

BMJ Open

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<http://bmjopen.bmj.com>).

If you have any questions on BMJ Open's open peer review process please email info.bmjopen@bmj.com

BMJ Open

What influences patient satisfaction after total knee replacement? A qualitative long term follow-up study

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2021-050385
Article Type:	Original research
Date Submitted by the Author:	18-Feb-2021
Complete List of Authors:	Klem, Nardia; Curtin University, Physiotherapy and Exercise Science Smith, Anne; Curtin University, School of Physiotherapy O'Sullivan, P; Curtin University Dowsey, Michelle; University of Melbourne, Department of Surgery, St.Vincent's Schütze, Robert; Curtin University, School of Psychology & Speech Pathology Kent, Peter; Curtin University, Physiotherapy and Exercise Science; University of Southern Denmark, Sports Science and Clinical Biomechanics Choong, Peter; University of Melbourne, Surgery; St Vincent's Hospital, Orthopaedics Bunzli, Samantha; University of Melbourne, Department of Surgery
Keywords:	Adult orthopaedics < ORTHOPAEDIC & TRAUMA SURGERY, Knee < ORTHOPAEDIC & TRAUMA SURGERY, ORTHOPAEDIC & TRAUMA SURGERY

SCHOLARONE™
Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1 **Title Page**

2 What influences patient satisfaction after total knee replacement? A qualitative long term follow-up

3 study

For peer review only

1
2
3 4 Author 1:

4
5
6 5 Miss Nardia-Rose Klem

7
8
9 6 Degree: BSc(Physio)(Hons)

10
11
12 7 Affiliation: Physiotherapy and Exercise Science, Curtin University

13
14
15 8 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,

16
17 9 Australia

18
19
20 10 Email address: n.klem@postgrad.curtin.edu.au

21
22
23 11

24
25
26 12 Author 2:

27
28
29 13 Professor Anne Smith

30
31
32 14 Degrees: BAppSc, MBiostats, PhD

33
34
35 15 Affiliation: Physiotherapy and Exercise Science, Curtin University

36
37 16 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,

38
39 17 Australia

40
41
42 18 Email address: anne.smith@exchange.curtin.edu.au

43
44
45 19

46
47
48 20 Author 3:

49
50
51 21 Professor Peter O'Sullivan

52
53
54 22 Degrees: Dip Physio, Grad Dip Manip Ther, PhD, FACP

55
56
57 23 Affiliation: Physiotherapy and Exercise Science, Curtin University

1
2
3 24 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
4
5 25 Australia

6
7
8 26 Email address: P.OSullivan@curtin.edu.au
9

10
11 27
12

13
14 28 Author 4:
15

16
17 29 Associate Professor Michelle M Dowsey
18

19
20 30 Degrees: BHealthSci, MEpi, PhD
21

22
23 31 Affiliation: The University of Melbourne, Department of Surgery, St Vincent's Hospital Melbourne,
24
25 32 Australia.
26

27
28 33 Affiliation address: Level 2, Clinical Sciences Building, 29 Regent St, Fitzroy, Victoria 3010 Australia.
29

30
31 34 Email address: mmdowsey@unimelb.edu.au
32

33
34 35
35

36
37 36 Author 5:
38

39
40 37 Dr. Robert Schütze
41

42
43 38 Degrees: MPsych(Clin), PhD
44

45
46 39 Affiliation: Physiotherapy and Exercise Science, Curtin University
47

48
49 40 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
50

51
52 41 Australia
53

54
55 42 Email address: R.Schutze@curtin.edu.au
56

57
58 43
59

60
44 Author 6:

1
2
3 45 Associate Professor Peter Kent
4
5

6 46 Degrees: BAppSc(Chiro), BAppSc(Physio), GradDipManipTher, PhD
7
8

9 47 Affiliation 1: Physiotherapy and Exercise Science, Curtin University
10
11

12 48 Affiliation 1 address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
13

14 49 Australia
15
16

17 50 Affiliation 2: Department of Clinical Biomechanics and Sports Science, University of Southern Denmark
18
19

20 51 Affiliation 2 address: Campusvej 55, University of Southern Denmark, Odense M 5230, Denmark
21
22

23 52 Email address: peter.kent@curtin.edu.au
24
25

26 53
27
28

29 54 Author 7:
30
31

32 55 Professor Peter F Choong
33
34

35 56 Degrees: MBBS, MD FRACS, FAOrthA, FAAHMS
36
37

38 57 Affiliation: The University of Melbourne, Department of Surgery, St Vincent's Hospital Melbourne,
39

40 58 Australia.
41
42

43 59 Affiliation address: Level 2, Clinical Sciences Building, 29 Regent St, Fitzroy, Victoria 3010 Australia.
44
45

46 60 Email address: pchoong@unimelb.edu.au
47
48

49 61
50
51

52 62 Author 8:
53
54

55 63 Dr. Samantha Bunzli
56
57

58 64 Degrees: BPhy (Hons), GradCert Res Methodology, PhD
59
60

1
2
3 65 Affiliation: The University of Melbourne, Department of Surgery, St Vincent's Hospital Level 2, Clinical
4
5 66 Sciences Building, 29 Regent St, Fitzroy, Victoria 3065, Australia
6
7

8 67 Email address: Samantha.bunzli@unimelb.edu.au
9
10

11 68
12
13

14 69 **Corresponding author:**
15
16

17 70 Miss Nardia-Rose Klem
18
19

20 71
21
22

23 72 This work was conducted in both St Vincent's Hospital (Melbourne), Australia, and Curtin University,
24
25 73 Perth, Australia.
26
27

28 74
29
30

31 75 **Conflict of Interest Statement**
32
33

34 76 Professor Peter Choong reports grants from National Health & Medical Research Council, during the
35
36 77 conduct of the study; personal fees from Stryker, personal fees from Johnson & Johnson, grants
37
38 78 from Medacta, personal fees from Kluwer, outside the submitted work. Peter Choong is supported
39
40 79 by a National Health & Medical Research Council Practitioner Fellowship (APP1154203).
41
42

43 80 Professor Peter O'Sullivan reports grants from National Health & Medical Research Council, during
44
45 81 the conduct of the study.
46
47

48 82 Associate Professor Michelle M Dowsey reports grants from Medacta International, grants from
49
50 83 National Health & Medical Research Council, grants from Australian Research Council, personal fees
51
52 84 from Pfizer, outside the submitted work; Associate Professor Michelle Dowsey is supported by a
53
54 85 National Health & Medical Research Council Career Development Fellowship (APP1122526) and a
55
56 86 Dame Kate Campbell Fellowship.
57
58
59
60

1
2
3 87 Professor Anne Smith reports grants from National Health & Medical Research Council, during the
4
5 88 conduct of the study.
6
7

8 89 Associate Professor Peter Kent, or any member of his immediate family, has no funding or
9
10 90 commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing
11
12 91 arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.
13
14

15 92 I agree and confirm this statement as true.
16
17

18 93
19
20

21 94 Dr. Samantha Bunzli, or any member of her immediate family, has no funding or commercial
22
23 95 associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangements,
24
25 96 etc.) that might pose a conflict of interest in connection with the submitted article.
26
27

28 97 I agree and confirm this statement as true.
29
30

31 98
32
33

34 99 Dr. Robert Schütze, or any member of his immediate family, has no funding or commercial
35
36 100 associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangements,
37
38 101 etc.) that might pose a conflict of interest in connection with the submitted article.
39
40

41 102 I agree and confirm this statement as true.
42
43

44 103
45
46

47 104 Miss Nardia-Rose Klem, or any member of her immediate family, has no funding or commercial
48
49 105 associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangements,
50
51 106 etc.) that might pose a conflict of interest in connection with the submitted article.
52
53

54 107
55
56

57
58 108 **Funding statement**
59
60

1
2
3 109 This work was supported by an Australian National Health and Medical Research Council Centre of
4
5 110 Research Excellence in Joint Replacement Surgery (APP1116325). The funders had no role in the
6
7 111 conduct of this study.
8
9

10
11 112

13 113 **Author contributions**

15
16 114 NRK, AS, SB developed the concept for the study. NRK collected data. All authors contributed to the
17
18 115 analysis of findings. NRK drafted the manuscript. All authors contributed to and approved the final
19
20
21 116 version submitted.
22

23
24 117

26 118 **Acknowledgements**

28
29 119 The publication of this work was supported by Physiotherapy Research Foundation grant number
30
31 120 T16-CR008. The Physiotherapy Research Foundation had no role in the conduct of this study.
32
33

34
35 121

37 122 **Patient consent for publication**

39
40 123 Not required.
41
42

43
44 124

46 125 **Ethical Review Committee Statement**

48
49 126 This study has been conducting in accordance with the ethical standards in the 1964 Declaration of
50
51 127 Helsinki. Ethics approval was granted by St Vincent's Hospital (Melbourne) Human Research Ethics
52
53 128 Committee (HREC/17/SVHM/251)
54

55
56 129

59 130 **Figures and Tables**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

131 Number of Tables: 3

132 Number of Figures: 2

133

134 **Word count**

135 Manuscript body: 5312

136 Abstract: 238

For peer review only

1
2
3 137 **What influences patient satisfaction after total knee replacement? A qualitative long term follow-**
4
5 138 **up study**
6
7

8 139 **Abstract**
9

10
11 140 *Objectives*
12

13
14 141 To explore whether a conceptual model of patient satisfaction previously developed 1-2 years post-
15
16 142 TKR is still relevant 3-4 years post-TKR. Specifically, (i) what is the stability in satisfaction levels 3-4
17
18 143 years post-TKR?; and (ii) does the existing conceptual model of patient satisfaction after TKR apply at
19
20 144 this later follow-up?
21
22

23
24 145 *Design*
25

26 146 Qualitative follow-up study. One-on-one semi-structured interviews designed to test the
27
28 147 assumptions of the model developed from the findings of the previous study.
29
30

31
32 148 *Setting*
33

34 149 An urban Australian public hospital
35
36

37 150 *Participants*
38

39
40 151 From forty people who participated in the original study, 11 participants were purposively sampled
41
42 152 based on their level of satisfaction and factors driving satisfaction as reported in their first interview.
43
44 153 There were six women and five men, the average time since TKR was 3 years and 5 months, and the
45
46 154 average age at time of interview was 77 years.
47
48

49
50 155 *Results*
51

52
53 156 Satisfaction levels were mostly stable with the exception of 3 participants; 2 transitioned in a
54
55 157 positive direction; 1 in a negative direction. The meaning of satisfaction and the factors that
56
57 158 influenced satisfaction were consistent with the original findings. However, beliefs relating to the
58
59
60

1
2
3 159 influence of aging on persistent knee symptoms and functional limitations were more dominant in
4
5 160 the present study.

7
8 161 *Conclusions*

10
11 162 The findings provide support for patient satisfaction being a multifactorial construct that is
12
13 163 potentially modifiable over time. Clinicians may apply the conceptual model we have described to
14
15 164 optimise satisfaction in patients up to 3-4 years post TKR.

17
18 165 **Article Summary**

19
20
21 166 *Strengths and limitations of this study*

- 22
23
24 167
- A novel insight to the meaning and processes of satisfaction up to 4 years-post TKR.
- 25
26 168
- Confirmatory design involving re-interviewing of participants over 4 years post-TKR allowed
- 27
28 169
- for thorough assessment of satisfaction over time.
- 29
30 170
- Consistent interviewer from the baseline study to this study facilitated the trust of the
- 31
32 171
- participants and therefore rich descriptions and insights.
- 33
34 172
- Sampling was restricted to the participants from the initial study, where broader sampling
- 35
36 173
- may have elicited different dimensions of satisfaction.
- 37
38 174
- Sampling was from a single institution where TKRs are government funded procedures,
- 39
40 175
- other settings may have yielded different aspects of satisfaction.
- 41
42
43
44
45
46
47

48
49 176

50
51 177 *Key words*

52
53 178 Patient satisfaction, total knee replacement, qualitative

54
55 179

56
57 180 **Introduction**

1
2
3 181 Measures of satisfaction are commonly used to capture patients' appraisal of the outcome of their
4
5 182 total knee replacement (TKR) for knee osteoarthritis. A Delphi study by the Outcome Measures in
6
7 183 Rheumatology initiative determined satisfaction to be a core outcome measure for TKR ¹. However,
8
9 184 despite the popularity and importance of measuring this construct, heterogeneity exists regarding
10
11 185 both the types of questions used and the quantification methods employed ². Furthermore, two
12
13 186 recent systematic reviews identified the poor content validity of current tools used to measure
14
15 187 satisfaction after TKR and in musculoskeletal primary care settings, as the patients' voice in
16
17 188 development of these measurement tools was absent ^{3,4}. Consequently, researchers and clinicians
18
19 189 cannot be certain as to the meaning of patient responses to current satisfaction questionnaires.
20
21
22
23
24 190 Poor content validity has likely arisen due to lack of theoretical grounding surrounding this construct
25
26 191 ⁵. To address this, our previous research sought to investigate what satisfaction meant to patients,
27
28 192 and what factors and processes influenced their satisfaction levels after TKR ⁶. Using a constructivist
29
30 193 grounded theory methodology ⁷, a conceptual model of satisfaction after TKR was developed.
31
32
33 194 Satisfaction was found to mean different things to different people. Those that reported high levels
34
35 195 of satisfaction described satisfaction as an improvement from their previous state. On the other
36
37 196 hand, those that reported low levels of satisfaction believed satisfaction meant a resolution in pain
38
39 197 and restoration in functional limitations. Our conceptual model (Figure 1) described three pathways
40
41 198 to satisfaction; (i) the 'full glass' who reported a high level of satisfaction with no/minimal ongoing
42
43 199 symptoms or functional limitations; (ii) the 'glass half full' who reported high satisfaction and
44
45 200 ongoing symptoms or functional limitations; and (iii) the 'glass half empty' who reported low
46
47 201 satisfaction and ongoing symptoms or functional limitations. For the latter two pathways, levels of
48
49 202 satisfaction were influenced by three key mechanisms (recalibration of symptoms, reframing of
50
51 203 valued activities and conceptualisation of symptoms) which interacted with thoughts, feelings, social
52
53 204 and contextual factors on the pathway to high or low satisfaction. Those findings informed
54
55 205 suggested avenues for clinicians to facilitate patients to experience greater satisfaction ⁶.
56
57
58
59
60

1
2
3 206 Given our previous study was conducted in the first two years following TKR, interviewing the same
4
5 207 participants two years later could provide insights into to the stability of patient satisfaction over
6
7 208 time, and whether the processes of the existing conceptual model are still valid. Such insights would
8
9
10 209 help clinicians understand what drives high patient satisfaction levels in the longer term after TKR.
11
12 210 Therefore, the research questions of this follow-up study were; (i) what is the stability in satisfaction
13
14 211 2 years following the initial inquiry?; and (ii) does the existing conceptual model of patient
15
16 212 satisfaction after TKR apply at this later follow-up?

18
19 213
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

FIGURE 1 ABOUT HERE

Figure 1 legend: Conceptual model of patient satisfaction post-TKR

Methods

The original purposive sampling strategy can be found in our previous publication ⁶. In the initial (baseline) study, each participant was categorised into one of three satisfaction pathways (full glass, glass half full, glass half empty) and the key mechanisms influencing their reported level of satisfaction were identified. In the follow-up study, we selected participants 2 years after the baseline interview based on their satisfaction pathway and mechanisms identified from the previous study, ensuring that the different pathways and mechanisms were represented in our follow-up sample (see Figure 1). The identified participants were considered our 'key informants', where the aim of this purposive sampling was to challenge rather than confirm the conceptual model. An exclusion criterion of this follow-up study was a subsequently developed cognitive impairment that prevented participants from providing meaningful responses to the interview questions.

Consistent with the qualitative approach, data collection and analysis occurred concurrently to enable emerging patterns in the data to be tested in subsequent interviews. Sampling ceased when diversity from our original sample was achieved; i.e. all facets of the original conceptual model were feasibly tested, which in the context of this study was considered theoretical saturation ⁸.

1
2
3 230 Each individual selected for follow-up was contacted via telephone. If they were interested in
4
5 231 participating, a participant information sheet was emailed or mailed to them. The lead author
6
7 232 contacted them within three days to confirm they had read and understood the information sheet,
8
9 233 and consented to being interviewed. All interviews were conducted via telephone because the lead
10
11 234 author was based in a different city to the participants. Interviews were conducted by the lead
12
13 235 author (NRK) who is a woman clinical physiotherapist, a PhD candidate with previous qualitative
14
15 236 research experience, and who received training from a qualitative expert (SB). NRK had previously
16
17 237 interviewed each of these participants for the baseline study two years prior, however, no other
18
19 238 form of relationship existed between the lead author and the participants.
20
21
22
23
24 239 Prior to the commencement of the interviews, the lead author (NRK) familiarised herself with each
25
26 240 of the baseline transcripts of the participants. This involved taking notes on how their level of
27
28 241 satisfaction related to the existing conceptual model, in particular, which mechanisms were most
29
30 242 influential for them. Further, it was noted how social and contextual factors, and thoughts and
31
32 243 feelings played a role in the three mechanisms. At the beginning of each interview, NRK explained
33
34 244 the purpose of the research and encouraged the participants to openly share their experiences.
35
36 245 Anonymity and complete confidentiality was emphasised, in particular from their treating surgeon.
37
38
39
40 246 The interview schedule (Table 1) was designed to test the stability of participants' satisfaction levels
41
42 247 and the extent to which the original conceptual model (Figure 1) remained relevant, whilst
43
44 248 remaining flexible to explore new concepts not captured in the original model, if they emerged.
45
46 249 Interviews lasted around 40 minutes on average, and were audio recorded and transcribed prior to
47
48 250 analysis.
49
50
51
52 251 Data analysis followed the methodology of the previous qualitative study, which employed
53
54 252 constructivist grounded theory⁷. Under a constructivist grounded theory approach, researchers seek
55
56 253 to understand patterns and processes in the data, rather than offer descriptions⁷. The prior
57
58 254 knowledge of the researchers is acknowledged and valued in the analysis, whilst the researchers
59
60

255 simultaneously reflexively engage with the data to ensure the participants' perspectives are
 256 prioritised ⁷. Under this constructivist approach, participants' construction of satisfaction was central
 257 to the analysis ⁷. The analysis also adopted a critical lens in this follow-up study, whereby the aim of
 258 the analysis was to challenge rather than confirm the model from the baseline study. This was
 259 facilitated by discussion with the multidisciplinary authorship team in which alternative
 260 interpretations were sought and considered. The purposive sampling approach also facilitated this
 261 by targeting all aspects of the conceptual model.

262 Data were managed using Microsoft Word (Microsoft Corp., Redmond, WA, USA) as the lead
 263 author's preference. For the present study, analysis was conducted in several stages, which were
 264 guided by the recommendations of Charmaz (2006) (Table 2). Coding was conducted by NRK and AS,
 265 where a combination of deductive codes, based on the conceptual model, and inductive codes
 266 looking at change over time were used. The analytic process was iterative, whereby, the lead author
 267 would move back and forth between the steps to ensure constant comparison between the new
 268 data and the findings of the existing model of patient satisfaction after TKR.

269 Table 1. Methods of analysis

Stage	Description
i	Familiarisation of transcripts, through reading and re-reading the data
ii	Reflexive and analytic memo writing, whereby the lead author (NRK) critically engaged her perception of the findings by writing and reflecting on these, as well as reflecting on the analytic process
iii	Coding the transcripts, guided by the initial memos produced, and by asking 'what is influencing this person's level of satisfaction?' and 'how does the original conceptual model relate to this person's experience of satisfaction?' At this stage, initial thoughts of the data were presented to members of the multidisciplinary authorship team for discussion and feedback, which included clinical and research physiotherapists, an orthopaedic research nurse, and a qualitative expert
iv	To refine the codebook from stage iii, two randomly selected transcripts were coded by AS to explore concordances and disagreements
v	Further memo writing following coding, and summarising the key findings of the participants, which required the lead author to compare the open coding findings with her original memos to create richer descriptions of the data
vi	The findings were compared with the existing conceptual model of patient satisfaction after TKR, which was again presented to the multidisciplinary authorship team for discussion and refinement

270

271 This study was conducted in accordance with the ethical standards in the 1964 Declaration of
 272 Helsinki. Ethics approval was granted by St Vincent's Hospital (Melbourne) Human Research Ethics
 273 Committee (HREC/17/SVHM/251).

274 Table 2. Semi-structured interview schedule

Construct from model	Questions
Context	It's been a couple of years since we spoke, can you tell me how your TKR has been?
Overall outcome Overall level of satisfaction // change	Overall, how satisfied are you with the results of your TKR? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ Why not? <i>If changed:</i> Last time we spoke you mentioned ____ about your satisfaction with ____, can you think why this may have changed?
Symptoms // change // recalibration // Re- conceptualisation	Can you tell me about any pain or other symptoms you currently experience? Overall, how satisfied are you with the results of your TKR for improving your pain? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ Why not? <i>If changed:</i> Last time we spoke you mentioned ____ about your satisfaction with ____, can you think why this may have changed? Why do you think you are still having ____ in your knee? Why do you think you are no longer experiencing ____ in your knee?
Function // change // Re-prioritisation	Can you tell me about any difficulties you have with activities at the moment? Overall, how satisfied are you with the results of your TKR for improving your ability to do home and yard work? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ Why not? Overall, are you satisfied with the results of your TKR for improving your ability to do recreational activities? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ why not? Last time we spoke you mentioned ____ about your satisfaction with ____, can you think why this may have changed? Can you tell me about how you have adapted/ not been able to adapt to the activities that you have difficulty with?
Conceptualisation of satisfaction	Can you help me understand, from your point of view, what it means to be very satisfied with your TKR?
Expectations	Can you try and cast your mind back and remember what you expected from your TKR? Do you believe these expectations have been met? Thinking forward, what are you now expecting from your TKR? Why? <i>If changed:</i> Last time we spoke you said ____ about your expectations for your TKR, what do you

	think about these expectations now? Do you believe they have been met?
Social	Thinking back through the time since you had your operation, can you tell me about any family or friends who helped you along your journey? Have you encountered many other people that have had a TKR? What did you think about their outcomes/ what did you learn from them?
Emotions	How has your TKR outcomes made you feel?
Cognitions	What kind of mind set did you have along your TKR journey? What do you think is important for having a successful outcome after TKR?
Care seeking	Have you had any contact with your surgeon or other health care professionals/ any treatment since we last spoke? What was the purpose of the appointment? Can you tell me how the appointment went?

275

276 **Results**277 Participants

278 Eleven of the 14 people identified as key informants from the baseline study of 40 participants,
279 participated in the study. Among the three key informants who did not participate, one had
280 developed cognitive impairment, one did not want to participate in the follow-up study, and one
281 was unavailable for interview. Recruitment was ceased at 11 participants as sufficient diversity was
282 captured to test the conceptual model. The demographic information for all participants, including
283 their level of satisfaction and key mechanisms influencing their level of satisfaction as identified at
284 the baseline interview, is presented in Table 3. There were six women and five men, the average
285 time since TKR was 3 years and 5 months, and the average age at time of interview was 77 years.

286 Table 3. Participant characteristics

Participant	Characteristics	Levels of satisfaction and mechanisms from initial study	Levels of satisfaction and mechanisms at 2 year follow-up
01b	Male 3 years 10 months post TKR 76 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
02b	Female 3 years 8 months post TKR 72 years old	Glass half full Non-bothersome conceptualisation of symptoms Reframing valued activities	Glass half full Positive conceptualisation of symptoms Reframing valued activities

04b	Male 3 years 9 months post TKR 79 years old	Glass half empty Inability to reframe valued activities	Glass half full Positive conceptualisation of symptoms Reframed valued activities
11b	Male 3 years 5 months post TKR 78 years old	Glass half full Non-bothersome conceptualisation of symptoms	Glass half full Positive conceptualisation of symptoms Reframed valued activities
12b	Female 3 years 9 months post TKR 81 years old	Glass half full Recalibration of symptoms Positive conceptualisation of symptoms	Glass half empty Negative conceptualisation of symptoms Inability to reframe valued activities
14b	Female 3 years 6 months post TKR 71 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
16b	Male 3 years 9 months post TKR 70 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
18b	Female 4 years post TKR 82 years old	Glass half full Reframing valued activities	Glass half full Positive conceptualisation of symptoms
39b	Female 2 years 10 months post TKR 77 years old	Glass half empty Negative conceptualisation of symptoms Negative calibration of symptoms	Glass half empty Negative conceptualisation of symptoms Inability to reframe valued activities Negative calibration of symptoms
41b	Female 2 years 8 months post TKR 81 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
43b	Male 2 years 8 months post TKR 83 years old	Glass half full Positive conceptualisation of symptoms	Full glass No/ minimal on going symptoms or functional limitations

287

288 Participant identification numbers are presented as the participant's identification number from the
 289 previous study followed by the letter 'B', to facilitate comparison with the previous publication ⁶.

290 Do satisfaction levels change at later follow-up?

1
2
3 291 Overall, participants reported similar levels of satisfaction as the previous study, with the exception
4
5 292 of three participants; P43b transitioned from 'glass half full' to 'full glass'; P04b transitioned from
6
7 293 'glass half empty' to 'glass half full'; and P12B transitioned from 'glass half full' to 'glass half empty'.
8
9
10 294 In the following quote, P12B acknowledges that her satisfaction levels have changed and attributes
11
12 295 this lower level of satisfaction to her recent falls:

15 296 *Interviewer: "...when I called you two years ago about your knee replacement, you told me that you*
16
17 297 *were somewhat satisfied with your ability to do home and yard work. What do you think has*
18
19 298 *changed?"*

22 299 *12B: "Yeah, well that was before I had the falls."*

25 300 These transitions were aligned with the mechanisms identified in the baseline interviews, thus, no
26
27 301 new themes emerged from interviewing these participants about their changed level of satisfaction.

30 302 How does the existing conceptual model of patient satisfaction after TKR apply at this later follow-
31
32 303 up?

35 304 In the following section, participants who reported no or minimal ongoing symptoms or functional
36
37 305 limitations, and high satisfaction in this follow-up study were classified as 'full glass'. Participants
38
39 306 who reported ongoing symptoms and/ or functional limitations were classified as either 'glass half
40
41 307 full' (those that reported high satisfaction), or 'glass half empty' (those that reported low
42
43 308 satisfaction) in this follow-up study. Where a participant changed classification from the baseline
44
45 309 study, this has been described under their classification from the follow-up interviews; i.e. their
46
47 310 'new' level of satisfaction.

51 311 *Full glass*

54 312 In alignment with the existing conceptual model, participants in the 'full glass' pathway at baseline
55
56 313 continued to report no, or minimal ongoing symptoms or functional limitations in the follow-up
57
58 314 interviews. Participants in this pathway also reported a stable level of symptoms; no participant

1
2
3 315 reported any new or changed level of symptoms. As participant P14 explains, she perceived herself
4
5 316 as lucky due to how positive her outcomes have been:

6
7
8 317 *"I'm one of the lucky ones obviously because I've never had problems. I've had both done and I've*
9
10 318 *never had problems... Now, yeah, it doesn't hurt but it's a very funny sensation when I go to kneel on*
11
12 319 *them. But that is all, I can squat, I can do everything bar that"*

13
14
15 320 In the presence of minimal symptoms, the participants appeared to be more forthcoming with
16
17 321 possible reasons for the occasional experience of pain compared to the baseline interviews.

18 322 However, consistent with the previous enquiry, the pain itself and perceived reasons for pain, were
19
20 323 deemed non-bothersome. P1b who previously thought his occasional symptoms may be related to
21
22 324 his age, explained how he experiences minimal, non-bothersome, pain as a result of aging and
23
24 325 changes to the weather, but he doesn't believe it negatively affects him:

25
26
27 326 *"It [the pain] doesn't affect me at all really. I just put it down to getting a bit old and change of*
28
29 327 *weather. I get it in other parts of the body as well, I get in the elbow, ankle and the back."*

30
31
32 328 Likewise, P16B who previously expressed contentment with not knowing the cause of his occasional
33
34 329 pain, now described the effect of cold weather on his knee but felt like it was nothing to worry
35
36 330 about:

37
38
39 331 *"[pain in] the knees? No, no worries. Like I said they can ache a little bit type of thing but um, ah*
40
41 332 *when it gets real cold but ah, no worries – but it's time to put on long trousers now and that keeps*
42
43 333 *them warm"*

44
45
46 334 *Glass half full pathway*

47
48
49 335 Participants in the 'glass half full' pathway continued to conceptualise satisfaction as improvement
50
51 336 from the pre-operative state. As described by P18b, she felt osteoarthritis was all through her body
52
53 337 (including her knees) and very painful, so the TKR operation was a success:

1
2
3 338 *“Well [I’m satisfied] because – oh I don’t know, because I have the, I had all through my legs –*
4
5 339 *because I have osteoarthritis through the whole body, so my knees are – they’re very sore, very bad,*
6
7 340 *so ah, the operation was successful.”*
8
9

10 341 Additionally, P11b, who described continual difficulty walking and felt like the knee wasn’t 100%,
11
12 342 reported high level of satisfaction based on a previously worse state:
13
14

15 343 *“Comparing to what it was, yeah, absolutely satisfied, yeah.”*
16
17

18 344 The mechanisms that facilitated satisfaction in the presence of ongoing symptoms or functional
19
20 345 limitations were consistent with the existing conceptual model; recalibration, reframing valued
21
22 346 activities, and non-bothersome conceptualisation of symptoms (Figure 1). However, it was apparent
23
24 347 the mechanisms that influenced high levels of satisfaction for an individual could change over time.
25
26 348 For P11b, his satisfaction was previously due to conceptualising his symptoms as continually
27
28 349 improving. However, in the follow-up interview, he developed a non-bothersome conceptualisation
29
30 350 of his symptoms through believing his symptoms were good for his age:
31
32

33
34
35 351 *“At my age it doesn't matter. I just walk and do everything to my knee. I don't walk if I have a lift or*
36
37 352 *whatever or go anywhere out of the way. I just carry on the way I do, I'm 78 so I think I get around*
38
39 353 *pretty good really for that age.... I'm just a little bit disappointed in it, but I've got to remember I'm*
40
41 354 *nearly 80, so I suppose I have to be satisfied with it, wouldn't I?”*
42
43

44 355 Additionally, the role of social comparison to facilitate recalibration of symptoms was also present
45
46 356 for P11b, who compared himself to others he perceived were doing worse than him:
47
48

49 357 *“Yeah, well, I've heard a lot of complaints about it. There's a lot of people that are not as good as me,*
50
51 358 *that I know, though, and so, I don't worry about mine. I've seen [surgeon] the other day and they x-*
52
53 359 *rayed me and said everything was in place, so I feel good about that too.”*
54
55

56
57 360 Similarly, for P18b, in her baseline interview, she described reframing valued activities in the form of
58
59 361 setting small functional targets, such as gradually increasing time on her stationary bike. In the
60

1
2
3 362 follow-up interview, her mechanisms for satisfaction were modified such that her impaired function
4
5 363 was conceptualised to be due to her other comorbidities, particularly her spine. Although the
6
7 364 influence of comorbidities was apparent in her previous interview, the attribution of these to her
8
9
10 365 reason for being satisfied came across more strongly in the follow-up interview:

11
12
13 366 *“Walking, that relates to my spine, it has nothing to do with my knees. I can’t reach my toes for*
14
15 367 *instance, I have to have pedicures because I can’t reach my toes there, I can’t bend down but that*
16
17 368 *has nothing to do with my knees. That is my back so that’s hard for me to distinguish you know, what*
18
19 369 *I’m saying?”*

20
21
22 370 Participant P04b, who transitioned into this group from ‘glass half empty’, reframed activities based
23
24 371 on what he considered to be reasonable for his age, and this reframing was a key mechanism for
25
26 372 transitioning to becoming satisfied. In the baseline interview, P04b reported dissatisfaction due to
27
28 373 an inability to do valued activities such as golf. In the follow-up interview P04b describes what he
29
30 374 has decided as appropriate for his age:

31
32
33
34 375 *P04b: “I probably after I spoke to you, if that was 2 years ago um, I probably did start playing again*
35
36 376 *with a friend of mine, ah, yeah, ah and we used to just play 9 holes we’d get a cart and we’d play*
37
38 377 *probably once a week and um, it got to the stage where ah, I couldn’t I – I had to give it away*
39
40 378 *because I couldn’t walk that far – and once again, which I’m sure it was because of the other knee, I*
41
42 379 *can’t remember having any trouble with my right knee it was always the left knee and the hip so...”*

43
44
45
46 380 *NRK: “Would you ever consider going back to it?”*

47
48
49 381 *P04b: “Nup. I figure at 80 I’m, I’ve passed it.”*

50
51
52 382 Consistent with the existing model, social and contextual factors, as well as thoughts and feelings
53
54 383 were also influential in this pathway. In particular, the role of acceptance pertaining to age-related
55
56 384 limitations appeared to play a larger role than in the previous study, as has been demonstrated in
57
58 385 the previous quotes. In addition to this, a positive relationship with the surgeon who had performed

1
2
3 386 their TKR continued to be an important social and contextual factor for satisfaction, as explained by
4
5 387 P18b:
6
7
8 388 *“Yes, ah, terrific man, um, well I suppose he was very caring and looking after me afterwards. I like*
9
10 389 *him very much, he is very calming very friendly, very reassuring and I thought he knew what he was*
11
12
13 390 *doing, if you know what I mean”*

14
15
16 391 Further, participants in this pathway generally did not express thoughts and feelings of worry and
17
18 392 anxiety about their current symptoms. Participants explained an ability to manage doing what they
19
20 393 wanted despite limitations. P11b expressed a lack of worry about his persistent knee clunking and
21
22 394 adequate self-efficacy to ‘work around it’:

23
24
25 395 *“I’m not worried about it [knee clunking], no, not at this stage. I can manage it pretty good now, and*
26
27 396 *so I work around it a little bit, yeah.”*

28
29
30 397 Likewise, P18b reported her knee instability as neither worrisome nor concerning, indicating a lack
31
32 398 of distress related to her current symptoms or functional limitations:

33
34
35 399 *“If I’m standing long time ah, not that I’m walking, if I’m standing long time it sort of tends to*
36
37 400 *sometimes give way on me, you know, but it’s not – I’m not concerned and it’s not really worrying,*
38
39 401 *you know.”*

40
41
42
43 402 *Glass half empty*

44
45
46 403 Participants in the ‘glass half empty’ pathway continued to conceptualise satisfaction as complete
47
48 404 resolution in symptoms and or functional impairments. In the follow-up interviews, ‘glass half
49
50 405 empty’ participants expressed a stronger emphasis on satisfaction as meaning having a knee that felt
51
52 406 and moved like a ‘normal’ knee:

53
54
55 407 *“[being very satisfied]... means I’ll be able to walk normally without any aids or anything or any*
56
57 408 *frames or anything that I have to use and that’s it... as if I hadn’t had any operations at all” [P39b]*

1
2
3 409 The three key mechanisms identified in the baseline study remained influential for 'glass half empty'
4
5 410 participants in the follow-up study. For participant P39b, whose low level of satisfaction remained
6
7 411 the same from the previous enquiry, her previous mechanism of a negative conceptualisation of
8
9 412 symptoms was confirmed and strengthened; P39b underwent a revision surgery to try and address
10
11 413 her persistent pain after her initial TKR, only to continue experiencing pain. P39b explained how she
12
13 414 understood the cause of her symptoms:

14
15
16
17 415 *"I was in too much pain after the surgery and the way the knee was going back it was really giving*
18
19 416 *me a lot of pain, and that because it was very hypo-extending back ... somehow it was stretched or*
20
21 417 *something he said that they had it stretched or whatever they did. And they had to do it again, but by*
22
23 418 *fixing it I think he might of, maybe, I think he might have put too much padding in. You know packed*
24
25 419 *it up too much this time. Maybe, I don't know, I hope I don't have to go under again and take some of*
26
27 420 *that padding off to stop that nerve. That's probably why it's pressing on the nerve now."*

28
29
30
31 421 Additionally, due to social comparison with others who had undergone TKR and had a positive
32
33 422 outcome, P39b recalibrated her symptoms as worse than theirs. This comparison also contributed to
34
35 423 further confusion regarding her conceptualisation of symptoms:

36
37
38
39 424 *"She was good and she had the second one done and she's ok. There's nothing wrong with her so you*
40
41 425 *know, I don't know... And she's quite happy and she's walking as if she never ever had anything done,*
42
43 426 *you know like, nothing is ever – she never even had the operations and she's fit and goes for walks*
44
45 427 *and does you know, exercises and goes to the gym and all and you know, she's quite happy with it.*
46
47 428 *And I'm thinking, well if you can do that well how come mine is like that, why am I having all this*
48
49 429 *problems, you know"*

50
51
52
53 430 Participant P12b, who transitioned from 'glass half full' to 'glass half empty', experienced two falls in
54
55 431 the period since her baseline interview. Although she reported persistent symptoms in her baseline
56
57 432 interview, at the follow-up interview she believed her pain was due to the falls. However, she
58
59 433 reported that her doctor assured her there was nothing internally wrong with her knee and

1
2
3 434 dismissed her concerns about her pain. This led to an inability to have a positive conceptualisation of
4
5 435 her symptoms, and subsequent reports of low levels of satisfaction:
6
7

8 436 *"Since I've had the fall, yes. I don't think I had very much pain at all, before I had the fall. I had to go*
9
10 437 *over to [location] to have me leg x-rayed, because I had me shoulders x-rayed as well. And he said,*
11
12 438 *"There's no need to do the right one." He x-rayed the left leg, but he didn't do the right one, that I*
13
14 439 *had replaced. And he said, "Everything there should be fine." So, okay. And that was it... I've told him*
15
16 440 *several times that I've got pain in the knee, and so he just makes jokes; he says, "You been playing*
17
18 441 *football, have you?" I say, "Oh yeah, of course.""*
19
20
21

22 442 P12b further described how she was unable to do valued activities, which also contributed to her
23
24 443 low level of satisfaction:
25
26

27 444 *"Very dissatisfied. I used to be able to look after my own garden, but now I've got to pay a fellow \$60*
28
29 445 *a fortnight to come and cut my lawn... That's how bad things are, and I've got a mower, and a blower*
30
31 446 *down in the shed, and rakes and what have you, but I can't use them."*
32
33
34

35 447 Consistent with the existing model, the influence of social and contextual factors, as well as thoughts
36
37 448 and feelings, appeared to play a role in this pathway. P39b recalls feeling unheard by her surgeon
38
39 449 and feeling high levels of frustrations because of this. P39b told a story of how her surgeon didn't
40
41 450 believe her problems with walking until a chance encounter on the street:
42
43

44 451 *"... He was in the street talking to another guy. And then I went past him, and said hello and I kept*
45
46 452 *passing... he saw me and then he realised what I was talking about. And I thought well I've been*
47
48 453 *trying to tell you that 12 months ago. Which I was really, really got upset about it, but it was, you*
49
50 454 *know, could've done it 12 months before and wouldn't have had all that problem... all the things I*
51
52 455 *had to do and then he was thinking of getting me – oh what was it? Like bars and that put on to keep*
53
54 456 *me leg straight and oh look, all the things that he was trying to do and didn't need to do any of that.*
55
56 457 *Which annoyed me really, really bad because, you know, back and forward and living in [location]*
57
58
59
60

1
2
3 458 *into Melbourne all the time, which you know, all that time which you didn't sort of – and I tried to tell*
4
5 459 *him what was going on and he just didn't – I don't know whether he wasn't listening or he wasn't – I*
6
7 460 *don't know what it was. Until he saw me walk and then he said, "Oh, I realise what you're talking*
8
9 461 *about" oh it's about time."*
10
11
12

13 462 For P12b, her low level of satisfaction was also influenced by the contextual factor of a negative
14
15 463 relationship with health care professions, as demonstrated in the previous quote where her reports
16
17 464 of pain following her falls were dismissed. Additionally, the experience of falls contributed to
18
19 465 negative thoughts and feelings, particularly high levels of fear related to her knee:
20
21

22 466 *"And that's very frightening, so unless I've got somebody with me, I try not to go there. I go over to*
23
24 467 *the plaza if I have to have my eyes tested or something, get new glasses. But otherwise, I stay away*
25
26 468 *from there."*
27
28

29
30 469 FIGURE 2 ABOUT HERE
31

32
33 470 Figure 2 legend: Roadmap to improve satisfaction levels post-TKR
34

35 471 **Discussion**

36
37
38 472 The findings from this qualitative follow-up study contribute to understanding the processes
39
40 473 involved in patient satisfaction 3-4 years after TKR. This study was conducted two years following
41
42 474 the baseline enquiry and demonstrated how the three pathways to high and low satisfaction were
43
44 475 still relevant ('full glass', 'glass half full', and 'glass half empty'), as were the originally identified
45
46 476 mechanisms of these pathways (recalibration, reframing valued activities, and conceptualisation of
47
48 477 symptoms). However, participants could change their level of satisfaction or the key mechanism(s)
49
50 478 driving their level of satisfaction over the two years following the baseline study. This highlights that
51
52 479 both the levels of satisfaction and the reasons underpinning it are fluid over time. Furthermore, the
53
54 480 factors underpinning these changes are potentially modifiable with targeted intervention.
55
56
57
58
59
60

1
2
3 481 This follow-up study provides novel insight to patient satisfaction as a continually changing process
4
5 482 up to 4 years post-TKR. Whether satisfaction changes over time after TKR, and if so how and why,
6
7 483 has not been previously investigated. The findings from the present study indicate that patient
8
9 484 satisfaction may be better considered as a 'moving target' due to the interaction of various
10
11
12 485 psychosocial processes.

13
14
15 486 This fluidity observed in patient satisfaction suggests that clinicians should continue to monitor
16
17 487 patient satisfaction for a number of years post TKR. Despite the changeable nature of satisfaction
18
19 488 seen in this study, participants did not indicate any belief that their outcomes could change without
20
21 489 further surgery. This is in agreement with previous qualitative research that found patients believe
22
23 490 they are "stuck with" their TKR outcomes⁹. Thus, it is important to inform patients their outcomes
24
25 491 are potentially modifiable over time. Additionally, in alignment with our previous study⁶ and existing
26
27 492 satisfaction literature^{5,10}, the role of the surgeon in forging a positive therapeutic alliance was
28
29 493 important in achieving high levels of satisfaction. This appeared to promote trust in the quality of
30
31 494 the TKR surgery and belief of a good outcome despite continued symptoms and functional
32
33 495 limitations. Thus, positive communication techniques and relationship building, such as active
34
35 496 listening and validating concerns regarding the integrity of the TKR, may be important in assisting
36
37 497 patient to achieve high levels of satisfaction. Furthermore, understanding the specific basis for a
38
39 498 person's dissatisfaction, utilising the proposed conceptual model, may allow for targeted
40
41 499 management to assist patients to feel more satisfied up to 4 years post-TKR.

42
43
44
45
46
47 500 The influence of the three key mechanisms in pathways to high and low levels of satisfaction suggest
48
49 501 patient satisfaction is largely a function of patient adaptability. This is aligned with previous
50
51 502 qualitative research that found patients post-TKR expressed happiness with their TKR and described
52
53 503 their outcomes as good despite continued pain or an inability to do valued activities¹¹. The potential
54
55 504 of patients to arrive at a positive appraisal of their TKR outcomes despite ongoing pain and/or
56
57 505 functional limitations is an important consideration when interpreting scores on measures of patient
58
59
60

1
2
3 506 satisfaction; high levels of satisfaction may not necessarily reflect meaningful improvement in pain
4
5 507 and function.
6
7

8 508 This follow-up study importantly revealed the more dominant influence of negative age-related
9
10 509 beliefs on symptoms and functional limitations compared to the baseline study. This is consistent
11
12 510 with other qualitative and quantitative research that has found older people more readily accept
13
14 511 that the process of aging relates to functional decline and persistent pain^{9,12}. Despite these beliefs
15
16 512 positively influencing a non-bothersome conceptualisation of symptoms and resultant reports of
17
18 513 high satisfaction in this study, it may promote continual disengagement from valued life activities in
19
20 514 this cohort. For example, participant 04b stopped playing golf, which has social, cognitive and
21
22 515 physical health benefits. The negative age-related beliefs seen in this study may reflect a stronger
23
24 516 social narrative of age related prejudice, which has become internalised in older adults^{13,14}.
25
26 517 Clinicians may play an important role in addressing internal negative self-perceptions of aging in
27
28 518 patients to prevent adverse health and wellbeing outcomes¹⁴⁻¹⁶.
29
30
31
32

33 519 *Clinical implications*

34
35
36 520 As the findings from this study indicate that patient satisfaction is a continuous journey up to 4 years
37
38 521 post-TKR, it may be appropriate to support vulnerable patients over this period of time. As
39
40 522 orthopaedic surgeons may not always follow their patients beyond the first year or two post-TKR,
41
42 523 GPs and physiotherapists may be best positioned to provide care at this stage, with referral on to
43
44 524 other appropriate allied health as required. To assist clinicians, we propose a road map (Figure 2)
45
46 525 detailing the utilisation of the conceptual model to identify key barriers to satisfaction and potential
47
48 526 treatment pathways for individualised management, for patients with low satisfaction up to 4 years
49
50 527 post-TKR. In alignment with clinical guidelines¹⁷, this ongoing support should include continuous
51
52 528 monitoring in the form of screening tools such as the WOMAC for pain and function¹⁸, and the
53
54 529 Örebro or STarT Back for psychological factors^{19,20}. Screening tools can guide patient-centred
55
56 530 communication, the importance of which was further highlighted in this study. The findings suggest
57
58
59
60

1
2
3 531 that patients reporting low levels of satisfaction require validating and reassuring communication
4
5 532 techniques, and a strong therapeutic alliance to facilitate an improvement in satisfaction levels. Our
6
7 533 previous publication provides exemplar communication techniques to assist patients who report low
8
9 534 levels of satisfaction ⁶. The identification of both physical and psychosocial barriers to achieving high
10
11 535 satisfaction highlights the potential role of physiotherapy and psychological support in this process.
12
13
14 536 The over-attribution of the perceived effects of aging on persistent symptoms and functional
15
16 537 limitations in this study suggest clinicians may play an important role in educating patients of the
17
18 538 potential to improve their clinical outcomes. This can include addressing implicit, negative age-
19
20 539 related beliefs and working with patients to set realistic functional goals, or targets to improve
21
22 540 social participation ¹⁵. Rehabilitation that disconfirms negative age-related beliefs, such as helping
23
24 541 people to develop movement strategies that are non-provocative, may provide successful
25
26 542 experiences that encourage further engagement with valued life activities. Future research may be
27
28 543 concerned with testing the framework proposed in this research for providing targeted care for
29
30 544 those who remain dissatisfied post-TKR.
31
32
33
34

35 545 **Strengths and limitations**

36
37
38 546 To achieve a longitudinal understanding of patient satisfaction, we were required to sample from
39
40 547 the participants in our previous study. This may have limited the scope of our findings and
41
42 548 participants of a younger age or at longer follow-up may have identified additional factors influential
43
44 549 to satisfaction. As no participant classified as “full glass” reported any different or new symptoms, it
45
46 550 is unknown if they would remain satisfied if they had developed bothersome symptoms. The sample
47
48 551 was from a single site, an Australian public hospital, where TKRs are government funded procedures.
49
50 552 Thus, the experiences may reflect the aspects of care which do not transfer to other health settings.
51
52
53
54 553 Using a longitudinal qualitative design by re-interviewing key informant participants from the
55
56 554 baseline study sample allowed a novel, in-depth comparison and analysis of factors related to what
57
58 555 satisfaction means to patients, and how and why satisfaction level changes or remain the same over
59
60

1
2
3 556 time. Additionally, a consistent interviewer across the baseline and follow-up studies facilitates a
4
5 557 trusting relationship with the participants and can yield more rich descriptions in the interviews. This
6
7 558 also meant the interviewer was familiar with the participants' experiences, and thus was able to
8
9 559 compare and contrast meaning over time. This is important when documenting contextual cues,
10
11
12 560 such as mood, which may not be revealed in written transcripts.
13
14

15 561 **Conclusions**

16
17
18 562 The findings from the present study provide support for satisfaction with TKR being a fluid,
19
20 563 multifactorial construct which is influenced by potentially modifiable factors that vary over time. The
21
22 564 findings suggest avenues for clinicians to assist their patients to feel satisfied with their TKR
23
24 565 outcomes up to 4 years post-surgery, and highlight the importance of informing TKR patients to
25
26 566 present for care in order to optimise their TKR outcomes, rather than accepting ongoing symptoms
27
28
29 567 or functional limitations.
30
31

32 568
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

569 **References**

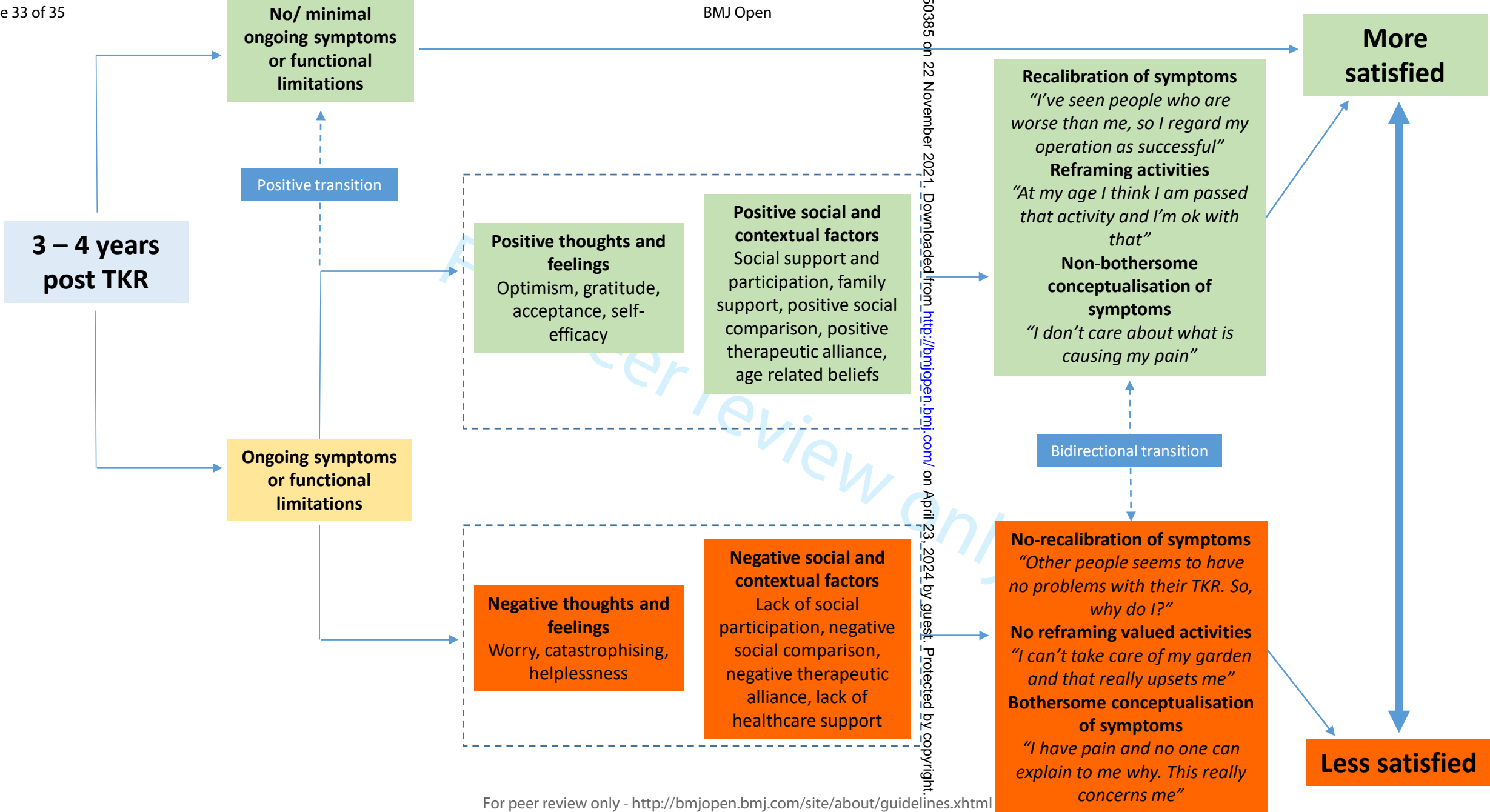
- 570 1. Singh JA, Dowsey M, Choong PF. Patient Endorsement of the Outcome Measures in
571 Rheumatology (OMERACT) Total Joint Replacement (TJR) clinical trial draft core domain set. *BMC*
572 *Musculoskelet Disord* [Comparative Study]. 2017; 18(1):111.
- 573 2. Kahlenberg CA, Nwachukwu BU, McLawhorn AS, Cross MB, Cornell CN, Padgett DE. Patient
574 Satisfaction After Total Knee Replacement: A Systematic Review. *HSS J* [Review]. 2018; 14(2):192-
575 201.
- 576 3. Klem N-R, Kent P, Smith A, Dowsey M, Fary R, Schütze R, et al. Satisfaction after total knee
577 replacement for osteoarthritis is usually high, but what are we measuring? A systematic review.
578 *Osteoarthritis and Cartilage* Open. 2020:100032.
- 579 4. Pellekooren S, Ostelo R, Pool A, van Tulder M, Jansma E, Chiarotto A. Content Validity of
580 Patient Reported Outcome Measurement Instruments for Patient Satisfaction in Primary Care:
581 Systematic Review of Studies Involving Patients with Musculoskeletal Complaints. *J Orthop Sports*
582 *Phys Ther*. 2020 [cited 2020/11/22]:1-42.
- 583 5. Batbaatar E, Dorjdagva J, Luvsannyam A, Amenta P. Conceptualisation of patient
584 satisfaction: a systematic narrative literature review. *Perspect Public Health*. 2015; 135(5):243-50.
- 585 6. Klem N-R, Smith A, O'Sullivan P, Dowsey MM, Schütze R, Kent P, et al. What Influences
586 Patient Satisfaction after TKA? A Qualitative Investigation. *Clin Orthop Relat Res*. 2020; 478(8):1850-
587 1866.
- 588 7. Charmaz K. *Constructing grounded theory: a practical guide through qualitative analysis.*:
589 London: SAGE Publications; 2006.
- 590 8. Starks H, Brown Trinidad S. Choose Your Method: A Comparison of Phenomenology,
591 Discourse Analysis, and Grounded Theory. *Qual Health Res*. 2016; 17(10):1372-1380.
- 592 9. Jeffery AE, Wylde V, Blom AW, Horwood JP. "It's there and I'm stuck with it": patients'
593 experiences of chronic pain following total knee replacement surgery. *Arthritis Care Res (Hoboken)*.
594 2011; 63(2):286-92.
- 595 10. Sitzia J, Wood N. Patient satisfaction: a review of issues and concepts. *Soc Sci Med*. 1997;
596 45(12):1829-43.
- 597 11. Woolhead GM, Donovan JL, Dieppe PA. Outcomes of total knee replacement: a qualitative
598 study. *Rheumatology (Oxford)*. 2005; 44(8):1032-7.
- 599 12. Robertson DA, Kenny RA. "I'm too old for that" — The association between negative
600 perceptions of aging and disengagement in later life. *Pers Individ Dif*. 2016; 100:114-119.
- 601 13. WHO. Ageing: Ageism [Internet]. [https://www.who.int/westernpacific/news/q-a-](https://www.who.int/westernpacific/news/q-a-detail/ageing-ageism)
602 [detail/ageing-ageism](https://www.who.int/westernpacific/news/q-a-detail/ageing-ageism): 2020 [Available
- 603 14. Hausknecht S, Clemson L, O'Loughlin k, McNab J, Low L. Reframing Ageing in Australia.
604 <https://www.age-platform.eu/publications/reframing-ageing-australia>; 2020. p.
- 605 15. Levy BR. Eradication of ageism requires addressing the enemy within. *Gerontologist*. 2001;
606 41(5):578-579.
- 607 16. Hausknecht S, Low L-F, O'Loughlin K, McNab J, Clemson L. Older Adults' Self-Perceptions of
608 Aging and Being Older: A Scoping Review. *Gerontologist*. 2019; 60(7):e524-e534.
- 609 17. Lin I, Wiles L, Waller R, Goucke R, Nagree Y, Gibberd M, et al. What does best practice care
610 for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical
611 practice guidelines: systematic review. *Br J Sports Med*. 2020; 54(2):79.
- 612 18. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC:
613 a health status instrument for measuring clinically important patient relevant outcomes to
614 antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol*. 1988;
615 15(12):1833-40.
- 616 19. Linton SJ, Nicholas M, MacDonald S. Development of a Short Form of the Örebro
617 Musculoskeletal Pain Screening Questionnaire. *Spine (Phila Pa 1976)*. 2011; 36(22)

1
2
3 618 20. Butera KA, Lentz TA, Beneciuk JM, George SZ. Preliminary Evaluation of a Modified STarT
4 619 Back Screening Tool Across Different Musculoskeletal Pain Conditions. Phys Ther. 2016 [cited
5 620 1/22/2021]; 96(8):1251-1261.
6

7 621
8
9

10 622
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41

1 – 4 year post-TKR dissatisfied with TKR outcomes

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41

- 1. Screening:**
- Screen for pain and functional impairments. eg. WOMAC
 - Screen for psychological factors. eg. Örebro, StartMusc
- 2. Questions / prompts:**
- Is anything about your TKR troubling you?
 - Prompts from screening tools
 - eg. *"I notice you scored high on low mood, can you tell me about that."*
 - eg. *"It looks like you are still struggling in ADL's / pain etc can you tell me about this?"*
 - Ask about their social environment.
 - eg. *"do you have support at home, and a social network you regularly engage in?"*

- Approach:**
- 1. Validate and address patient concerns
 - 2. Reassurance re TKR integrity
 - 3. Biopsychosocial pain education
 - 4. Address functional limitations with graded exercise program
 - 5. Address psychological and social factors, referring for additional support as needed

Patient still troubled by their knee after functional rehabilitation: integrate the Three Mechanisms of Change via the following pathways, with thoughts, feelings, social and contextual factors

Patient is no longer troubled by their knee after functional rehab: plan long term management strategy with patient. This should include a home exercise plan, and plans to check-up over long term intervals. Eg every 6 months

Negative calibration
"My friends/family who have had a TKR are so much better than me"

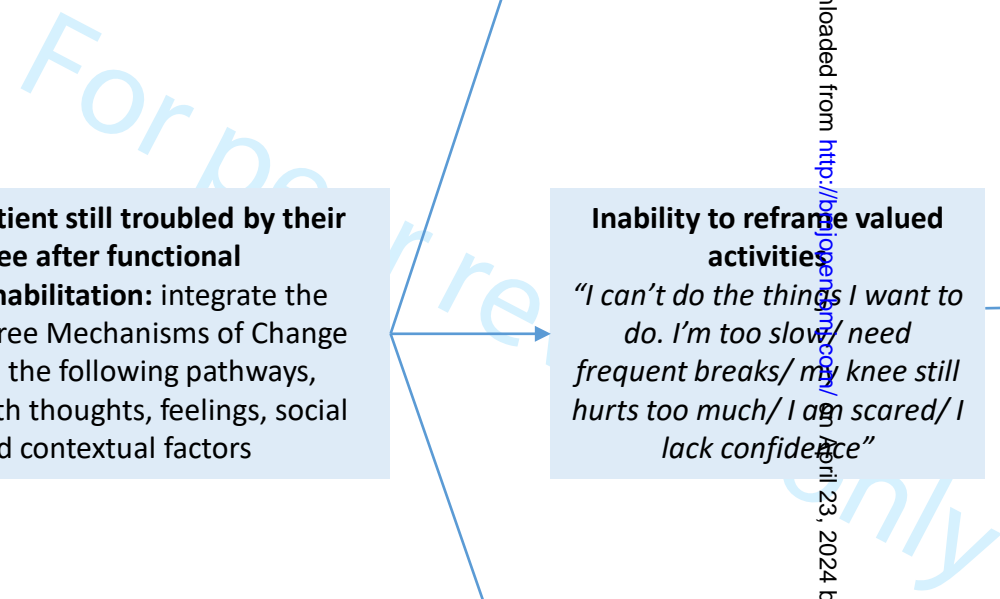
Inability to reframe valued activities
"I can't do the things I want to do. I'm too slow/ need frequent breaks/ my knee still hurts too much/ I am scared/ I lack confidence"

Bothersome conceptualisation of symptoms
"I'm really worried my pain/ other symptoms means something bad, like something went wrong in surgery"

To assist positive calibration of symptoms
 Discuss and encourage broader engagement with other TKR patients. Eg. Group exercise classes, social clubs, online support forums

To assist reframing valued activities
 Work with patients to identify new activities to enjoy and/ or create strategies to modify or adapt current activities. Eg. Pacing strategies or use of aids. Where this is driven by fear or lack of confidence, techniques such as graded exposure therapy may be used

To assist a positive conceptualisation of symptoms
 Discuss and explain reasons for symptoms in a way that is non-threatening and makes sense to the patient. Patients should be reassured that pain can occur as a result of many factors, which may be unrelated to their TKR



050385 on 22 November 2021. Downloaded from <http://bmjopen.bmj.com/> on April 23, 2024 by guest. Protected by copyright.

COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

BMJ Open

What influences patient satisfaction after total knee replacement? A qualitative long term follow-up study

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2021-050385.R1
Article Type:	Original research
Date Submitted by the Author:	15-Sep-2021
Complete List of Authors:	Klem, Nardia; Curtin University, Physiotherapy and Exercise Science Smith, Anne; Curtin University, School of Physiotherapy O'Sullivan, P; Curtin University Dowsey, Michelle; University of Melbourne, Department of Surgery, St.Vincent's Schütze, Robert; Curtin University, School of Psychology & Speech Pathology Kent, Peter; Curtin University, Physiotherapy and Exercise Science; University of Southern Denmark, Sports Science and Clinical Biomechanics Choong, Peter; University of Melbourne, Surgery; St Vincent's Hospital, Orthopaedics Bunzli, Samantha; University of Melbourne, Department of Surgery
Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	Rehabilitation medicine
Keywords:	Adult orthopaedics < ORTHOPAEDIC & TRAUMA SURGERY, Knee < ORTHOPAEDIC & TRAUMA SURGERY, ORTHOPAEDIC & TRAUMA SURGERY

SCHOLARONE™
Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1 **Title Page**

2 What influences patient satisfaction after total knee replacement? A qualitative long term follow-up

3 study

For peer review only

1
2
3 4 Author 1:
4
5

6 5 Dr Nardia-Rose Klem
7

8
9 6 Degree: BSc(Physio)(Hons), PhD
10

11 7 Affiliation: Physiotherapy and Exercise Science, Curtin University
12
13

14 8 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
15
16

17 9 Australia
18
19

20 10 Email address: n.klem@postgrad.curtin.edu.au
21
22

23 11
24
25

26 12 Author 2:
27

28 13 Professor Anne Smith
29
30

31 14 Degrees: BAppSc, MBiostats, PhD
32
33

34 15 Affiliation: Physiotherapy and Exercise Science, Curtin University
35
36

37 16 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
38
39

40 17 Australia
41
42

43 18 Email address: anne.smith@exchange.curtin.edu.au
44
45

46 19
47
48

49 20 Author 3:
50

51 21 Professor Peter O'Sullivan
52
53

54 22 Degrees: Dip Physio, Grad Dip Manip Ther, PhD, FACP
55
56

57 23 Affiliation: Physiotherapy and Exercise Science, Curtin University
58
59
60

1
2
3 24 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
4
5 25 Australia

6
7
8 26 Email address: P.OSullivan@curtin.edu.au
9

10
11 27

12
13
14 28 Author 4:

15
16
17 29 Associate Professor Michelle M Dowsey

18
19
20 30 Degrees: BHealthSci, MEpi, PhD

21
22
23 31 Affiliation: The University of Melbourne, Department of Surgery, St Vincent's Hospital Melbourne,
24
25 32 Australia.

26
27
28 33 Affiliation address: Level 2, Clinical Sciences Building, 29 Regent St, Fitzroy, Victoria 3010 Australia.

29
30
31 34 Email address: mmdowsey@unimelb.edu.au
32

33
34 35

35
36
37 36 Author 5:

38
39
40 37 Dr. Robert Schütze

41
42
43 38 Degrees: MPsych(Clin), PhD

44
45
46 39 Affiliation: Physiotherapy and Exercise Science, Curtin University

47
48
49 40 Affiliation address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,

50
51 41 Australia

52
53
54 42 Email address: R.Schutze@curtin.edu.au

55
56
57 43

58
59
60 44 Author 6:

1
2
3 45 Associate Professor Peter Kent
4
5

6 46 Degrees: BAppSc(Chiro), BAppSc(Physio), GradDipManipTher, PhD
7
8

9 47 Affiliation 1: Physiotherapy and Exercise Science, Curtin University
10
11

12 48 Affiliation 1 address: Building 408, Curtin University, Brand Drive, Bentley, Western Australia 6102,
13

14 49 Australia
15
16

17 50 Affiliation 2: Department of Clinical Biomechanics and Sports Science, University of Southern Denmark
18
19

20 51 Affiliation 2 address: Campusvej 55, University of Southern Denmark, Odense M 5230, Denmark
21
22

23 52 Email address: peter.kent@curtin.edu.au
24
25

26 53
27
28

29 54 Author 7:
30
31

32 55 Professor Peter F Choong
33
34

35 56 Degrees: MBBS, MD FRACS, FAOrthA, FAAHMS
36
37

38 57 Affiliation: The University of Melbourne, Department of Surgery, St Vincent's Hospital Melbourne,
39

40 58 Australia.
41
42

43 59 Affiliation address: Level 2, Clinical Sciences Building, 29 Regent St, Fitzroy, Victoria 3010 Australia.
44
45

46 60 Email address: pchoong@unimelb.edu.au
47
48

49 61
50
51

52 62 Author 8:
53
54

55 63 Dr. Samantha Bunzli
56
57

58 64 Degrees: BPhy (Hons), GradCert Res Methodology, PhD
59
60

1
2
3 65 Affiliation: The University of Melbourne, Department of Surgery, St Vincent's Hospital Level 2, Clinical
4
5 66 Sciences Building, 29 Regent St, Fitzroy, Victoria 3065, Australia
6
7
8 67 Email address: Samantha.bunzli@unimelb.edu.au
9

10
11 68

12
13
14 69 **Corresponding author:**

15
16
17 70 Dr Nardia-Rose Klem
18
19
20 71

21
22
23 72 This work was conducted in both St Vincent's Hospital (Melbourne), Australia, and Curtin University,
24
25 73 Perth, Australia.
26
27
28 74

29
30
31 75 **Conflict of Interest Statement**

32
33
34 76 Professor Peter Choong reports grants from National Health & Medical Research Council, during the
35
36 77 conduct of the study; personal fees from Stryker, personal fees from Johnson & Johnson, grants
37
38 78 from Medacta, personal fees from Kluwer, outside the submitted work. Peter Choong is supported
39
40 79 by a National Health & Medical Research Council Practitioner Fellowship (APP1154203).

41
42
43 80 Professor Peter O'Sullivan reports grants from National Health & Medical Research Council, during
44
45 81 the conduct of the study.

46
47
48 82 Associate Professor Michelle M Dowsey reports grants from Medacta International, grants from
49
50 83 National Health & Medical Research Council, grants from Australian Research Council, personal fees
51
52 84 from Pfizer, outside the submitted work; Associate Professor Michelle Dowsey is supported by a
53
54 85 National Health & Medical Research Council Career Development Fellowship (APP1122526) and a
55
56 86 Dame Kate Campbell Fellowship.
57
58
59
60

1
2
3 87 Professor Anne Smith reports grants from National Health & Medical Research Council, during the
4
5 88 conduct of the study.
6
7

8 89 Associate Professor Peter Kent, or any member of his immediate family, has no funding or
9
10 90 commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing
11
12 91 arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.
13
14

15 92 I agree and confirm this statement as true.
16
17

18 93
19
20

21 94 Dr. Samantha Bunzli, or any member of her immediate family, has no funding or commercial
22
23 95 associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangements,
24
25 96 etc.) that might pose a conflict of interest in connection with the submitted article.
26
27

28 97 I agree and confirm this statement as true.
29
30

31 98
32
33

34 99 Dr. Robert Schütze, or any member of his immediate family, has no funding or commercial
35
36 100 associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangements,
37
38 101 etc.) that might pose a conflict of interest in connection with the submitted article.
39
40

41 102 I agree and confirm this statement as true.
42
43

44 103
45
46

47 104 Miss Nardia-Rose Klem, or any member of her immediate family, has no funding or commercial
48
49 105 associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangements,
50
51 106 etc.) that might pose a conflict of interest in connection with the submitted article.
52
53

54 107
55
56

57
58 108 **Funding statement**
59
60

1
2
3 109 This work was supported by an Australian National Health and Medical Research Council Centre of
4
5 110 Research Excellence in Joint Replacement Surgery (APP1116325). The funders had no role in the
6
7 111 conduct of this study.
8
9

10
11 112

13 113 **Author contributions**

15
16 114 NRK, AS, SB developed the concept for the study. NRK, AS, SB, PO, RS, PK, PC, MD contributed to the
17
18 115 planning, reporting and design of the study. NRK acquired the data. NRK, AS, SB, PO, RS, PK, PC, MD
19
20 116 contributed to the analysis and interpretation of data. NRK drafted the manuscript. NRK, AS, SB, PO,
21
22 117 RS, PK, PC, MD contributed to and approved the final version submitted.
23
24
25

26 118

29 119 **Acknowledgements**

31
32 120 The publication of this work was supported by Physiotherapy Research Foundation grant number
33
34 121 T16-CR008. The Physiotherapy Research Foundation had no role in the conduct of this study.
35
36

37 122

40 123 **Patient consent for publication**

41
42 124 Not required.
43
44

45 125

48 126 **Ethical Review Committee Statement**

50
51 127 This study has been conducting in accordance with the ethical standards in the 1964 Declaration of
52
53 128 Helsinki. Ethics approval was granted by St Vincent's Hospital (Melbourne) Human Research Ethics
54
55 129 Committee (HREC/17/SVHM/251)
56
57

58
59 130
60

1
2
3 131 **Data Availability Statement**
4

5
6 132 All data relevant to the study are included in the article or uploaded as supplementary information.
7
8

9 133
10

11
12 134 **Figures and Tables**
13

14
15 135 Number of Tables: 3
16

17 136 Number of Figures: 2
18
19

20 137
21
22

23 138 **Word count**
24

25
26 139 Manuscript body: 5312
27
28

29 140 Abstract: 238
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only

1
2
3 141 **What influences patient satisfaction after total knee replacement? A qualitative long term follow-**
4
5 142 **up study**
6
7

8 143 **Abstract**
9

10
11 144 *Objectives*
12

13
14 145 To explore whether a conceptual model of patient satisfaction previously developed 1-2 years post-
15
16 146 TKR is still relevant 3-4 years post-TKR. Specifically, (i) what is the stability in satisfaction levels 3-4
17
18 147 years post-TKR?; and (ii) does the existing conceptual model of patient satisfaction after TKR apply at
19
20 148 this later follow-up?
21
22

23
24 149 *Design*
25

26 150 A constructivist grounded theory qualitative follow-up study. The present study was theoretically
27
28 151 governed by the findings of the initial qualitative inquiry. One-on-one semi-structured interviews
29
30 152 were used to test the assumptions of the model developed from the findings of the previous study.
31
32

33
34 153 *Setting*
35

36 154 An urban Australian public hospital
37
38

39
40 155 *Participants*
41

42 156 From forty people who participated in the original study, 11 participants were purposively sampled
43
44 157 based on their level of satisfaction and factors driving satisfaction as reported in their first interview.
45
46 158 There were six women and five men, the average time since TKR was 3 years and 5 months, and the
47
48 159 average age at time of interview was 77 years.
49
50

51
52 160 *Results*
53

54
55 161 Satisfaction levels were mostly stable with the exception of 3 participants; 2 transitioned in a
56
57 162 positive direction; 1 in a negative direction. The meaning of satisfaction and the factors that
58
59 163 influenced satisfaction were consistent with the original findings. However, beliefs relating to the
60

1
2
3 164 influence of aging on persistent knee symptoms and functional limitations were more dominant in
4
5 165 the present study.

6
7
8 166 *Conclusions*

9
10
11 167 The findings provide support for patient satisfaction being a multifactorial construct that is
12
13 168 potentially modifiable over time. Clinicians may apply the conceptual model we have described to
14
15 169 optimise satisfaction in patients up to 3-4 years post TKR.

16
17
18 170 **Article Summary**

19
20
21 171 *Strengths and limitations of this study*

- 22
23
24 172 • A novel insight to the meaning and processes of satisfaction up to 4 years-post TKR.
25
26 173 • Confirmatory design involving re-interviewing of participants over 4 years post-TKR allowed
27
28 174 for thorough assessment of satisfaction over time.
29
30 175 • Consistent interviewer from the baseline study to this study facilitated the trust of the
31
32 176 participants and therefore rich descriptions and insights.
33
34 177 • Sampling was restricted to the participants from the initial study, where broader sampling
35
36 178 may have elicited different dimensions of satisfaction.
37
38 179 • Sampling was from a single institution where TKRs are government funded procedures,
39
40 180 other settings may have yielded different aspects of satisfaction.
41
42
43
44

45 181

46
47
48 182 *Key words*

49
50
51 183 Patient satisfaction, total knee replacement, qualitative

52
53
54 184

55
56
57 185 **Introduction**

1
2
3 186 Measures of satisfaction are commonly used to capture patients' appraisal of the outcome of their
4
5 187 total knee replacement (TKR) for knee osteoarthritis. A Delphi study by the Outcome Measures in
6
7 188 Rheumatology initiative determined satisfaction to be a core outcome measure for TKR ¹. However,
8
9 189 despite the popularity and importance of measuring this construct, heterogeneity exists regarding
10
11 190 both the types of questions used and the quantification methods employed ². Furthermore, two
12
13 191 recent systematic reviews identified the poor content validity of current tools used to measure
14
15 192 satisfaction after TKR and in musculoskeletal primary care settings, as the patients' voice in
16
17 193 development of these measurement tools was absent ^{3,4}. Consequently, researchers and clinicians
18
19 194 cannot be certain as to the meaning of patient responses to current satisfaction questionnaires.
20
21
22
23
24 195 Poor content validity has likely arisen due to lack of theoretical grounding surrounding this construct
25
26 196 ⁵. To address this, our previous research sought to investigate what satisfaction meant to patients,
27
28 197 and what factors and processes influenced their satisfaction levels after TKR ⁶. Using a constructivist
29
30 198 grounded theory methodology ⁷, a conceptual model of satisfaction after TKR was developed.
31
32
33 199 Satisfaction was found to mean different things to different people. Those that reported high levels
34
35 200 of satisfaction described satisfaction as an improvement from their previous state. On the other
36
37 201 hand, those that reported low levels of satisfaction believed satisfaction meant a resolution in pain
38
39 202 and restoration in functional limitations. Our conceptual model (Figure 1) described three pathways
40
41 203 to satisfaction; (i) the 'full glass' who reported a high level of satisfaction with no/minimal ongoing
42
43 204 symptoms or functional limitations; (ii) the 'glass half full' who reported high satisfaction and
44
45 205 ongoing symptoms or functional limitations; and (iii) the 'glass half empty' who reported low
46
47 206 satisfaction and ongoing symptoms or functional limitations. For the latter two pathways, levels of
48
49 207 satisfaction were influenced by three key mechanisms (recalibration of symptoms, reframing of
50
51 208 valued activities and conceptualisation of symptoms) which interacted with thoughts, feelings, social
52
53 209 and contextual factors on the pathway to high or low satisfaction. Those findings informed
54
55 210 suggested avenues for clinicians to facilitate patients to experience greater satisfaction ⁶.
56
57
58
59
60

1
2
3 211 Given our previous study was conducted in the first two years following TKR, interviewing the same
4
5 212 participants two years later could provide insights into to the stability of patient satisfaction over
6
7 213 time, and whether the processes of the existing conceptual model are still valid. Such insights would
8
9
10 214 help clinicians understand what drives high patient satisfaction levels in the longer term after TKR.
11
12 215 Therefore, the research questions of this follow-up study were; (i) what is the stability in satisfaction
13
14 216 2 years following the initial inquiry?; and (ii) does the existing conceptual model of patient
15
16 217 satisfaction after TKR apply at this later follow-up?

18
19 218
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

FIGURE 1 ABOUT HERE

Figure 1 legend: Conceptual model of patient satisfaction post-TKR

Methods

The original purposive sampling strategy can be found in our previous publication⁶. In the initial (baseline) study, each participant was categorised into one of three satisfaction pathways (full glass, glass half full, glass half empty) and the key mechanisms influencing their reported level of satisfaction were identified. The satisfaction pathways were based on the accounts of people up to 2-years post TKR with a range of pain and function outcomes, satisfaction scores, ethnic backgrounds, ages, and a mix of men and women. Baseline data were analysed according to constructivist grounded theory, which is a methodological approach that facilitates an iterative, in-depth analysis of data. A key finding from this baseline study was that in the presence of ongoing symptoms and/ or functional limitations, participants could reach high (glass half full) or low (glass half empty) satisfaction through the presence or absence of an adaption process through three key mechanisms: recalibration, reprioritisation, and reconceptualization of symptoms. These three key mechanisms were influenced by social and contextual factors (such as social support, relationship with health care professionals, living environment, and social engagement), as well as thoughts and feelings (such as the presence of worry, fear, catastrophizing, and pain cause belief). For a full

1
2
3 235 description of the methodology employed to generate this theory of satisfaction, see Klem et al.
4
5 236 (2021).

6
7
8 237 In the follow-up study, we selected participants 2 years after the baseline interview based on their
9
10 238 satisfaction pathway and mechanisms identified from the previous study, ensuring that the different
11
12 239 pathways and mechanisms were represented in our follow-up sample (see Figure 1). The identified
13
14 240 participants were considered our 'key informants', where the aim of this purposive sampling was to
15
16 241 challenge rather than confirm the conceptual model. An exclusion criterion of this follow-up study
17
18 242 was a subsequently developed cognitive impairment that prevented participants from providing
19
20 243 meaningful responses to the interview questions.

21
22
23
24 244 Consistent with the qualitative approach, data collection and analysis occurred concurrently to
25
26 245 enable emerging patterns in the data to be tested in subsequent interviews. Sampling ceased when
27
28 246 diversity from our original sample was achieved; i.e. all facets of the original conceptual model were
29
30 247 feasibly tested, which in the context of this study was considered theoretical saturation ⁸.

31
32
33 248 Theoretical saturation is a concept derived from grounded theory research, which does not
34
35 249 subscribe to notions of repeated data ⁷. Instead, theoretical saturation looks for theoretical concepts
36
37 250 and ceases data collection when all theoretical avenues have been sufficiently explicated ⁷. As this
38
39 251 study was based on the theoretical framework of satisfaction from our baseline study ⁶, sampling in
40
41 252 this present study aimed to represent the diversity of the original conceptual model and to 'test' this
42
43 253 theory.

44
45
46
47 254 Each individual selected for follow-up was contacted via telephone. If they were interested in
48
49 255 participating, a participant information sheet was emailed or mailed to them. The lead author
50
51 256 contacted them within three days to confirm they had read and understood the information sheet,
52
53 257 and consented to being interviewed. All interviews were conducted via telephone because the lead
54
55 258 author was based in a different city to the participants. Interviews were conducted by the lead
56
57 259 author (NRK) who is a woman clinical physiotherapist, a PhD candidate with previous qualitative
58
59
60

1
2
3 260 research experience, and who received training from a qualitative expert (SB). NRK had previously
4
5 261 interviewed each of these participants for the baseline study two years prior, however, no other
6
7 262 form of relationship existed between the lead author and the participants.
8
9
10 263 Prior to the commencement of the interviews, the lead author (NRK) familiarised herself with each
11
12 264 of the baseline transcripts of the participants. This involved taking notes on how their level of
13
14 265 satisfaction related to the existing conceptual model, in particular, which mechanisms were most
15
16 266 influential for them. Further, it was noted how social and contextual factors, and thoughts and
17
18 267 feelings played a role in the three mechanisms. At the beginning of each interview, NRK explained
19
20 268 the purpose of the research and encouraged the participants to openly share their experiences.
21
22 269 Anonymity and complete confidentiality was emphasised, in particular from their treating surgeon.
23
24
25
26
27 270 The interview schedule (Table 1) was designed to test the stability of participants' satisfaction levels
28
29 271 and the extent to which the original conceptual model (Figure 1) remained relevant, whilst
30
31 272 remaining flexible to explore new concepts not captured in the original model, if they emerged.
32
33 273 Interviews lasted around 40 minutes on average, and were audio recorded and transcribed prior to
34
35 274 analysis.
36
37
38
39 275 Data analysis followed the methodology of the previous qualitative study, which employed
40
41 276 constructivist grounded theory⁷. Under a constructivist grounded theory approach, researchers seek
42
43 277 to understand patterns and processes in the data, rather than offer descriptions⁷. The prior
44
45 278 knowledge of the researchers is acknowledged and valued in the analysis, whilst the researchers
46
47 279 simultaneously reflexively engage with the data to ensure the participants' perspectives are
48
49 280 prioritised⁷. Under this constructivist approach, participants' construction of satisfaction was central
50
51 281 to the analysis⁷. The analysis also adopted a critical lens in this follow-up study, whereby the aim of
52
53 282 the analysis was to challenge rather than confirm the model from the baseline study. This was
54
55 283 facilitated by discussion with the multidisciplinary authorship team in which alternative
56
57
58
59
60

284 interpretations were sought and considered. The purposive sampling approach also facilitated this
 285 by targeting all aspects of the conceptual model.

286 Data were managed using Microsoft Word (Microsoft Corp., Redmond, WA, USA) as the lead
 287 author's preference. For the present study, analysis was conducted in several stages, which were
 288 guided by the recommendations of Charmaz (2006) (Table 2). Coding was conducted by NRK and AS,
 289 where a combination of deductive codes, based on the conceptual model, and inductive codes
 290 looking at change over time were used. The analytic process was iterative, whereby, the lead author
 291 would move back and forth between the steps to ensure constant comparison between the new
 292 data and the findings of the existing model of patient satisfaction after TKR.

293 Table 1. Methods of analysis

Stage	Description
i	Familiarisation of transcripts, through reading and re-reading the data
ii	Reflexive and analytic memo writing, whereby the lead author (NRK) critically engaged her perception of the findings by writing and reflecting on these, as well as reflecting on the analytic process
iii	Coding the transcripts, guided by the initial memos produced, and by asking 'what is influencing this person's level of satisfaction?' and 'how does the original conceptual model relate to this person's experience of satisfaction?' At this stage, initial thoughts of the data were presented to members of the multidisciplinary authorship team for discussion and feedback, which included clinical and research physiotherapists, an orthopaedic research nurse, and a qualitative expert
iv	To refine the codebook from stage iii, two randomly selected transcripts were coded by AS to explore concordances and disagreements
v	Further memo writing following coding, and summarising the key findings of the participants, which required the lead author to compare the open coding findings with her original memos to create richer descriptions of the data
vi	The findings were compared with the existing conceptual model of patient satisfaction after TKR, which was again presented to the multidisciplinary authorship team for discussion and refinement

294

295 This study was conducted in accordance with the ethical standards in the 1964 Declaration of
 296 Helsinki. Ethics approval was granted by St Vincent's Hospital (Melbourne) Human Research Ethics
 297 Committee (HREC/17/SVHM/251).

298 Table 2. Semi-structured interview schedule

Construct from model	Questions
----------------------	-----------

Context	It's been a couple of years since we spoke, can you tell me how your TKR has been?
Overall outcome Overall level of satisfaction // change	Overall, how satisfied are you with the results of your TKR? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ Why not? <i>If changed:</i> Last time we spoke you mentioned _____ about your satisfaction with _____, can you think why this may have changed?
Symptoms // change // recalibration // Re-conceptualisation	Can you tell me about any pain or other symptoms you currently experience? Overall, how satisfied are you with the results of your TKR for improving your pain? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ Why not? <i>If changed:</i> Last time we spoke you mentioned _____ about your satisfaction with _____, can you think why this may have changed? Why do you think you are still having ___ in your knee? Why do you think you are no longer experiencing ___ in your knee?
Function // change // Re-prioritisation	Can you tell me about any difficulties you have with activities at the moment? Overall, how satisfied are you with the results of your TKR for improving your ability to do home and yard work? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ Why not? Overall, are you satisfied with the results of your TKR for improving your ability to do recreational activities? (very satisfied, somewhat satisfied, somewhat dissatisfied, very dissatisfied) Why/ why not? Last time we spoke you mentioned _____ about your satisfaction with _____, can you think why this may have changed? Can you tell me about how you have adapted/ not been able to adapt to the activities that you have difficulty with?
Conceptualisation of satisfaction	Can you help me understand, from your point of view, what it means to be very satisfied with your TKR?
Expectations	Can you try and cast your mind back and remember what you expected from your TKR? Do you believe these expectations have been met? Thinking forward, what are you now expecting from your TKR? Why? <i>If changed:</i> Last time we spoke you said _____ about your expectations for your TKR, what do you think about these expectations now? Do you believe they have been met?
Social	Thinking back through the time since you had your operation, can you tell me about any family or friends who helped you along your journey? Have you encountered many other people that have had a TKR? What did you think about their outcomes/ what did you learn from them?
Emotions	How has your TKR outcomes made you feel?
Cognitions	What kind of mind set did you have along your TKR journey? What do you think is important for having a successful outcome after TKR?

Care seeking	Have you had any contact with your surgeon or other health care professionals/ any treatment since we last spoke? What was the purpose of the appointment? Can you tell me how the appointment went?
--------------	--

299

300 Patient and public involvement

301 In qualitatively exploring patient satisfaction after TKR, we are allowing patients to voice their
 302 priorities, experiences and preferences related to their TKR journeys. However, involvement of
 303 patients and the public in the research design or recruitment process was not feasible for this
 304 present study. Findings will be disseminated to participants once published.

305

306 **Results**307 Participants

308 Eleven of the 14 people identified as key informants from the baseline study of 40 participants,
 309 participated in the study. Among the three key informants who did not participate, one had
 310 developed cognitive impairment, one did not want to participate in the follow-up study, and one
 311 was unavailable for interview. Recruitment was ceased at 11 participants as sufficient diversity was
 312 captured to test the conceptual model. The demographic information for all participants, including
 313 their level of satisfaction and key mechanisms influencing their level of satisfaction as identified at
 314 the baseline interview, is presented in Table 3. There were six women and five men, the average
 315 time since TKR was 3 years and 5 months, and the average age at time of interview was 77 years.

316 Table 3. Participant characteristics

Participant	Characteristics	Levels of satisfaction and mechanisms from initial study	Levels of satisfaction and mechanisms at 2 year follow-up
01b	Male 3 years 10 months post TKR 76 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations

02b	Female 3 years 8 months post TKR 72 years old	Glass half full Non-bothersome conceptualisation of symptoms Reframing valued activities	Glass half full Positive conceptualisation of symptoms Reframing valued activities
04b	Male 3 years 9 months post TKR 79 years old	Glass half empty Inability to reframe valued activities	Glass half full Positive conceptualisation of symptoms Reframed valued activities
11b	Male 3 years 5 months post TKR 78 years old	Glass half full Non-bothersome conceptualisation of symptoms	Glass half full Positive conceptualisation of symptoms Reframed valued activities
12b	Female 3 years 9 months post TKR 81 years old	Glass half full Recalibration of symptoms Positive conceptualisation of symptoms	Glass half empty Negative conceptualisation of symptoms Inability to reframe valued activities
14b	Female 3 years 6 months post TKR 71 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
16b	Male 3 years 9 months post TKR 70 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
18b	Female 4 years post TKR 82 years old	Glass half full Reframing valued activities	Glass half full Positive conceptualisation of symptoms
39b	Female 2 years 10 months post TKR 77 years old	Glass half empty Negative conceptualisation of symptoms Negative calibration of symptoms	Glass half empty Negative conceptualisation of symptoms Inability to reframe valued activities Negative calibration of symptoms
41b	Female 2 years 8 months post TKR 81 years old	Full glass No/ minimal on going symptoms or functional limitations	Full glass No/ minimal on going symptoms or functional limitations
43b	Male 2 years 8 months post TKR 83 years old	Glass half full Positive conceptualisation of symptoms	Full glass No/ minimal on going symptoms or functional limitations

317

318 Participant identification numbers are presented as the participant's identification number from the
 319 previous study followed by the letter 'B', to facilitate comparison with the previous publication ⁶.

1
2
3 320 Do satisfaction levels change at later follow-up?
4
5

6 321 Overall, participants reported similar levels of satisfaction as the previous study, with the exception
7
8 322 of three participants; P43b transitioned from 'glass half full' to 'full glass'; P04b transitioned from
9
10 323 'glass half empty' to 'glass half full'; and P12B transitioned from 'glass half full' to 'glass half empty'.
11
12 324 In the following quote, P12B acknowledges that her satisfaction levels have changed and attributes
13
14 325 this lower level of satisfaction to her recent falls:
15
16

17
18 326 *Interviewer: "...when I called you two years ago about your knee replacement, you told me that you*
19
20 327 *were somewhat satisfied with your ability to do home and yard work. What do you think has*
21
22 328 *changed?"*
23
24

25 329 *12B: "Yeah, well that was before I had the falls."*
26
27

28 330 These transitions were aligned with the mechanisms identified in the baseline interviews, thus, no
29
30 331 new themes emerged from interviewing these participants about their changed level of satisfaction.
31
32

33 332 How does the existing conceptual model of patient satisfaction after TKR apply at this later follow-
34
35 333 up?
36
37

38 334 In the following section, participants who reported no or minimal ongoing symptoms or functional
39
40 335 limitations, and high satisfaction in this follow-up study were classified as 'full glass'. Participants
41
42 336 who reported ongoing symptoms and/ or functional limitations were classified as either 'glass half
43
44 337 full' (those that reported high satisfaction), or 'glass half empty' (those that reported low
45
46 338 satisfaction) in this follow-up study. Where a participant changed classification from the baseline
47
48 339 study, this has been described under their classification from the follow-up interviews; i.e. their
49
50 340 'new' level of satisfaction.
51
52

53
54 341 *Full glass*
55
56

57 342 In alignment with the existing conceptual model, participants in the 'full glass' pathway at baseline
58
59 343 continued to report no, or minimal ongoing symptoms or functional limitations in the follow-up
60

1
2
3 344 interviews. Participants in this pathway also reported a stable level of symptoms; no participant
4
5 345 reported any new or changed level of symptoms. As participant P14 explains, she perceived herself
6
7 346 as lucky due to how positive her outcomes have been:

8
9
10 347 *"I'm one of the lucky ones obviously because I've never had problems. I've had both done and I've*
11
12 348 *never had problems... Now, yeah, it doesn't hurt but it's a very funny sensation when I go to kneel on*
13
14 349 *them. But that is all, I can squat, I can do everything bar that"*

15
16
17
18 350 In the presence of minimal symptoms, the participants appeared to be more forthcoming with
19
20 351 possible reasons for the occasional experience of pain compared to the baseline interviews.
21
22 352 However, consistent with the previous enquiry, the pain itself and perceived reasons for pain,
23
24 353 appeared non-bothersome. P1b who previously thought his occasional symptoms may be related to
25
26 354 his age, explained how he experiences minimal, non-bothersome, pain as a result of aging and
27
28 355 changes to the weather, but he doesn't believe it negatively affects him:

29
30
31
32 356 *"It [the pain] doesn't affect me at all really. I just put it down to getting a bit old and change of*
33
34 357 *weather. I get it in other parts of the body as well, I get in the elbow, ankle and the back."*

35
36
37 358 Likewise, P16B who previously expressed contentment with not knowing the cause of his occasional
38
39 359 pain, now described the effect of cold weather on his knee but felt like it was nothing to worry
40
41 360 about:

42
43
44 361 *"[pain in] the knees? No, no worries. Like I said they can ache a little bit type of thing but um, ah*
45
46 362 *when it gets real cold but ah, no worries – but it's time to put on long trousers now and that keeps*
47
48 363 *them warm"*

49
50
51
52 364 *Glass half full pathway*

53
54
55 365 Participants in the 'glass half full' pathway continued to conceptualise satisfaction as improvement
56
57 366 from the pre-operative state. As described by P18b, she felt osteoarthritis was all through her body
58
59 367 (including her knees) and very painful, so the TKR operation was a success:
60

1
2
3 368 *“Well [I’m satisfied] because – oh I don’t know, because I have the, I had all through my legs –*
4
5 369 *because I have osteoarthritis through the whole body, so my knees are – they’re very sore, very bad,*
6
7 370 *so ah, the operation was successful.”*
8
9

10 371 Additionally, P11b, who described continual difficulty walking and felt like the knee wasn’t 100%,
11
12 372 reported high level of satisfaction based on a previously worse state:
13
14

15 373 *“Comparing to what it was, yeah, absolutely satisfied, yeah.”*
16
17

18 374 The mechanisms that facilitated satisfaction in the presence of ongoing symptoms or functional
19
20 375 limitations were consistent with the existing conceptual model; recalibration, reframing valued
21
22 376 activities, and non-bothersome conceptualisation of symptoms (Figure 1). However, it was apparent
23
24 377 the mechanisms that influenced high levels of satisfaction for an individual could change over time.
25
26 378 For P11b, his satisfaction was previously due to conceptualising his symptoms as continually
27
28 379 improving. However, in the follow-up interview, he developed a non-bothersome conceptualisation
29
30 380 of his symptoms through believing his symptoms were good for his age:
31
32
33

34
35 381 *“At my age it doesn't matter. I just walk and do everything to my knee. I don't walk if I have a lift or*
36
37 382 *whatever or go anywhere out of the way. I just carry on the way I do, I'm 78 so I think I get around*
38
39 383 *pretty good really for that age.... I'm just a little bit disappointed in it, but I've got to remember I'm*
40
41 384 *nearly 80, so I suppose I have to be satisfied with it, wouldn't I?”*
42
43

44 385 Additionally, the role of social comparison to facilitate recalibration of symptoms was also present
45
46 386 for P11b, who compared himself to others he perceived were doing worse than him:
47
48

49 387 *“Yeah, well, I've heard a lot of complaints about it. There's a lot of people that are not as good as me,*
50
51 388 *that I know, though, and so, I don't worry about mine. I've seen [surgeon] the other day and they x-*
52
53 389 *rayed me and said everything was in place, so I feel good about that too.”*
54
55

56
57 390 Similarly, for P18b, in her baseline interview, described reframing valued activities in the form of
58
59 391 setting small functional targets, such as gradually increasing time on her stationary bike. In the
60

1
2
3 392 follow-up interview, her mechanisms for satisfaction were modified such that she appeared to
4
5 393 conceptualise her impaired function as due to her other comorbidities, particularly her spine.
6
7 394 Although the influence of comorbidities was apparent in her previous interview, the attribution of
8
9 395 these to her reason for being satisfied came across more strongly in the follow-up interview:
10
11
12 396 *“Walking, that relates to my spine, it has nothing to do with my knees. I can’t reach my toes for*
13
14 397 *instance, I have to have pedicures because I can’t reach my toes there, I can’t bend down but that*
15
16 398 *has nothing to do with my knees. That is my back so that’s hard for me to distinguish you know, what*
17
18 399 *I’m saying?”*

21
22 400 Participant P04b, who transitioned into this group from ‘glass half empty’, appeared to reframe
23
24 401 activities based on what he considered to be reasonable for his age, and this reframing was a key
25
26 402 mechanism for transitioning to becoming satisfied. In the baseline interview, P04b reported
27
28 403 dissatisfaction due to an inability to do valued activities such as golf. In the follow-up interview P04b
29
30 404 describes what he has decided as appropriate for his age:

31
32 405 *P04b: “I probably after I spoke to you, if that was 2 years ago um, I probably did start playing again*
33
34 406 *with a friend of mine, ah, yeah, ah and we used to just play 9 holes we’d get a cart and we’d play*
35
36 407 *probably once a week and um, it got to the stage where ah, I couldn’t I – I had to give it away*
37
38 408 *because I couldn’t walk that far – and once again, which I’m sure it was because of the other knee, I*
39
40 409 *can’t remember having any trouble with my right knee it was always the left knee and the hip so...”*

41
42 410 *NRK: “Would you ever consider going back to it?”*

43
44 411 *P04b: “Nup. I figure at 80 I’m, I’ve passed it.”*

45
46 412 Consistent with the existing model, social and contextual factors, as well as thoughts and feelings
47
48 413 were also influential in this pathway. In particular, the role of acceptance pertaining to age-related
49
50 414 limitations appeared to play a larger role than in the previous study, as has been demonstrated in
51
52 415 the previous quotes. In addition to this, consistent with the baseline study, a positive relationship

1
2
3 416 with the surgeon who had performed their TKR appeared to be an important social and contextual
4
5 417 factor for satisfaction, as explained by P18b:

6
7
8 418 *“Yes, ah, terrific man, um, well I suppose he was very caring and looking after me afterwards. I like*
9
10 419 *him very much, he is very calming very friendly, very reassuring and I thought he knew what he was*
11
12 420 *doing, if you know what I mean”*

13
14
15 421 Further, participants in this pathway generally did not express thoughts and feelings of worry and
16
17 422 anxiety about their current symptoms. Participants explained an ability to manage doing what they
18
19 423 wanted despite limitations. P11b expressed a lack of worry about his persistent knee clunking and
20
21 424 adequate self-efficacy to ‘work around it’:

22
23
24
25 425 *“I’m not worried about it [knee clunking], no, not at this stage. I can manage it pretty good now, and*
26
27 426 *so I work around it a little bit, yeah.”*

28
29
30 427 Likewise, P18b reported her knee instability as neither worrisome nor concerning, indicating a lack
31
32 428 of distress related to her current symptoms or functional limitations:

33
34
35 429 *“If I’m standing long time ah, not that I’m walking, if I’m standing long time it sort of tends to*
36
37 430 *sometimes give way on me, you know, but it’s not – I’m not concerned and it’s not really worrying,*
38
39 431 *you know.”*

40
41
42
43 432 *Glass half empty*

44
45
46 433 Participants in the ‘glass half empty’ pathway continued to conceptualise satisfaction as complete
47
48 434 resolution in symptoms and or functional impairments. In the follow-up interviews, ‘glass half
49
50 435 empty’ participants expressed a stronger emphasis on satisfaction as meaning having a knee that felt
51
52 436 and moved like a ‘normal’ knee:

53
54
55 437 *“[being very satisfied]... means I’ll be able to walk normally without any aids or anything or any*
56
57 438 *frames or anything that I have to use and that’s it... as if I hadn’t had any operations at all” [P39b]*
58
59
60

1
2
3 439 The three key mechanisms identified in the baseline study appeared to remain influential for 'glass
4
5 440 half empty' participants in the follow-up study. For participant P39b, whose low level of satisfaction
6
7 441 remained the same from the previous enquiry, her previous mechanism of a negative
8
9 442 conceptualisation of symptoms was confirmed and strengthened; P39b underwent a revision
10
11 443 surgery to try and address her persistent pain after her initial TKR, only to continue experiencing
12
13 444 pain. P39b explained how she understood the cause of her symptoms:

14
15
16
17 445 *"I was in too much pain after the surgery and the way the knee was going back it was really giving*
18
19 446 *me a lot of pain, and that because it was very hypo-extending back ... somehow it was stretched or*
20
21 447 *something he said that they had it stretched or whatever they did. And they had to do it again, but by*
22
23 448 *fixing it I think he might of, maybe, I think he might have put too much padding in. You know packed*
24
25 449 *it up too much this time. Maybe, I don't know, I hope I don't have to go under again and take some of*
26
27 450 *that padding off to stop that nerve. That's probably why it's pressing on the nerve now."*

28
29
30
31 451 Additionally, due to social comparison with others who had undergone TKR and had a positive
32
33 452 outcome, P39b recalibrated her symptoms as worse than theirs. This comparison also contributed to
34
35 453 further confusion regarding her conceptualisation of symptoms:

36
37
38
39 454 *"She was good and she had the second one done and she's ok. There's nothing wrong with her so you*
40
41 455 *know, I don't know... And she's quite happy and she's walking as if she never ever had anything done,*
42
43 456 *you know like, nothing is ever – she never even had the operations and she's fit and goes for walks*
44
45 457 *and does you know, exercises and goes to the gym and all and you know, she's quite happy with it.*
46
47 458 *And I'm thinking, well if you can do that well how come mine is like that, why am I having all this*
48
49 459 *problems, you know"*

50
51
52
53 460 Participant P12b, who transitioned from 'glass half full' to 'glass half empty', experienced two falls in
54
55 461 the period since her baseline interview. Although she reported persistent symptoms in her baseline
56
57 462 interview, at the follow-up interview she believed her pain was due to the falls. However, she
58
59 463 reported that her doctor assured her there was nothing internally wrong with her knee and

1
2
3 464 dismissed her concerns about her pain. This appeared to lead to an inability to have a positive
4
5 465 conceptualisation of her symptoms, and subsequent reports of low levels of satisfaction:
6
7

8 466 *"Since I've had the fall, yes. I don't think I had very much pain at all, before I had the fall. I had to go*
9
10 467 *over to [location] to have me leg x-rayed, because I had me shoulders x-rayed as well. And he said,*
11
12 468 *"There's no need to do the right one." He x-rayed the left leg, but he didn't do the right one, that I*
13
14 469 *had replaced. And he said, "Everything there should be fine." So, okay. And that was it... I've told him*
15
16 470 *several times that I've got pain in the knee, and so he just makes jokes; he says, "You been playing*
17
18 471 *football, have you?" I say, "Oh yeah, of course.""*
19
20
21

22 472 P12b further described how she was unable to do valued activities, which also contributed to her
23
24 473 low level of satisfaction:
25
26

27 474 *"Very dissatisfied. I used to be able to look after my own garden, but now I've got to pay a fellow \$60*
28
29 475 *a fortnight to come and cut my lawn... That's how bad things are, and I've got a mower, and a blower*
30
31 476 *down in the shed, and rakes and what have you, but I can't use them."*
32
33
34

35 477 Consistent with the existing model, the influence of social and contextual factors, as well as thoughts
36
37 478 and feelings, appeared to play a role in this pathway. P39b recalls feeling unheard by her surgeon
38
39 479 and feeling high levels of frustrations because of this. P39b told a story of how her surgeon didn't
40
41 480 believe her problems with walking until a chance encounter on the street:
42
43

44 481 *"... He was in the street talking to another guy. And then I went past him, and said hello and I kept*
45
46 482 *passing... he saw me and then he realised what I was talking about. And I thought well I've been*
47
48 483 *trying to tell you that 12 months ago. Which I was really, really got upset about it, but it was, you*
49
50 484 *know, could've done it 12 months before and wouldn't have had all that problem... all the things I*
51
52 485 *had to do and then he was thinking of getting me – oh what was it? Like bars and that put on to keep*
53
54 486 *me leg straight and oh look, all the things that he was trying to do and didn't need to do any of that.*
55
56 487 *Which annoyed me really, really bad because, you know, back and forward and living in [location]*
57
58
59
60

1
2
3 488 *into Melbourne all the time, which you know, all that time which you didn't sort of – and I tried to tell*
4
5 489 *him what was going on and he just didn't – I don't know whether he wasn't listening or he wasn't – I*
6
7 490 *don't know what it was. Until he saw me walk and then he said, "Oh, I realise what you're talking*
8
9 491 *about" oh it's about time."*

10
11
12 492 For P12b, her low level of satisfaction was also influenced by the contextual factor of a negative
13
14 493 relationship with health care professions, as demonstrated in the previous quote where her reports
15
16 494 of pain following her falls were dismissed. Additionally, the experience of falls contributed to
17
18 495 negative thoughts and feelings, particularly high levels of fear related to her knee:

19
20
21
22 496 *"And that's very frightening, so unless I've got somebody with me, I try not to go there. I go over to*
23
24 497 *the plaza if I have to have my eyes tested or something, get new glasses. But otherwise, I stay away*
25
26 498 *from there."*

27
28
29
30 499 FIGURE 2 ABOUT HERE

31
32
33 500 Figure 2 legend: Roadmap to improve satisfaction levels post-TKR

34 35 501 **Discussion**

36
37
38 502 The findings from this qualitative follow-up study contribute to understanding the processes
39
40 503 involved in patient satisfaction 3-4 years after TKR. This study was conducted two years following
41
42 504 the baseline enquiry and demonstrated how the three pathways to high and low satisfaction were
43
44 505 still relevant ('full glass', 'glass half full', and 'glass half empty'), as were the originally identified
45
46 506 mechanisms of these pathways (recalibration, reframing valued activities, and conceptualisation of
47
48 507 symptoms). However, participants could change their level of satisfaction or the key mechanism(s)
49
50 508 driving their level of satisfaction over the two years following the baseline study. This highlights that
51
52 509 both the levels of satisfaction and the reasons underpinning it are fluid over time. Furthermore, the
53
54 510 factors underpinning these changes are potentially modifiable with targeted intervention.

1
2
3 511 This follow-up study provides novel insight to patient satisfaction as a continually changing process
4
5 512 up to 4 years post-TKR. Whether satisfaction changes over time after TKR, and if so how and why,
6
7 513 has not been previously investigated. The findings from the present study indicate that patient
8
9 514 satisfaction may be better considered as a 'moving target' due to the interaction of various
10
11 515 psychosocial processes.

12
13
14
15 516 This fluidity observed in patient satisfaction suggests that clinicians should continue to monitor
16
17 517 patient satisfaction for a number of years post TKR. Despite the changeable nature of satisfaction
18
19 518 seen in this study, participants did not indicate any belief that their outcomes could change without
20
21 519 further surgery. This is in agreement with previous qualitative research that found patients believe
22
23 520 they are "stuck with" their TKR outcomes⁹. Thus, it is important to inform patients their outcomes
24
25 521 are potentially modifiable over time. Additionally, in alignment with our previous study⁶ and existing
26
27 522 satisfaction literature^{5,10}, the role of the surgeon in forging a positive therapeutic alliance was
28
29 523 important in achieving high levels of satisfaction. This appeared to promote trust in the quality of
30
31 524 the TKR surgery and belief of a good outcome despite continued symptoms and functional
32
33 525 limitations. Thus, positive communication techniques and relationship building, such as active
34
35 526 listening and validating concerns regarding the integrity of the TKR, may be important in assisting
36
37 527 patient to achieve high levels of satisfaction. Furthermore, understanding the specific basis for a
38
39 528 person's dissatisfaction, utilising the proposed conceptual model, may allow for targeted
40
41 529 management to assist patients to feel more satisfied up to 4 years post-TKR.

42
43
44
45
46
47 530 The influence of the three key mechanisms in pathways to high and low levels of satisfaction suggest
48
49 531 patient satisfaction is largely a function of patient adaptability. This is aligned with previous
50
51 532 qualitative research that found patients post-TKR expressed happiness with their TKR and described
52
53 533 their outcomes as good despite continued pain or an inability to do valued activities¹¹. The potential
54
55 534 of patients to arrive at a positive appraisal of their TKR outcomes despite ongoing pain and/or
56
57 535 functional limitations is an important consideration when interpreting scores on measures of patient
58
59
60

1
2
3 536 satisfaction; high levels of satisfaction may not necessarily reflect meaningful improvement in pain
4
5 537 and function.
6
7
8 538 This follow-up study importantly revealed the more dominant influence of negative age-related
9
10 539 beliefs on symptoms and functional limitations compared to the baseline study. This is consistent
11
12 540 with other qualitative and quantitative research that has found older people more readily accept
13
14 541 that the process of aging relates to functional decline and persistent pain^{9,12}. Despite these beliefs
15
16 542 positively influencing a non-bothersome conceptualisation of symptoms and resultant reports of
17
18 543 high satisfaction in this study, it may promote continual disengagement from valued life activities in
19
20 544 this cohort. For example, participant 04b stopped playing golf, which has social, cognitive and
21
22 545 physical health benefits. The negative age-related beliefs seen in this study may reflect a stronger
23
24 546 social narrative of age related prejudice, which has become internalised in older adults^{13,14}.
25
26 547 Clinicians may play an important role in addressing internal negative self-perceptions of aging in
27
28 548 patients to prevent adverse health and wellbeing outcomes¹⁴⁻¹⁶.
29
30
31
32

33 549 *Clinical implications*

34
35
36 550 As the findings from this study indicate that patient satisfaction is a continuous journey up to 4 years
37
38 551 post-TKR, it may be appropriate to support vulnerable patients over this period of time. As
39
40 552 orthopaedic surgeons may not always follow their patients beyond the first year or two post-TKR,
41
42 553 GPs and physiotherapists may be best positioned to provide care at this stage, with referral on to
43
44 554 other appropriate allied health as required. To assist clinicians, we propose a road map (Figure 2)
45
46 555 detailing the utilisation of the conceptual model to identify key barriers to satisfaction and potential
47
48 556 treatment pathways for individualised management, for patients with low satisfaction up to 4 years
49
50 557 post-TKR. In alignment with clinical guidelines¹⁷, this ongoing support should include continuous
51
52 558 monitoring in the form of screening tools such as the WOMAC for pain and function¹⁸, and the
53
54 559 Örebro or STarT Back for psychological factors^{19,20}. Screening tools can guide patient-centred
55
56
57
58
59 560 communication, the importance of which was further highlighted in this study. The findings suggest
60

1
2
3 561 that patients reporting low levels of satisfaction require validating and reassuring communication
4
5 562 techniques, and a strong therapeutic alliance to facilitate an improvement in satisfaction levels. Our
6
7 563 previous publication provides exemplar communication techniques to assist patients who report low
8
9 564 levels of satisfaction ⁶. The identification of both physical and psychosocial barriers to achieving high
10
11 565 satisfaction highlights the potential role of physiotherapy and psychological support in this process.
12
13
14 566 The over-attribution of the perceived effects of aging on persistent symptoms and functional
15
16 567 limitations in this study suggest clinicians may play an important role in educating patients of the
17
18 568 potential to improve their clinical outcomes. This can include addressing implicit, negative age-
19
20 569 related beliefs and working with patients to set realistic functional goals, or targets to improve
21
22 570 social participation ¹⁵. Rehabilitation that disconfirms negative age-related beliefs, such as helping
23
24 571 people to develop movement strategies that are non-provocative, may provide successful
25
26 572 experiences that encourage further engagement with valued life activities. Future research may be
27
28 573 concerned with testing the framework proposed in this research for providing targeted care for
29
30 574 those who remain dissatisfied post-TKR.

35 575 **Strengths and limitations**

36
37
38 576 To achieve a longitudinal understanding of patient satisfaction, we were required to sample from
39
40 577 the participants in our previous study. This may have limited the scope of our findings and
41
42 578 participants of a younger age or at longer follow-up may have identified additional factors influential
43
44 579 to satisfaction. As no participant classified as “full glass” reported any different or new symptoms, it
45
46 580 is unknown if they would remain satisfied if they had developed bothersome symptoms. The sample
47
48 581 was from a single site, an Australian public hospital, where TKRs are government funded procedures.
49
50 582 Thus, the experiences may reflect the aspects of care which do not transfer to other health settings.
51
52
53
54 583 Using a longitudinal qualitative design by re-interviewing key informant participants from the
55
56 584 baseline study sample allowed a novel, in-depth comparison and analysis of factors related to what
57
58 585 satisfaction means to patients, and how and why satisfaction level changes or remain the same over
59
60

1
2
3 586 time. Additionally, a consistent interviewer across the baseline and follow-up studies facilitates a
4
5 587 trusting relationship with the participants and can yield more rich descriptions in the interviews. This
6
7 588 also meant the interviewer was familiar with the participants' experiences, and thus was able to
8
9
10 589 compare and contrast meaning over time. This is important when documenting contextual cues,
11
12 590 such as mood, which may not be revealed in written transcripts.
13
14

15 591 **Conclusions**

16
17
18 592 The findings from the present study provide support for satisfaction with TKR being a multifactorial
19
20 593 construct which is influenced by potentially modifiable factors that can vary over time. The results of
21
22 594 this study also demonstrate how satisfaction after TKR can be fluid in the level of satisfaction and
23
24 595 the factors underpinning the level of satisfaction. The findings suggest avenues for clinicians to assist
25
26
27 596 their patients to feel satisfied with their TKR outcomes up to 4 years post-surgery, and highlight the
28
29 597 importance of informing TKR patients to present for care in order to optimise their TKR outcomes,
30
31 598 rather than accepting ongoing symptoms or functional limitations
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

599 **References**

- 600 1. Singh JA, Dowsey M, Choong PF. Patient Endorsement of the Outcome Measures in
601 Rheumatology (OMERACT) Total Joint Replacement (TJR) clinical trial draft core domain set. *BMC*
602 *Musculoskelet Disord* [Comparative Study]. 2017; 18(1):111.
- 603 2. Kahlenberg CA, Nwachukwu BU, McLawhorn AS, Cross MB, Cornell CN, Padgett DE. Patient
604 Satisfaction After Total Knee Replacement: A Systematic Review. *HSS J* [Review]. 2018; 14(2):192-
605 201.
- 606 3. Klem N-R, Kent P, Smith A, Dowsey M, Fary R, Schütze R, et al. Satisfaction after total knee
607 replacement for osteoarthritis is usually high, but what are we measuring? A systematic review.
608 *Osteoarthritis and Cartilage Open*. 2020:100032.
- 609 4. Pellekooren S, Ostelo R, Pool A, van Tulder M, Jansma E, Chiarotto A. Content Validity of
610 Patient Reported Outcome Measurement Instruments for Patient Satisfaction in Primary Care:
611 Systematic Review of Studies Involving Patients with Musculoskeletal Complaints. *J Orthop Sports*
612 *Phys Ther*. 2020 [cited 2020/11/22]:1-42.
- 613 5. Batbaatar E, Dorjdagva J, Luvsannyam A, Amenta P. Conceptualisation of patient
614 satisfaction: a systematic narrative literature review. *Perspect Public Health*. 2015; 135(5):243-50.
- 615 6. Klem N-R, Smith A, O'Sullivan P, Dowsey MM, Schütze R, Kent P, et al. What Influences
616 Patient Satisfaction after TKA? A Qualitative Investigation. *Clin Orthop Relat Res*. 2020; 478(8):1850-
617 1866.
- 618 7. Charmaz K. *Constructing grounded theory: a practical guide through qualitative analysis.*:
619 London: SAGE Publications; 2006.
- 620 8. Starks H, Brown Trinidad S. Choose Your Method: A Comparison of Phenomenology,
621 Discourse Analysis, and Grounded Theory. *Qual Health Res*. 2016; 17(10):1372-1380.
- 622 9. Jeffery AE, Wylde V, Blom AW, Horwood JP. "It's there and I'm stuck with it": patients'
623 experiences of chronic pain following total knee replacement surgery. *Arthritis Care Res (Hoboken)*.
624 2011; 63(2):286-92.
- 625 10. Sitzia J, Wood N. Patient satisfaction: a review of issues and concepts. *Soc Sci Med*. 1997;
626 45(12):1829-43.
- 627 11. Woolhead GM, Donovan JL, Dieppe PA. Outcomes of total knee replacement: a qualitative
628 study. *Rheumatology (Oxford)*. 2005; 44(8):1032-7.
- 629 12. Robertson DA, Kenny RA. "I'm too old for that" — The association between negative
630 perceptions of aging and disengagement in later life. *Pers Individ Dif*. 2016; 100:114-119.
- 631 13. WHO. Ageing: Ageism [Internet]. [https://www.who.int/westernpacific/news/q-a-](https://www.who.int/westernpacific/news/q-a-detail/ageing-ageism)
632 [detail/ageing-ageism](https://www.who.int/westernpacific/news/q-a-detail/ageing-ageism): 2020 [Available
- 633 14. Hausknecht S, Clemson L, O'Loughlin k, McNab J, Low L. Reframing Ageing in Australia.
634 <https://www.age-platform.eu/publications/reframing-ageing-australia>; 2020. p.
- 635 15. Levy BR. Eradication of ageism requires addressing the enemy within. *Gerontologist*. 2001;
636 41(5):578-579.
- 637 16. Hausknecht S, Low L-F, O'Loughlin K, McNab J, Clemson L. Older Adults' Self-Perceptions of
638 Aging and Being Older: A Scoping Review. *Gerontologist*. 2019; 60(7):e524-e534.
- 639 17. Lin I, Wiles L, Waller R, Goucke R, Nagree Y, Gibberd M, et al. What does best practice care
640 for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical
641 practice guidelines: systematic review. *Br J Sports Med*. 2020; 54(2):79.
- 642 18. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC:
643 a health status instrument for measuring clinically important patient relevant outcomes to
644 antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol*. 1988;
645 15(12):1833-40.
- 646 19. Linton SJ, Nicholas M, MacDonald S. Development of a Short Form of the Örebro
647 Musculoskeletal Pain Screening Questionnaire. *Spine (Phila Pa 1976)*. 2011; 36(22)

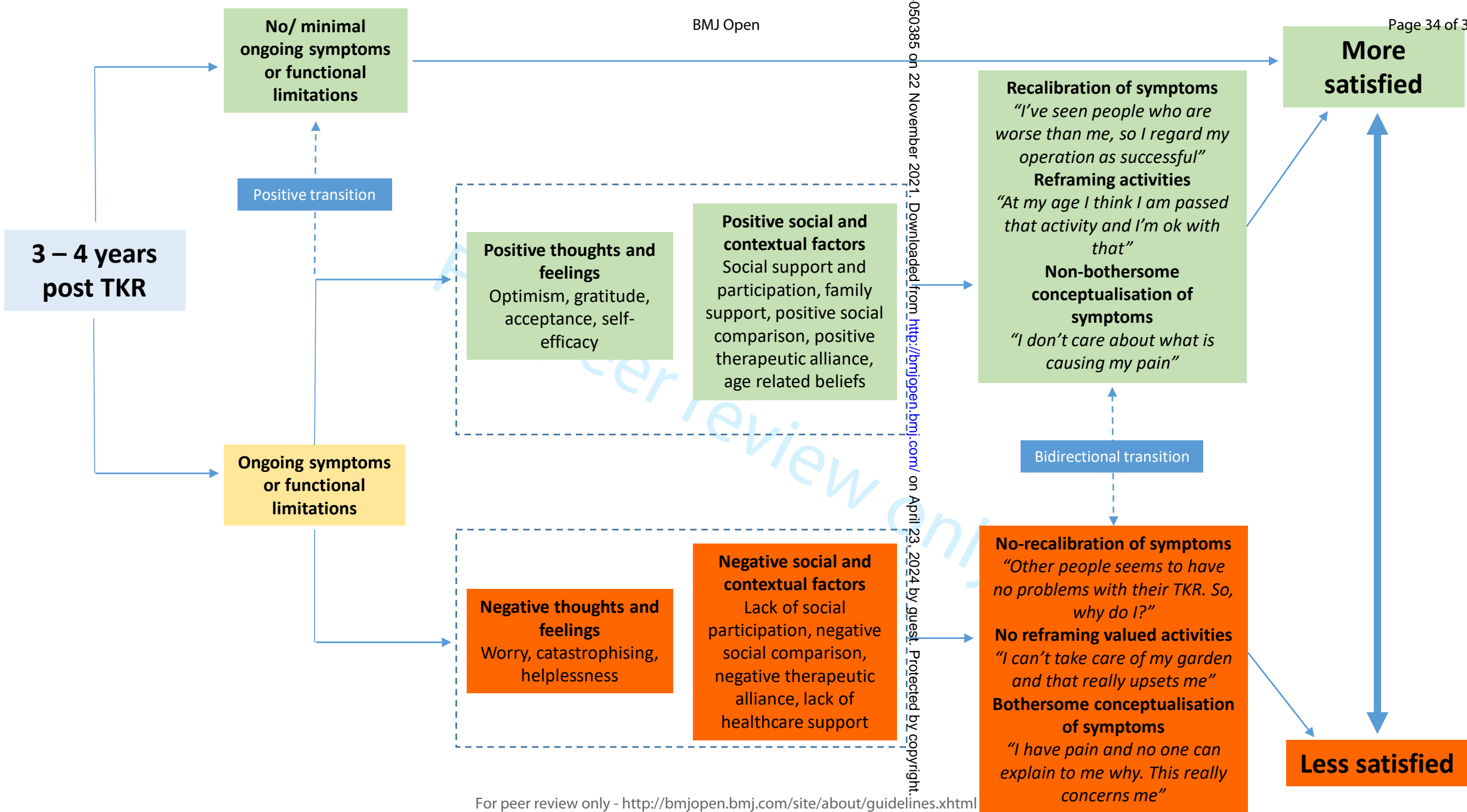
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

648 20. Butera KA, Lentz TA, Beneciuk JM, George SZ. Preliminary Evaluation of a Modified STarT
649 Back Screening Tool Across Different Musculoskeletal Pain Conditions. Phys Ther. 2016 [cited
650 1/22/2021]; 96(8):1251-1261.

651

652

For peer review only



050385 on 22 November 2021. Downloaded from <http://bmjopen.bmj.com/> on April 23, 2024 by guest. Protected by copyright.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41

1- 4 year post-TKR dissatisfied with TKR outcomes

- 1. Screening:**
 - Screen for pain and functional impairments. eg. WOMAC
 - Screen for psychological factors. eg. Örebro, StartMusc
- 2. Questions / prompts:**
 - Is anything about your TKR troubling you?
 - Prompts from screening tools
 - eg. "I notice you scored high on low mood, can you tell me about that."
 - eg. "It looks like you are still struggling in ADL's / pain etc can you tell me about this?"
 - Ask about their social environment.
 - eg. "do you have support at home, and a social network you regularly engage in?"

- Approach:**
 - 1. Validate and address patient concerns
 - 2. Reassurance re TKR integrity
 - 3. Biopsychosocial pain education
 - 4. Address functional limitations with graded exercise program
 - 5. Address psychological and social factors, referring for additional support as needed

Patient still troubled by their knee after functional rehabilitation: integrate the Three Mechanisms of Change via the following pathways, with thoughts, feelings, social and contextual factors

Patient is no longer troubled by their knee after functional rehab: plan long term management strategy with patient. This should include a home exercise plan, and plans to check-up over long term intervals. Eg every 6 months

Negative calibration
 "My friends/family who have had a TKR are so much better than me"

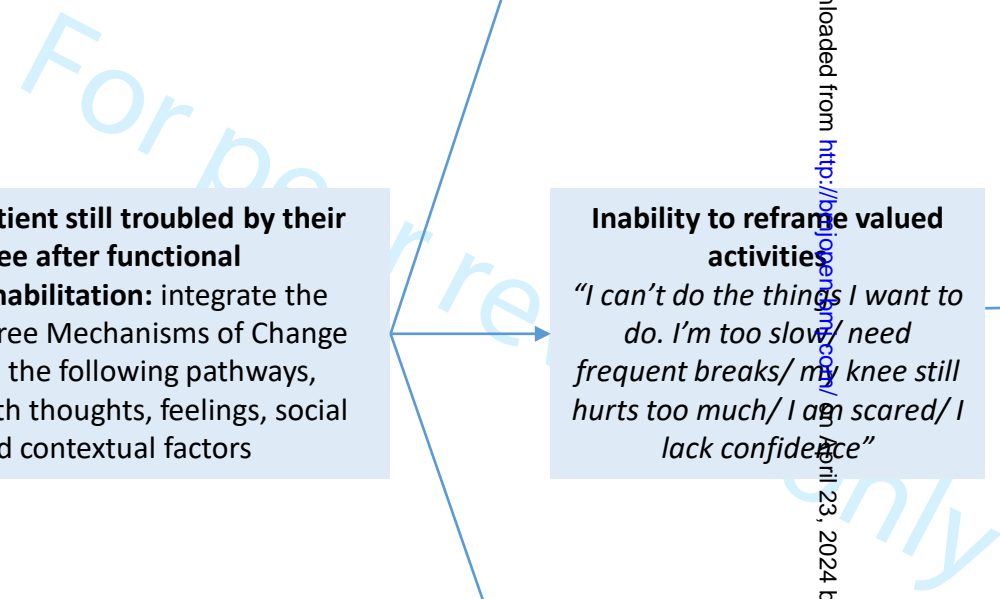
Inability to reframe valued activities
 "I can't do the things I want to do. I'm too slow/ need frequent breaks/ my knee still hurts too much/ I am scared/ I lack confidence"

Bothersome conceptualisation of symptoms
 "I'm really worried my pain/ other symptoms means something bad, like something went wrong in surgery"

To assist positive calibration of symptoms
 Discuss and encourage broader engagement with other TKR patients. Eg. Group exercise classes, social clubs, online support forums

To assist reframing valued activities
 Work with patients to identify new activities to enjoy and/ or create strategies to modify or adapt current activities. Eg. Pacing strategies or use of aids. Where this is driven by fear or lack of confidence, techniques such as graded exposure therapy may be used

To assist a positive conceptualisation of symptoms
 Discuss and explain reasons for symptoms in a way that is non-threatening and makes sense to the patient. Patients should be reassured that pain can occur as a result of many factors, which may be unrelated to their TKR



050385 on 22 November 2021. Downloaded from <http://bmjopen.bmj.com/> on April 23, 2024 by guest. Protected by copyright.

COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.