

Comparative Analysis of Patient-Reported Outcome Measures in Global Arthroplasty Registries

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INTRODUCTION: National joint replacement registries allow for evaluation and improvement of joint arthroplasty interventions and longitudinal outcomes through extensive data reporting. Many registries now include patient-reported outcome measure (PROM) data. The PROM surveys and reporting methods vary widely between registries, and data comparison between them is challenging. The purpose of this study is to: 1) summarize how national joint registries publish patient-reported outcome measure (PROM) survey results differently in their annual reports; 2) explain the utility of being able to compare PROMs data between registries; 3) identify possible solutions to facilitate harmonization in reporting; 4) discusses the importance of risk-adjustment (stratification of PROMs across variables that affect results, such as patient age and sex) to enable comparison between similar groups.

METHODS: The PROMs reported in the open access 2022 annual reports of five registries were summarized and compared. The five registries were the American Joint Replacement Registry, the Australian Orthopaedic Association National Joint Replacement Registry, the Canadian Joint Replacement Registry, the National Joint Replacement Registry of the United Kingdom, and the Swedish Arthroplasty Register. Scoring methods, stratification variables, patient inclusion criteria, post-operative collection timing, and history of collection were compared between the registries.

RESULTS SECTION: Twelve unique PROMs surveys were identified among the five registries: EQ-5D, EQ-VAS, PROMIS-10, VR-12, Oxford Knee Score, Oxford Hip Score, KOOS-12, HOOS-12, KOOS-JR, HOOS-JR, a patient satisfaction question, and a patient perceived change question. The most commonly used PROMs were the EQ-5D and EQ-VAS, Oxford Scores, and patient satisfaction question. Patient criteria for inclusion in reporting varied between registries with two having age requirements and two only reporting PROMs for patients who underwent primary total arthroplasty specifically for diagnosis of osteoarthritis. Post-operative PROMs collection also varied between registries; the Australian and UK registries reported six-month post-operative scores, while the other three registries reported scores from one year following surgery. Registries also used a wide range of different variables for stratification: Patient factors included age, sex, BMI, and ASA score. Surgical factors for hip replacement included femoral fixation and surgical approach. Surgical factors for knee replacement included stability, patella usage, and technology assistance.

DISCUSSION: Comparison of PROMs results between global arthroplasty registries is difficult due to variation in surveys collected, post-operative collection timing, scoring methods, criteria for inclusion, and variables used for stratification. Harmonization of the PROMs collection and reporting process across registries would facilitate comparison between registries and could identify areas of improvement for these procedures. Harmonization of reporting could be achieved by standardizing how a minimally important clinical difference (MCID) is calculated, or selecting PROMs that fulfill the Outcome Measures in Arthritis Clinical Trials (OMERACT) criteria. Increasing the risk adjustment for PROMs results by stratifying them over different patient demographics will control for modifying variables such as age and sex, and thus allow for more accurate comparison of diverse populations. Risk adjustment enables data to be compared between more similar groups, making it possible for individual surgeons or practices to compare their own data to data published by the registries. Stratification across surgical factors and implant types may show associations that can affect future implant selection.

SIGNIFICANCE/CLINICAL RELEVANCE: Harmonization of the PROMs reporting process will facilitate direct comparison between registries, allowing for identification of which regions have the greatest improvement in PROMs following intervention. Registry data from participating regions can inform future approach, implant, and technique selections worldwide if consistently reported and compared.

Table 1. Comparison of the PROMs Reported by Five Global Arthroplasty Registries

	Survey	# of Items	Categories	Scoring	In Use By
Hip & Knee	EQ-5D	5	Mobility, Self-care, Usual activities, Pain & discomfort, Anxiety & depression	0-1 (0 is state of death)	AOANJRR, CJRR, SAR
	EQ-VAS	1	Overall health	1-100 (100 best imaginable health)	AOANJRR, CJRR, SAR
	Perceived Change	1	-	Much worse to much better (5 options)	AOANJRR, SAR
	PROMIS-10	10	Global mental health, Global physical health	Score standardized to general population (50 ± 10). Higher score = less healthy	AJRR
	VR-12	12	Mental Component, Physical Component	Difference compared to general population average in (50 ± 10). Higher score = healthier	AJRR
	Satisfaction	1	-	Very dissatisfied to very satisfied (5 options)	AOANJRR, CJRR, SAR
Knee Only	KOOS-12	12	Pain (4), Function & daily living (4), QoL (4)	0-48 (converted to percentile)	SAR
	KOOS JR	7	Stiffness (1), Pain (4), Function & daily living (2)	0-28 (converted to interval score out of 100)	AJRR
	Oxford Knee Score	12	-	0-48 (lower = more severe)	AOANJRR, CJRR, NJR
Hip Only	HOOS-12	12	Pain (4), Function & daily living (4), QoL (4)	0-48 (converted to percentile)	SAR
	HOOS JR	6	Pain (2), Function & daily living (4)	0-28 (converted to interval score out of 100)	AJRR
	Oxford Hip Score	12	-	0-48 (lower = more severe)	AOANJRR, CJRR, NJR