Patient perspectives on EQ-5D-5L data visualization within an individualized decision aid for total knee replacement (TKA) in Alberta, Canada

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INTRODUCTION & METHODS

Decision aids are intended to help patients set realistic expectations when making decisions. In this study, **we explored alternative presentations to visualize patient-reported outcomes (EQ-5D-5L) data** that summarizes expectations for a previously developed online *individualized* decision aid for patients considering total knee arthroplasty (TKA) to enhance its usability prior to implementation into routine clinical practice.

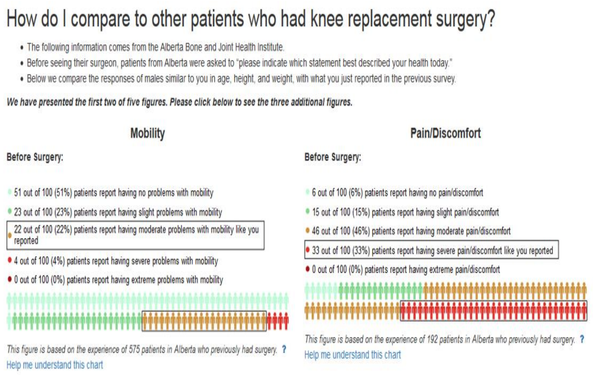
The original EQ-5D-5L output was modified using data visualization techniques to create 2 prototypes for 2 parts: (1) compared to patients like them pre-surgery and (2) how patients like them changed at 1-year post-surgery.

Patients from an urban orthopedic clinic were recruited. We collected feedback on comprehension, usefulness, and visual appeal using researcher-administered checklists. Data were analyzed using descriptive statistics and content analysis. A final version was generated through consensus for each part. The University of Alberta & University of Calgary Health Research Ethics Boards approved this study and all participants provided written informed consent.

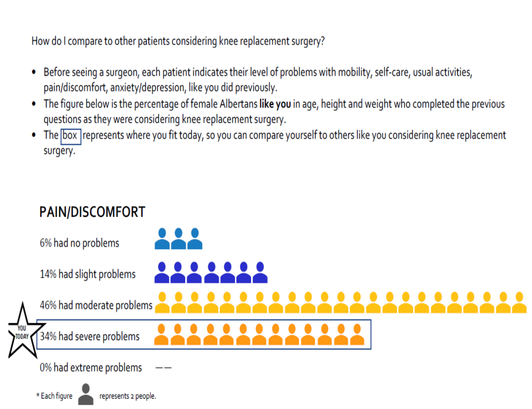
RESULTS

Pre-surgery (Part 1) n=24

Original version

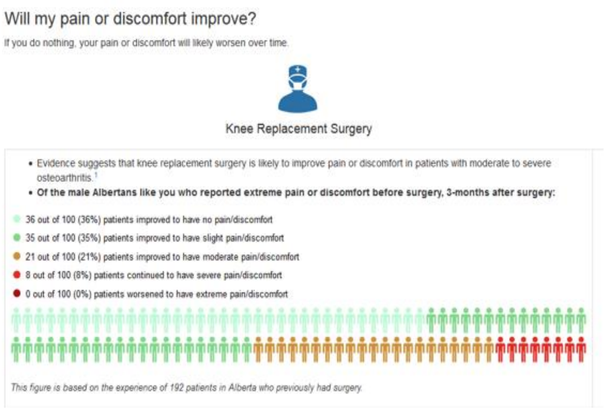


Final version

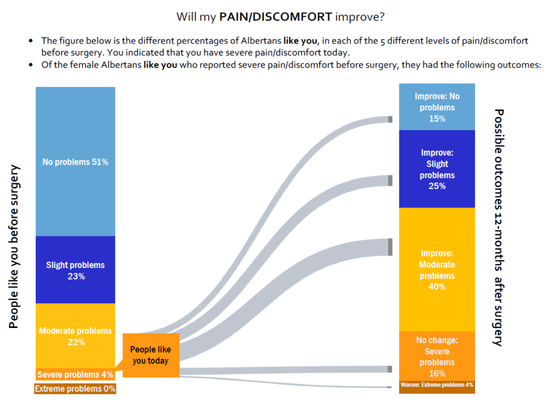


1-year post-surgery (Part 2) n=25

Original version



Final version



Most participants demonstrated adequate **comprehension** for all versions (range 50-72%) and most participants commented that the instructions were clear.

While 50-60% of participants rated the content as **useful**, including knowing the possible outcomes of surgery, some participants found the information interesting only, were unsure how to use the information, or did not find it useful because they had decided on a treatment.

Participants rated **visual appeal** for all versions favorably but suggested improvements for readability, mainly larger font and image sizes and enhanced contrast between elements.

We provide a detailed summary of modifications and rationale for changes from the original to final versions in **Table 1.**

Table 1: Summary of modifications & rationale for changes from original to final versions

		Original Versions	Finalized Versions
Comprehension			
Both Parts		Redundant text	Simplified text by removing redundant messaging and/or unnecessary words. "5 different levels" changed to "5 levels".
		Repetition of words	Removed repetitive words/content. e.g., "You can see" removed.
		Used written numeracy (e.g. 51 out of 100) and proportions (e.g. 51%)	Used proportions (e.g. 51%) only for simplification.
		Use of Jargon/ Scientific / Academic language	Used "plain language". Simplified text e.g., Removed "5 dimensions of health" for simplicity.
		Inconsistent use of terms	Used consistent terms matched to EQ-5D-5L scale.
		Long sentence structure	Uesed simple sentence structure.
		Limited instructions. Part 1 instructions on how to understand the figure hidden. Patients needed to click on the link labelled, "? Help me understand this chart" to reveal the information on interpretation. Part 2 had limited instructions on how to interpret the visualized change in levels or categories of problems before and after surgery.	Part 1 instructions on how to understand the figure placed in the narrative above the figure. Part 2 added instructions on how to interpret the visualized change in levels or categories of problems before and after surgery. Recommended to emphasize "like you" in the instructions to clarify the individualization of the data. Used bold font for "people like you".
Part 1		Icons shown separate from the text that described the levels or categories of problems. Two boxes used: One box used in the text/narrative and a second box used in figure. No instructions on how to interpret the information in the box.	Icons linked to the text describing levels or categories of problems for easy understanding. One box used around the icons and text. Identification of current level of problems using a box with the star was preferred. Included instructions on how to interpret the information in the box.
		No star icon present to direct attention to current level of problems.	Identification of their current level of problems using a box with the star was preferred.
		Two lines of icon used, making it difficult to discern count and levels or categories of problems (i.e. proportions) spread over 2 lines in the figure.	One line of icons understood and preferred. Footnote remains.
Part 2		No headings existed.	Deleted "before surgery" heading and used box labelled "people like you today". Replaced "after surgery" heading with "possible outcomes after surgery".
		Use of icons (i.e. cross-sectional) made it difficult to discern change in levels or categories of problems before and after surgery; implies a static categorization.	Removed icons. Used Sankey Chart. Preferred explicit before-surgery stacked bars of Version 2, to describe level of problems for comprehensive information. Slope of curves to indicate magnitude of change: No obvious preference; considered unmodifiable as is data dependent on before surgery response of level of problem (e.g. severe).
		There was no recall of a patient's EQ-5D-5L data on the level or category of problems before surgery. This limited people's ability to assess their potential probability of change from before to after surgery.	Used visual recall for comprehension of message, before- and after-surgery levels of problems. Programming competencies to be considered to address this.
Visual appeal			
Pt 1		Used internationally accepted 'Male' icon for figure.	Used gender-neutral icons in Part 1. Increased size of icons.
Both		Difficult to discern change of level or category with current colors of icons	Use maximum color contrast between icons.
		Original default colors	Used ABJHI Branding (i.e. color palette).
		Additional comments	Recommended to have larger visuals and fonts.

SUMMARY

Based on patient feedback, we produced an enhanced presentation of EQ-5D-5L data for both parts. Key improvements were linking text to icons in Part 1 and the use of Sankey to depict change in Part 2. These improvements will be tested, along with the entire decision aid, in further usability testing and refinements made before implementing the decision aid in routine clinical practice.

Our results on patients' perspectives on the presentation of EQ-5D-5L data to support decision making for TKA treatments contributes to the knowledge on EQ-5D-5L applications within healthcare systems for clinical care.