# The Development of a Surgical Readiness Interview Tool for Patients to Improve Conversation on Modifiable Risk Factors Prior to Total Joint Arthroplasty

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# The Development of a Surgical Readiness Interview Tool for Patients to Improve Conversation on Modifiable Risk Factors Prior to Total Joint Arthroplasty

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## ABSTRACT

**Background:** Total joint arthroplasty (TJA) surgery is conducted for severe hip and knee osteoarthritis (OA). However, a significant number of patients referred to orthopedic surgeons with hip and knee OA are not appropriate surgical candidates. Further, many are sent back to their primary care physician because they had not yet exhausted non-surgical options, which suggests the importance surgeons place on exhausting conservative management before proceeding with TJA. The objective of this qualitative inquiry was to 1) explore patients' perspectives of a surgical readiness interview tool and its potential utility in the management process for patients with OA, and 2) gain input from study participants to further refine the tool and ensure that it is reflective of the patients' needs and perspectives.

**Methods:** We used a diverse convenience sampling strategy to recruit TJA patients from the hip and knee arthroplasty clinics in Calgary, Alberta. Semi-structured qualitative interviews were conducted using a cognitive interviewing approach in order to elicit information regarding clarity and relevance of the interview tool. All interviews were digitally recorded and transcribed verbatim. Through an iterative process, a coding framework was developed and then applied in the analysis of all interviews.

**Results:** Nine interviews were conducted (n=3 males and n=6), all of whom had a TJA within the previous 12 months. Participants found the questions in the interview tool to be clear and relevant, and nothing listed was unexpected. All participants expressed that they felt comfortable discussing the content of the interview tool with their doctors. The main themes that emerged from the interviews include 1) the need for clarifications, 2) patient-oriented changes, and 3) expectation management. While gaining insight from study participants, the qualitative inquiry confirmed

utility of the tool improve the conversation about surgical readiness and utilizing conservative management prior to TJA.

**Conclusions:** Overall, participants were positive about the interview tool and felt that it would lead to better care provision. We recommend the use of the interview tool in primary care settings to support the conversation on modifiable risk factors and non-surgical management strategies for OA prior to TJA.

**Keywords:** total joint arthroplasty, interview tool, modifiable risk factors

## BACKGROUND

Total joint arthroplasty (TJA) surgery is an effective and cost-effective intervention for severe hip and knee osteoarthritis (OA) leading to reduce pain, improve function, and improve quality of life (1-8). In current practice, surgical suitability and medically determined readiness for TJA includes the following factors: degree of OA (progression of OA disease on plain radiographs), level of severity of functional disability or dysfunction, pain experience, patient symptoms, and/or co-morbidities, most notably obesity (9). However, utilization rates vary significantly as there are no set indications for when, in the course of OA, it is best to operate, and which patients benefit most from the operation.

The majority of patients (50-75%) that are referred to orthopedic surgeons for hip and knee OA in Alberta do not require TJA at that time or are not appropriate surgical candidates. McHugh *et al.* report that patient referrals to an orthopedic surgeon by general practitioners were often inappropriate, with only 33% of referred patients undergoing TJA (10). Of the remaining patients, the majority were sent back to their primary care physician because they did not want to undergo TJA or they had not yet exhausted non-surgical options (i.e. physiotherapy, joint injections, weight loss), had been referred to the wrong type of specialist (i.e. referred for arthroplasty when should have been referred high tibial osteotomy), or were not in a condition severe enough to warrant TJA (10). Canadian data suggests that 45% of patients with moderate knee OA who are referred by their primary care physician to an orthopaedic surgeons do not require TJA at that time or are not appropriate surgical candidates (11, 12). Klett *et al.* (13) also found that 47.4% of patients referred to sports medicine specialists were referred back to their primary care physician. Furthermore, patients referred to TJA by a sport medicine specialist were more likely to have exhausted

conservative measures to manage their OA (13), utilizing conservative management prior to TJA. Similarly, in a study by Cross e*t al.* (14), orthopaedic surgeons were found to be focused on disease management (disease severity, obesity, severity, patient demand, nursing home residency, etc.) in comparison to referring health care providers, which suggests the importance surgeons place on exhausting conservative management before proceeding with TJA.

The Bone and Joint Health Strategic Clinical Network (BJH SCN) in Alberta has been addressing the issue of inappropriate surgical referrals for TJA in the Alberta context and identifying how to better support individuals living with OA through non-surgical (conservative) approaches. One activity initiated by the BJH SCN in 2016/2017 was a student competition where student teams were challenged to identify a solution to the real-world problem of how to best prepare patients for TJA. The proposed solution of the winning team (KIB, NLT, CEH) was a Surgical Readiness Interview Tool (interview tool) that would facilitate a conversation between a primary care provider and a patient about modifiable risk factors for OA and non-surgical management strategies for OA. With feedback and input from orthopedic surgeons in Calgary, Alberta, the student team identified a lack of knowledge regarding these factors and strategies. Further, there was no screening tool used by a primary care physician prior to a referral for an orthopedic consult to evaluate readiness for TJA and to identify modifiable risk factors that may contribute to adverse surgical outcomes. Lastly, the student team recognized that such an interview tool may also enable a supportive dialogue with a shift to emphasize non-surgical approaches which would be more beneficial to the patients' overall health in the long run and facilitate more efficient use of specialists' time.

77 ***Development of the Interview Tool***

78 The Surgical Readiness Interview Tool (Table 1) was developed by assessing the current evidence-
79 based guidelines and recommendations for both TJA and optimizing surgical outcomes.
80 Specifically, the interview tool aims to improve the conversation regarding modifiable risk factors
81 that contribute to adverse surgical outcomes in TJA and provide guidance for appropriate referrals
82 to the orthopedic surgeon. The language used is based on current motivational interviewing (MI)
83 techniques and used to identify patient knowledge, engagement, and ability to change (15). MI
84 also enhances patient locus of control and encourages a collaborative patient-physician
85 partnership. By utilizing these techniques, the tool is meant to empower the patient and encourage
86 them to play an active role in their health care decisions. In keeping with the patient-centered
87 approach, the student team felt it necessary to include multiple risk factors. Further, weight loss is
88 a particularly sensitive topic, and often the focus of such conversations. Yet, weight loss is not
89 consistently supported in the literature to enhance TJA outcomes (15) and the student team was
90 unable to develop an equitable and non-stigmatizing strategy to triage patients with and without
91 obesity issues. In the instances where the interview tool does ask the patient to self-report on
92 weight or weight related subjects, we have utilized weight-related language that is safe and non-
93 stigmatizing (15). In addition, the interview tool also includes evidence-based non-surgical
94 management strategies to ensure patients are aware of and have exhausted all other treatment
95 options prior to consult for surgery.
96
97 The interview tool has been presented to clinicians and clinical support staff of arthroplasty clinics
98 from across Alberta at BJH SCN provincial meetings (a multidisciplinary BJH SCN Core
99 Committee meeting and a BJH SCN workshop focused on care for individuals living with OA and

obesity (16). Feedback was generally positive and included specific recommendations on how the tool could be further refined and context for uptake and integration in the OA care and referral processes. Although there was interest from some clinics to test the tool in their settings, it was recognition that a key stakeholder in the uptake and utility of this tool are patients. Hence, the team determined to obtain input from patients to confirm utility and alignment with patient needs. Further, with patient input, there was need to determine the optimal operational placement of the tool – in primary care settings or central intake hip and knee clinics. The primary objective of the qualitative inquiry reported on here was to explore patients' perspectives with the interview tool and its potential utility in the management process for patients with OA, with the goal of improving conversation in regard to managing modifiable risk factors that contribute to adverse surgical outcomes in TJA and surgical readiness. The secondary objective was to gain input from study participants to further refine the tool and ensure that it is reflective of the patients' needs and perspectives.

## METHODS

A qualitative study was conducted to address the objectives, applying the interpretative description approach (17). Interpretative description enables an in-depth exploration of participant's experience and perceptions and moves beyond description by intentionally aligning the lived experience and implications within the clinical or health care context. Ethics approval was received from the Conjoint Research Ethics Board at the University of Calgary (Ethics ID: REB17-1814).

123 ***Context***

124 The study was conducted in Alberta at two hip and knee arthroplasty clinics in Calgary, Alberta.

125

126 ***Participants***

127 To address our research questions, we conducted interviews with a diverse sample of patients who
128 had previously undergone at least one TJA at one of the recruitment sites. A convenience sampling
129 strategy was used and with the aim of including a range of participants (male/female; broad age
130 range; no requirements related to education, residence location or other underlying conditions).
131 The final sample was determined by the diversity criterion and data saturation – recruitment was
132 stopped when the team determined that no new codes or categories were emerging with additional
133 interviews. Participants were recruited from the hip and knee arthroplasty clinics in Calgary.
134 Potential participants were approached about the study by clinic managers during their routine
135 post-TJA follow up appointment. If consent to be contacted by one of the research team members
136 was obtained, contact for the interviews was initiated by the research/student team, with consent
137 obtained prior to the interview.

138

139 ***Data Collection***

140 Semi-structured qualitative interviews were conducted by telephone by KIB, NLT and CEH. The
141 interviews applied a cognitive interviewing approach in order to elicit information regarding
142 clarity of questions and response options, and relevance of topics covered in the tool. Drawing on
143 the experience of the participants, we also wanted to determine if any topics related to surgical
144 readiness and/or modifiable factors were missing in the tool. Based on a preliminary analysis of
145 the first 2 interviews, AKR provided minor revisions to the interview guide and additional

coaching on how to frame questions in a semi-structured format during the interview process. All interviews were digitally recorded and transcribed verbatim.

### *Data Analysis*

The analysis, led by AKR, was initiated after the first 3 interviews were completed. The first step involved listening to all recordings for initial emersion into the data. Each transcript was then analyzed by two of the team members (AKR, KIB). Codes and categories identified by each member were compared to determine corroboration through three rounds. Any discrepancies were further discussed and final decisions regarding codes/categories were consensus based. Through several iterations, codes and categories were identified, resulting in the development of an emergent coding framework. The coding framework was then applied to all interviews and based on similarities, patterns, and relationships between categories, emergent themes were identified.

## RESULTS

### *Participants*

The participant sample (n=9), included males (n=3) and females (n=6), and, at the time of the interview, all had a TJA within the previous 12 months. One participant had more than one TJA.

### *Findings*

Overall, participants were positive about the tool and felt that it would lead to better care provision. They felt the questions were clear and relevant to determining surgical readiness for individuals with osteoarthritis, addressing modifiable risk factors, and addressing issues relevant to arthroplasty. The rating scale used in the interview tool to assess each item was seen as effective

in capturing responses as it provided a quick yet good sense of where participants were at in relation to each of the health areas addressed.

There appeared be nothing surprising in the topics covered in the interview tool. For some, there was a degree of familiarity with the content of the tool; several participants said that these types of questions were addressed with their family doctor or physiotherapist in relation to their OA and/or discussions regarding surgery. Several participants commented that it was a good source of credible information in terms of what needs or should be considered in relation to surgery. Some emphasize that this information is not only useful for them, but also for their family doctors and surgeons as it provides a more complete picture of what the patient had done (or not). All expressed that they felt comfortable discussing the content with their doctors.

### *Emergent Themes*

The coding framework, which outlines the codes and categories identified during the analysis process are outlined in Table 3. Through the analytic process, three themes emerged – need for clarifications, patient oriented changes, and expectation management – which are described below.

### *Need for Clarification*

The key areas that raised questions for participant were related to tool administration, question priority, and relative importance of the topics in relation to determining readiness for surgery. A few of the participants were unclear about the method of administration - whether it would be done by the patient alone or with a doctor, or by the doctor. Timing of administration, in relation to a referral or scheduling of a surgery, was also raised by a few participants. This was important as it

192 appeared to determine the purpose of the tool: later administration seemed to mean it would be
193 used as a decision making tool for the doctor regarding referral to a specialist for surgery whereas
194 earlier administration meant it functioned more as tool for the patient to help assess what needed
195 to be done to enhance their surgical readiness. There was some preference towards earlier
196 administration and using the tool as a readiness tool for the patient.
197
198 There was some question as to whether the order of questions reflected a priority in relation to
199 surgical readiness, which suggested that the first topics were more important than those listed
200 towards the end. Related to this, some participants were unclear about the relative importance of
201 the questions. For example, almost all agreed that exercise and physical strength were important,
202 however, questions were raised regarding the relevance of the weight question. This was due to
203 the inconsistency observed, as discussed by several participants, regarding excess weight and its
204 impact on surgery and/or surgical outcomes. For example, several participants observed that some
205 people who were over-weight had surgery "…and did just fine". Some who were not over-weight
206 had poor outcomes. Therefore, focus on or any emphasis on weight seemed contradictory or
207 confusing to participants.
208
209 ***Patient Oriented Changes***
210 Several changes to the language and content were proposed by participants to further enhance the
211 tool. In terms of terminology used in the questions, asking about a patient's confidence in relation
212 to their readiness did not "resonate" for one participant as they did not think this was an issue of
213 confidence. For the few participants who were dissatisfied with the question specific to weight
214 management, the issue appeared to hinge on how the question was stated. The way the question

was worded seemed to imply that weight was a concern or an issue, which "automatically makes one defensive …" (Participant 3). Similarly, use of "excess weight" was interpreted as an assumption that there was a problem with weight. Whereas stating "weight' or 'weight management' in the question was perceived to be more neutral, asking it a question about weight instead of a weight issue. Most participants shared the opinion that the use of "excess weight" was preferable to "over-weight" or "obese" or "fat" as these appeared be interpreted as an insult or negative judgement of the person. The sensitized meaning of these words appeared to be important to participants, as reflected in the experience of Participant 8:

> *"And he (surgeon) came in with this piece of paper… and he says, you're obese. And I said, what?! I said, what the heck are you talking about? I said, yes, I've put on a few pounds. I said, I may be 10 to 15 pounds overweight, but you call that obese? I said, what is wrong with you? I, I just wanted to up and hammer him right there, I was so angry with him…the word obese should never be used to a person that is trying to stay fit with a problem knee*."

A couple of participants also commented that a narrow view of weight - a number on a scale - had negative consequences. It resulted in an automatic judgement and precluded a beneficial health-focused dialogue. The experience of some participants suggests that this could lead to detrimental effects on a patient's physical/or and mental health, as evidenced in the experience of Participant 8:

> *"…yeah wording is definitely everything. And it has a tendency to play on people's minds. It can turn their mind off surgery, and they go into, they turn into themselves. And they uh*

*build a shell around them and they don't come out. You know? It takes a long time to reach a person like this."*

Participants' feedback identified additional information that should be included in the interview tool: an indicator of mental health state, quality of life and rating of impact of the disease on everyday activities and functionality. A number of participants recommended provision of more space for each question where additional details could be included to provide a better or more complete picture of the individual's reality or situation. Additionally, it may be useful to provide space where the different strategies can be listed and the individual's comments specific to the strategies tried. This seemed to be particularly important in relation to exercise and weight management. For instance, simply being labelled as "over-weight" or "obese" without a context or understanding of why was very limiting and did not provide the complete picture that participants felt should be considered by a doctor.

There were several recommendations to expand what is covered under "surgical readiness". Several noted that this does not only relate to the time prior to surgery but also after surgery. To that end, suggestions were made that the tool should include questions that consider readiness at home – food preparation, social and health care supports, access at home. In addition, consideration of the very real challenges faced after surgery - pain, limited mobility, poor sleep – and if the patient is ready for this. As one participant commented:

*"… and they show you these exercises, and yeah they are a piece of cake before surgery… until you've had the surgery. Then it's a whole different ballpark…"* (Participant 4).

***Expectation Management***

Participants' feedback on the tool brought to light the importance of managing expectations of what the outcomes of the tool and their relevance in terms of healthcare provision mean. Several participants raised the issue that any discussion about surgery, even if the tool suggests a high readiness level, should also include some real risk considerations – the surgery may not work, the outcomes may be poor. Further, the level of functionality may improve but it will not be at the same as level as before they had OA. As one participant stated:

> *"….I knew, once I had the procedure done I wasn't going to be breakdancing down Eight Avenue…it's not as good as my original equipment…and I did not expect it to be…as a result, I'm definitely not disappointed" (Participant 9).*

The interview tool may also be useful in potentially managing the expectations that doctors have of their patients in terms of what can realistically be achieved by the person compared to a readiness and/or optimization benchmark. Although most participants recognized the importance of the listed topics in tool in relation to surgery, many expressed a lack of control of the issues their doctors wanted addressed or "fixed". For example:

> *"…and I think sometimes people, especially if they have no issues with weight, always just say well you've just got to lose it, you've got to lose weight. But this guy was really trying. And he get's to meet the surgeon finally – and it takes a long time to get to that point – and I remember he was just so deflated. And he just felt like, he didn't know what the next step was" (Participant 2).*

Some also spoke of a 'vicious cycle' that doctors appeared unaware of, and, in some ways, was perpetuated by doctors. For instance, one became overweight because they were unable to exercise due to the arthritis and the pain. And now they were expected to lose weight that they gained because they are unable to function and did not have surgery that they perceived would give them the function back. This is captured in the experience of Participant 3:

> *"…I mean it's such a vicious cycle because you know…they'll say…if you can lose x amount of weight, that'll be helpful. And I'm like, great. I can't walk two feet without being in pain. And you know, I've done physio…and it take me two days to recover from doing that kind of thing….".*

Lastly, there is an expectation that people will respond to the questions in the tool honestly. However, one participant pointed out that if the tool is used to inform a decision about surgery or referral to a surgeon, this may influence how the patient responds to the question; they may aim to provide the "right answer" instead of an honest answer to get the end result they want - the surgical referral and/or the surgery.

Based on these findings, the interview tool was revise, incorporating content and wording suggestions from participants. The suggested changes have been incorporated into the readiness interview tool and are presented in Table 2.

## DISCUSSION

The present study explored patients' perspectives and experiences with the developed readiness interview tool for TJA. Participants were very positive about the interview tool and felt that it

would lead to better care provision. Participants noted that the outlined questions were clear and relevant, and nothing listed was unexpected. All participants expressed that they felt comfortable discussing the content of the interview tool with their doctors. The main themes that emerged from the interviews include the need for clarifications, patient-oriented changes, and expectation management. While gaining insight from study participants, the qualitative inquiry confirmed utility of the tool improve the conversation in regard to modifiable risk factors that contribute to adverse surgical outcomes in TJA and potentially improving appropriate surgical referrals.

A perspective identified across multiple interviews was that the tool was medicine or physician centric. Study participants recognized that the interview tool was a useful educational and awareness tool of non-operative options prior to the TJA referral to an orthopedic surgeon – for themselves and their doctors. However, it was perceived as primarily oriented towards information needs and issues of importance to physicians and not necessarily the patient. The goal of developing this interview tool was to involve the patient and encourage an open dialogue, therefore focusing on a patient centric care – to align decisions with patient's needs, wants, and preferences (18-20). To ensure that the tool also meaningful to patients in the context of the OA that they live with and decision-making regarding surgery and surgical readiness, input from study participants was incorporated in the interview tool.

An important topic that emerged during the interviews was around the intention of the response to the questions. There is often an inherent assumption, if not expectation, that patients respond to questionnaires or questions in the context of a consultation with a physician in an honest or transparent manner. However, several participants endorsed the notion that some may answer the

328 questions on how the physician would want the answers to be completed with the goal of getting
329 TJA, and not necessarily honestly; therefore, not optimizing all non-operative options prior to TJA,
330 as TJA was viewed as the solution compared to weight loss, diabetes control, etc. Interview
331 respondents also noted that potentially patients "would say what they needed to" to get a referral
332 to an orthopaedic surgeon. A similar issue was addressed in a study by Burt *et al* (2017) exploring
333 how patients' choices of response options related the nature of the primary care physician
334 consultation. The authors concluded that drivers impacting responses to questionnaires include the
335 nature of the consultation with a primary care physician and expectations of that consultation, and
336 the power differential between a doctor and the patient (17). This highlights the need for careful
337 consideration of when the interview is administered in the process of OA management as this may
338 potentially influence how a patient responds to the tool items.
339
340 A framework for an evidence-based, multidisciplinary, patient-centered, approach to hip or knee
341 OA has been developed (21). The stepped care approach provides a progressive strategy to
342 management and treatment of OA that is initiated with low intensity evidence-informed
343 interventions with an emphasis on self-management in step 1. This is progressed to increasingly
344 more intensive treatment interventions with step 2 including exercise therapy, dietary therapy, and
345 non-steroidal anti-inflammatory drugs, and step 3) treatment options comprising of
346 multidisciplinary care, intra-articular injections, and transcutaneous electrical nerve stimulation
347 for patients with persisting complaints (21). Surgery would be the last option, after step 3
348 essentially failed in effective treatment of OA symptoms. With the stepped care approach, it is
349 imperative to both the patient and the health care system to complete the adequate steps in an
350 ordered manner, and the steps should need to be done prior to invasive therapy. Further, to provide

value, a stepped care strategy needs to be consistent within primary care, as there are effects on costs and long-term effects (22). In a previous study that evaluated the extent to which clinical practice was consistent with the stepped care strategy in hip or knee OA, consistency was found in about half of the patients within the aspects of care (consistency regarding timing of radiological assessment, sequence of non-surgical treatment options, and making follow-up appointments) (23). The inconsistencies mainly focused around underuse of lifestyle advice and dietary therapy. Further, they found that in 57% of the consultations with their primary care physician, the patient reported to have been advised to make a follow-up appointment (23). Such an approach has taken up by the BJH SCN, as reflected in the BJH SCN's framework for OA management (24). The interview tool may effectively enable the implementation of a stepped care approach in OA care. It could provide consistency within primary care as to what conversations to have prior to any referrals, including consultation for arthroplasty, and then prompt the physician to encourage follow up appointments for both discussion and reassessment of modifiable risk factors.

***Delivery of Tool***

The interview tool provides a unique opportunity to allow the patient to play an active role in their care. This interview tool provides a valuable opportunity for the physician to have a conversation and educate their patients about different modifiable risk factors. Also, it can be used to guide the patient to local resources (i.e. physiotherapists, kinesiologists, dieticians, diabetes management clinics, smoking cessation clinics, etc.) available to help address these risk factors. This open dialogue will help identify which risk factors the patient is willing and able to start making changes on. We encourage the primary care physicians to follow the patient serially throughout this process and therefore aiming to decrease their overall health risk prior to consultation to the surgeon, if

there is sufficient need to proceed to TJA. Further, the interview tool could assist in effectively managing expectations. Ideally, the interview tool would be an included in the referral documentation for TJA. Its uptake could result in improvements in referral efficiency by appropriately triaging poor current surgical candidates to other health care professionals prior to orthopaedic surgeons, that would in turn reduce inappropriate surgeon referrals, improve patient monitoring in primary care, decrease wait times, and possibly delay the need for TJA.

This study is not without limitations. First, the patients were recruited from the hip and knee arthroplasty clinics in Calgary, Alberta. Although we aimed for diversity in our sample, this is an inherently limited sample given the geographic location of the recruitment sites. Second, the patients were identified from the clinic managers and then invited to participate, therefore introducing potential selection bias into which patients were invited to be interviewed. The cognitive interviewing approach was relatively new to the interviewers. This led to some inconsistency in how the interviews were conducted by the three interviewers. However, the semi-structured approach allows for flexibility in the flow of an interview to ensure research objectives are addressed. Further, almost all interviews (6/9) were conducted by the same interviewer (KB).

***Future Directions***

Dissemination of the revised interview tool in Alberta to BJH SCN stakeholders will be continued in order to identify optimal operational uptake within the primary care setting and/or OA tool kits currently in development by the BJH SCN to enhance OA care across the continuum and in context of the patient's lived OA journey. These processes continue to be supported by the BJH SCN and uptake is dependent on interested local primary care clinics and sites in Alberta. Once an uptake

site is identified, a critical next step will be to test the interview tool in the clinic setting and its impact on patient outcomes and care processes.

## CONCLUSIONS

In summary, this study demonstrated that participants were positive about the proposed interview tool. Findings confirmed utility of the interview tool to improve the conversation on surgical readiness and specifically modifiable risk factors that contribute to adverse surgical outcomes in TJA. Participants believed these discussions would lead to better care provision. The provision of a tool that asks patients to rate their understanding of their surgical risk factors, the importance of modifying those risk factors, and their confidence in being able to modify same will likely encourage patient-directed strategies and care, and reduce the number of inappropriate consults seen by orthopedic surgeons.

## ABBREVIATIONS

OA - Osteoarthritis

TJA - Total Joint Arthroplasty

BJH SCN - Bone and Joint Health Strategic Clinical Network

## DECLARATIONS

### *Ethics approval and consent to participate*

Ethics approval was received from the Conjoint Research Ethics Board at the University of Calgary (Ethics ID: REB17-1814). All participants completed informed consent prior to the study.

***Consent for publication***

Consent for publication is not applicable for this manuscript.

***Availability of data and material***

De-identified data collected and analyzed for this study may be made available on reasonable request by contacting the corresponding author.

***Competing interests***

The authors declare they have no competing interests.

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***Authors' contributions***

KIB co-developed the tool, implemented revisions to create version 2 of the tool, collaborated on the study design, conducted interviews, co-analyzed data, and led the manuscript preparation. CEH co-developed the tool development, conducted interviews, and edited the manuscript. AKR collaborated on the study design, confirmed version 2 of the tool, led the data analysis and co-led the manuscript preparation. AKR works for the BJH SCN and was directly involved in the development and administration of the student competition that led to the development of the interview tool addressed in this manuscript.

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## REFERENCES

1. Ethgen O, Bruyere O, Richy F, Dardennes C, Reginster JY. Health-related quality of life in total hip and total knee arthroplasty. A qualitative and systematic review of the literature. The Journal of bone and joint surgery American volume. 2004;86-a(5):963-74.

2. Fortin PR, Clarke AE, Joseph L, Liang MH, Tanzer M, Ferland D, et al. Outcomes of total hip and knee replacement: preoperative functional status predicts outcomes at six months after surgery. Arthritis and rheumatism. 1999;42(8):1722-8.

3. Jones CA, Beaupre LA, Johnston DW, Suarez-Almazor ME. Total joint arthroplasties: current concepts of patient outcomes after surgery. Rheumatic diseases clinics of North America. 2007;33(1):71-86.

4. Judge A, Arden NK, Cooper C, Kassim Javaid M, Carr AJ, Field RE, et al. Predictors of outcomes of total knee replacement surgery. Rheumatology (Oxford, England). 2012;51(10):1804-13.

5. Laupacis A, Bourne R, Rorabeck C, Feeny D, Wong C, Tugwell P, et al. The effect of elective total hip replacement on health-related quality of life. The Journal of bone and joint surgery American volume. 1993;75(11):1619-26.

6. Rampersaud YR, Wai EK, Fisher CG, Yee AJ, Dvorak MF, Finkelstein JA, et al. Postoperative improvement in health-related quality of life: a national comparison of surgical treatment for focal (one- to two-level) lumbar spinal stenosis compared with total joint arthroplasty for osteoarthritis. The spine journal : official journal of the North American Spine Society. 2011;11(11):1033-41.

468 7. Salmon P, Hall GM, Peerbhoy D, Shenkin A, Parker C. Recovery from hip and knee
469 arthroplasty: Patients' perspective on pain, function, quality of life, and well-being up to 6 months
470 postoperatively. Archives of physical medicine and rehabilitation. 2001;82(3):360-6.
471 8. Dieppe P, Lim K, Lohmander S. Who should have knee joint replacement surgery for
472 osteoarthritis? International journal of rheumatic diseases. 2011;14(2):175-80.
473 9. Frankel L, Sanmartin C, Conner-Spady B, Marshall DA, Freeman-Collins L, Wall A, et al.
474 Osteoarthritis patients' perceptions of "appropriateness" for total joint replacement surgery.
475 Osteoarthritis and cartilage / OARS, Osteoarthritis Research Society. 2012;20(9):967-73.
476 10. McHugh GA, Campbell M, Luker KA. GP referral of patients with osteoarthritis for
477 consideration of total joint replacement: a longitudinal study. The British journal of general
478 practice : the journal of the Royal College of General Practitioners. 2011;61(589):e459-68.
479 11. Malian SJ. Predictors of appropriate referral to total knee arthroplasty: a validation study.
480 Electronic Thesis and Dissertation Repository: Western University; 2015.
481 12. Churchill L, Malian SJ, Chesworth BM, Bryant D, MacDonald SJ, Marsh JD, et al. The
482 development and validation of a multivariable model to predict whether patients referred for total
483 knee replacement are suitable surgical candidates at the time of initial consultation. Canadian
484 journal of surgery Journal canadien de chirurgie. 2016;59(6):407-14.
485 13. Klett MJ, Frankovich R, Dervin GF, Stacey D. Impact of a surgical screening clinic for
486 patients with knee osteoarthritis: a descriptive study. Clinical journal of sport medicine : official
487 journal of the Canadian Academy of Sport Medicine. 2012;22(3):274-7.
488 14. Cross WW, 3rd, Saleh KJ, Wilt TJ, Kane RL. Agreement about indications for total knee
489 arthroplasty. Clinical orthopaedics and related research. 2006;446:34-9.

15. Dietz WH, Kahan S. Why weight? A guide to discussing obesity and health with your patients. Strategies to Overcome and Prevent (STOP) Obesity Alliance. 2014.

16. Godziuk K, Kania-Richmond A, Hart DA. Obesity: Implications for patients with osteoarthritis. 2017. Available from: https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-bjh-osteoarthritis-and-obesity-white-paper-final.pdf.

17. Thorne S, Kirkham SR, O'Flynn-Magee K. The Analytic Challenge in Interpretive Description. International Journal of Qualitative Methods. 2004;3(1):1-11.

18. Bardes CL. Defining "patient-centered medicine". The New England journal of medicine. 2012;366(9):782-3.

19. Barry MJ, Edgman-Levitan S. Shared decision making--pinnacle of patient-centered care. The New England journal of medicine. 2012;366(9):780-1.

20. Weiner SJ, Schwartz A, Sharma G, Binns-Calvey A, Ashley N, Kelly B, et al. Patient-centered decision making and health care outcomes: an observational study. Annals of internal medicine. 2013;158(8):573-9.

21. Smink AJ, van den Ende CH, Vliet Vlieland TP, Swierstra BA, Kortland JH, Bijlsma JW, et al. "Beating osteoARThritis": development of a stepped care strategy to optimize utilization and timing of non-surgical treatment modalities for patients with hip or knee osteoarthritis. Clin Rheumatol. 2011;30(12):1623-9.

22. Smink AJ, van den Ende CH, Vliet Vlieland TP, Bijlsma JW, Swierstra BA, Kortland JH, et al. Effect of stepped care on health outcomes in patients with osteoarthritis: an observational study in Dutch general practice. The British journal of general practice : the journal of the Royal College of General Practitioners. 2014;64(626):e538-44.

512 23. Smink AJ, Bierma-Zeinstra SM, Schers HJ, Swierstra BA, Kortland JH, Bijlsma JW, et al.
513 Non-surgical care in patients with hip or knee osteoarthritis is modestly consistent with a stepped
514 care strategy after its implementation. Int J Qual Health Care. 2014;26(4):490-8.
515 24. Bone and Joint Health Strategic Clinical Network. Model of Care for Osteoarthritis
516 Treatment. 2017. Available from: https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-
517 bjh-model-of-care-for-osteoarthritis-management.pdf.

518

519 **TABLE LEGEND**

520 **Table 1** The readiness interview tool for patients to improve conversation on modifiable risk
521 factors prior to total joint arthroplasty (TJA). The revised suggested changes are in grey text.

522

523 **Table 2** Suggested changes for the readiness interview tool from study participants.

524

525 **Table 3** Coding framework.

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