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# A Systematic Review of the Health-related Quality of Life Measures following Total Knee Arthroplasty

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## Background

- Total knee arthroplasty (TKA) is a treatment of choice when all other treatment options have been exhausted in patients with different forms of knee arthritis.
- One of the goals of TKA, including the rehabilitation interventions that follow TKA, is to improve health-related quality of life (HRQOL).
- Patients awaiting TKA expect TKA to improve their HRQOL (1).
- QOL - an overarching concept consisting of different domains such as physical, psychological, social, life conditions, behavior, and happiness.
- HRQOL - the construct that examines the impact of health status on the physical and psychosocial well-being, fulfilment of life roles, and satisfaction in contrast to merely objective changes in health status.
- It is important that the patient-reported outcomes (PROs) that measure HRQOL after TKA assess psychosocial well-being, participation in life roles, and satisfaction after TKA.
- A number of PROs have been used for assessing HRQOL as an outcome following TKA (2).
- PROs for this purpose can be - region specific, disease-specific, or generic measure of HRQOL.
- It is unclear, however, whether current PROs used in patients with TKA incorporate the critical components of HRQOL and have established clinimetric properties in context of TKA.

## Objectives

- The objective of this review was to conduct a systematic review of the commonly used HRQOL outcomes in patients with TKA.
- More specifically, to examine the clinimetric properties namely clinical utility, reliability, validity, and responsiveness of the HRQOL outcome measures using standardized guidelines.
- The review also summarizes the challenges in measuring HRQOL in these patients.

## Research Methods

- **Bibliographic databases** such as MEDLINE, CINAHL AND EMBASE were searched using pre-determined search terms.
- **Search terms were** - (total knee arthroplasty OR total knee replacement OR knee arthroplasty OR knee replacement) AND (patient-reported outcomes OR self-reported outcomes OR outcome measures)
- **Inclusion/exclusion criteria were** - any PRO used in either randomized controlled trial (RCTs) or described in systematic reviews (SRs) for assessing HRQOL in patients with TKA were identified and included in the review. The HRQOL outcomes used in cohort or case-controlled studies were excluded. The PROs published in languages other than English and the objective assessment scores were excluded.
- A total of eight criteria were reviewed. These were conceptual model, reliability, validity, responsiveness, interpretability, administrative burden, alternative modes of administration, and cultural adaptations performed for that HRQOL outcome. These criteria have been described earlier (3).
- Two independent reviewers searched the literature, identified the potential HRQOL outcomes, and extracted the necessary data.
- Any disagreements between the reviewers were addressed by discussion and consensus-building.

## Results

- The review identified seven outcomes that have been used in the RCTs and SRs focusing on patients with TKA.
- They were - Short Form 36 (SF-36) and its shorter version SF-12, The Western Ontario and McMaster Universities Arthritis Index (WOMAC), EuroQOL (EQ-5D), Quality of Well-being (QWB) scale, Knee Osteoarthritis Outcome Score (KOOS), and 15D

## Results (continued)

### Conceptual model

- **SF-36 and SF-12** - generic measures and developed for assessing burden of disease on health status but not HRQOL (4).
- **The WOMAC** - joint-specific measure and assesses pain, stiffness, function, social, and emotional well-being in patients with knee arthritis (5).
- **The EQ-5D** - generic health measure for clinical and economic analysis for different interventions (6).
- **QWB Scale** - generic measure based on the general health policy model, assesses preference for observed health states (7).
- **KOOS** - joint-specific measure and assesses pain, symptoms, ADL, sports and recreation, and QOL in patients with knee pathology (8).
- **15D** - generic measure of HRQOL to assess physical, mental, and social well-being in a given population (9).

### Reliability

- Two joint specific measures of the KOOS and the WOMAC has acceptable reliability (ICC > 0.7) in patients with TKA (8, 10).
- Of the generic measures, only the SF-36 has been examined for its test-retest reliability (ICC > 0.75) in patients with TKA (11).
- Construct validity and responsiveness of the KOOS and the WOMAC have been well-established in patients with TKA (8, 10).
- Of the generic health measures, validity of the SF-36 has examined in patients with TKA and has been moderate when compared with joint -specific PROs or objective outcomes. Responsiveness of the SF-36 has been low to moderate in patients with TKA (12).
- Other outcomes do not have established validity in context of TKA. Many have, in fact, been recommended for economic analysis and not for HRQOL.

- **Validity and Responsiveness**
- Construct validity and responsiveness of the KOOS and the WOMAC have been well-established in patients with TKA (8, 10).
- Of the generic health measures, validity of the SF-36 has examined in patients with TKA and has been moderate when compared with joint -specific PROs or objective outcomes. Responsiveness of the SF-36 has been low to moderate in patients with TKA (12).
- Other outcomes do not have established validity in context of TKA. Many have, in fact, been recommended for economic analysis and not for HRQOL.

### Mode of administration/Burden of Administration

- Most PROs reviewed can be self-administered or administered by a trained interviewer.
- All the reviewed PROs take an average of 10 minutes or to complete.

### Interpretability and Versions in Other Languages

- **SF-36 and SF-12** have been widely tested for their interpretability; available in almost 50 languages
- **The WOMAC** has been found to be acceptable for its interpretability and ease of understanding; available in over 60 languages
- **EQ-5D** is easy to interpret and is available in over 100 languages.
- **KOOS** is simple and easy to interpret; available in 28 languages.

## Discussion and Conclusions

- The WOMAC and the KOOS have more condition-specific items and have proven psychometric properties for patients with TKA; however they are primarily measures of pain and functions rather than HRQOL.
- SF-36 and SF-12 are other measures which have been tested in patients with TKA, however have low to moderate validity/responsiveness in this patient group.
- Other measures have not been tested in TKA and need further examination before their use.
- **Researchers** should examine the psychometric properties of more established HRQOL measures such as the EQ-5D, QWB, and WHOQOL also for newer joint-specific QOL measure such as the osteoarthritis knee and hip quality of life questionnaire (OAKHQOL).
- **Clinicians** should be careful while selecting PROs and base their decision on what exactly they want to measure - pain/functions (KOOS or WOMAC), burden of disease or health status (SF-36 or SF-12), or HRQOL (no preferred measure available as of yet).

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