Partnerships
3. Provide Evidence, Including Uncertainties
4. Present Recommendations
5. Check for Understanding and Agreement

Table 2
Baseline- and follow up measurements from T_1–T_7.

Signs & symptoms	Outcome						
	T_1	T_2	T_3	T_4	T_5	T_6	T_7
Knee pain (present)	6	3	6	6	3	2	1
MicroFet 2 in Newton:							
-m. Quadriceps left	258	260	262	288	283	354	361
-m. Quadriceps right	142	140	145	289	305	352	339
-m. Hamstrings left	210	221	223	268	239	222	274
-m. Hamstrings right	181	199	237	283	259	283	252
Passive mobility Δ:							
-Flexion	No	[a]	[a]	No	[a]	[a]	No
-Extension	No	[a]	[a]	No	[a]	[a]	No
Activity limitations							
- Walking stairs	7	8	7	4	2	2	1
- Cycling	9	5	7	0	0	0	1
- Walking	10	5	6	3	3	1	2
IPs item:							
1 Consequences	8	8	7	4	3	3	1
2 Timeline	8	7	8	6	7	2	1
3 Personal control	2	3	7	4	8	8	10
4 Treatment control	9	8	8	9	9	9	10
5 Identity	10	8	7	4	3	2	1
6 Concern	10	7	9	6	7	2	1
7 Comprehensibility	8	8	9	5	5	9	10
8 Emotional consequences	9	8	7	4	6	3	1
9 Causal[b]	2 & 4	2 & 4	2 & 4	2	1	2	2
Algofunctional Index	9	8	9	8	4	3	3
Medication use (in % of T_0)	100	100	75	50	50	0	0
Work status (%)	100	100	100	100	100	100	100
Global Perceived Effect							2

T_1 = Baseline.
[a] Measurement did not take place.
[b] 1 = psychological attribution, 2 = risk factors, 3 = immunity, 4 = accident or chance.

Reliability, validity and responsiveness have been shown (Jensen et al., 2002). The SDC is 2 points (Ostelo et al., 2008).

Knee extension strength was measured using the MicorFET2 (MF2 Hoggan Health Industries) hand-held dynamometer. The SDC for knee extension strength is 21.5 N (Roebroeck et al., 1998). The passive flexion/extension range of motion of the knee was measured using the Microfet5 digital goniometric measurement instrument (Cleffken et al., 2007).

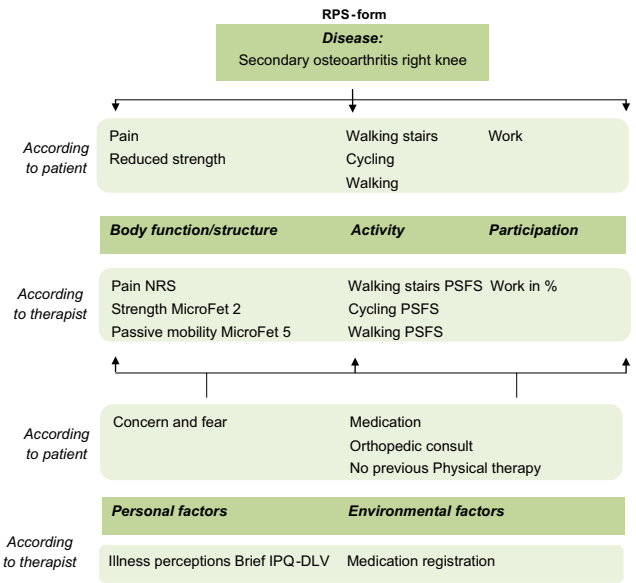

Fig. 1. Rehabilitation problem solving form adapted from Steiner et al., (2002).

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Measurements were taken before every treatment session. In addition, in the last session the patient was asked to rate the Global Perceived Effect (GPE) by rating the change between baseline and the last session, on a 6 point Likert scale.

At baseline, the patient presented with significant pain and limitations in ADL on the PFSF. A decrease was shown in muscle strength of the right quadriceps and hamstrings, with no decrease in range of motion of her knee. The Brief IPQ DLV questions 1, 2, 4, 5, 6, 7, 8 showed a high score and question 3 a low score (Table 2).

The scores on the Brief IPQ DLV may well be indicative for maladaptive IPs. Patient's IPs of her OA on consequences, timeline, identity, concern and emotional consequences could be associated with baseline outcome on the PFSF. It was hypothesized that changing her maladaptive IPs would result in fewer limitations as measured by the PFSF. The patient was monitored six times from baseline within a 3-month period. Changes on measurements smaller than the SDC will reject the hypothesis.

2.2. Intervention

Physical therapy treatment was in accordance with the Dutch knee-hip Osteoarthritis guideline. Informing, advising and instructing the patient to keep engaged in normal ADL are considered to be major treatment modalities (Vogels et al., 2005). The intervention consisted of targeting maladaptive IPs. The IPs were discussed in relation to limitations in ADL in each treatment session using the steps of the PDM-model (Table 1). For example, if the patient pointed out (step 1 & 2) to be highly concerned about the progress of her OA over time ('*I think my knee will have to be replaced within a few years*'), the physiotherapist communicated evidence about the actual progression of OA (Vogels et al., 2005) (step 3). Information about the slow progression of OA over time, and the fact that symptoms may well be minor during this process was given (step 4). After providing this information, checking for understanding and agreement was part of each treatment session (step 5). Co-interventions, like regular active and passive exercise therapy were given (Vogels et al., 2005). No other medical interventions, besides medication, took place.

3. Results

The patient attended seven treatment sessions (T_1–T_7) within three months and the outcomes are presented in Table 2. Six out of eight IPs items changed beyond the SDC of 3 points between T_1 and T_7. The treatment Control and Comprehensibility item showed a difference of 1 and 2 points, respectively (Fig. 2).

At baseline, the patient's attribution to the cause of her illness was her medical condition (OA) and her previous injury (IP causal item). At T_7, she changed causal perception to her own behaviour as attribution factor.

All activity limitations scored with the PSFS changed beyond the SDC, showing clinical relevant decreases in limitations in walking stairs, cycling and walking. Knee pain decreased significantly. For all outcomes see Table 2. The GPE was 2, meaning the patient felt much improved.

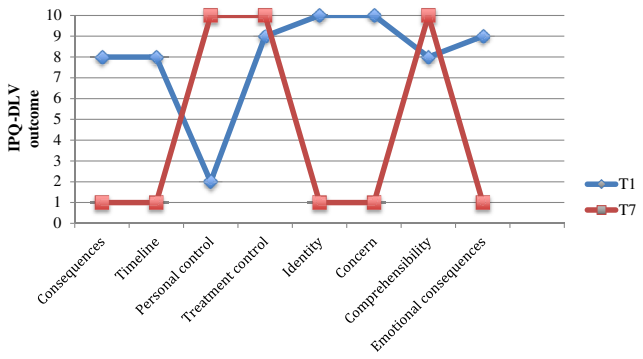

Fig. 2. Outcome on the IPQ-DLV per item T_1 & T_7.

4. Discussion

In this case report, changes in IPs in a patient with secondary osteoarthritis of the right knee are reported. They changed in favourable directions. The question that should be asked is: due to which intervention?

The maladaptive IPs were the starting point for the patient's need for information. For instance, Concern scored high at baseline, accompanied by causal attributions of injury and aging. Discussing these issues made it clear that she worried about more degeneration of her knee and that she thought exercise might damage the knee further. The patient also had a high score on Emotional Consequences at baseline, indicating a high level of distress concerning her knee condition. The IPs of the patient gave direction to the communication and education about her OA. This approach may have led to a shift in IPs as shown in Table 2. Conversely, it can also be argued that the applied co-interventions may have led to better physical function, thereby leading to a shift in IPs.

In a case report, no causal attributions can be drawn. It is unclear whether the changes in IPs are responsible for the changes in outcome on pain intensity, ADL and knee impairments, or whether changes in these outcomes positively influenced IPs. What favours the idea that a change in IPs might be the driving factor for improved outcomes is the fact that the patient experienced progressive pain and disability in the year prior to physical therapy, despite the advice of an orthopaedic surgeon to stay active. During physical therapy treatment in which her maladaptive IPs were explicitly targeted, positive changes in health status were reported.

The body of knowledge in both OA related and non OA related literature suggests an association between IPs and activity limitations (Hagger and Orbell, 2003; Botha-Scheepers et al., 2006; Bijsterbosch et al., 2009). The study by Bijsterbosch et al. shows a relation between increased maladaptive IPs and progression in disability. They draw an important conclusion: "…interventions aimed at changing illness perceptions can contribute to better functional outcome". Findings in this case report are in line with their conclusion.

The physiotherapist in our case report can be classified as an expert based on the criteria mentioned by Jensen (2000). Knowledge and skills in areas of patient-centeredness, clinical reasoning, clinical assessment and commitment to patient preferences values are conditional. Physiotherapists should be taught the process of participatory decision making and to address IPs as an important attribute of patients' health status.

Outcome scores in Table 2 suggest little change in time for IPs dimensions Treatment Control and Comprehensibility. However, when assessing an IPs question about comprehensibility, one should take notice of the fact that a patient may well report a high score on item number 7, but this may not mean that the illness is well understood. A patient might be convinced of having a correct understanding of the illness, but from a medical point of view, such understanding may well be incorrect. In our case report, the patient believed prior to treatment that her activity limitations were due to the medical condition (OA) of her knee and aging. After treatment the patient realized these were maladaptive perceptions and that her current level of activities was not affected by her medical condition. In addition, the patient's beliefs about Treatment Control

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had changed from an external locus of control (therapist will help) to an internal locus of control (I can help myself). PTs should also try to find out the rationale behind the IPs.

The change in IPs outcome during three months of physical therapy can well be seen as a change from maladaptive IPs to adaptive IPs. Assessing IPs in order to change the way people experience their disease may help PT's to cope with possibly less limitations in physical functioning.

Further research in large samples of patients is needed to explore the associations between IPs and limitations in physical functioning.

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