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ORIGINAL ARTICLE

What Predicts 36-Item Health Survey Version 2 After Total Hip Arthroplasty

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Abstract

Objective: To identify the factors having the greatest effect on the Medical Outcomes Study 36-Item Short-Form Health Survey, version 2 (SF-36v2) score after total hip arthroplasty (THA).

Design: Retrospective review.

Setting: Private 150-bed hospital.

Participants: Patients (N=659) who underwent initial THA for osteoarthritis (OA) of the hip between April 2007 and January 2009. A total of 138 patients who fulfilled the inclusion criteria were seen at the first follow-up, while 108 patients were included in the second follow-up; all 30 patients excluded at the second follow-up underwent contralateral THA between follow-ups. The average time ± SD from surgery to first follow-up was 195.1±67.7 days, and that to second follow-up was 443.0±108.5 days. Patients' average age ± SD was 61.1±9.9 years at first follow-up and 61.3±10.3 years at second follow-up. Women accounted for 85.5% of patients at first follow-up and 85.2% at second follow-up.

Interventions: Not applicable.

Main Outcome Measures: Eight subscales of the SF-36v2, age, sex, body mass index, complications, living alone, contralateral hip OA, range of hip joint motion, walking aids, and preoperative mental health (MH) values from the SF-36v2.

Results: Canonical correlation analysis showed that contralateral hip OA had a major effect on the SF-36v2 score at the first follow-up. At the second follow-up, excluding the 30 patients who had undergone contralateral THA, physical function measured by the SF-36v2 was strongly affected by age, and other items were strongly affected by preoperative MH.

Conclusions: When using the SF-36v2 as an assessment scale after THA, adjustments should be made for contralateral hip OA. Moreover, age and preoperative MH should also be considered.

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Total hip arthroplasty (THA) is a surgical treatment for a variety of hip disorders, particularly end-stage osteoarthritis (OA) of the hip.[1,2] In the past, most reports have evaluated the THA outcome from the treatment provider's perspective. In recent years, response evaluation scales have attempted to assess therapeutic efficacy from the patient's perspective, through the development of scales that take into account health levels and functioning in daily living from the patient's own subjective viewpoint. One such patient-centered response evaluation scale is quality-of-life (QOL) assessment. In the health care sector, this is known as health-related quality of life (HRQOL). HRQOL focuses on the physical, mental, and social aspects of patients affected by disorders and how these change as a result of treatment.

Scales used to measure the HRQOL of patients with hip disorders include the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36),[3] the Western Ontario and McMaster Universities Osteoarthritis Index,[4] the Lequesne Index of Severity for Osteoarthritis of the Hip,[5] the Nottingham Health Profile,[6] the Sickness Impact Profile,[7] and the EuroQol-5-dimension.[8] Of these, the SF-36 has been reported to be highly reliable,[9-11] and there have also been reports of evaluation of HRQOL after THA using only the SF-36.[12,13]

Factors affecting HRQOL after THA include age,[14] sex,[15] obesity,[16-19] complications,[20,21] contralateral hip OA,[22,23] and preoperative mental health (MH).[21] In recent years, elderly people

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living alone have also been reported to have low HRQOL.[24,25] Many of these reports, however, have investigated the effect of single items on HRQOL, without simultaneously investigating relevant factors. HRQOL is designed to assess a complex phenomenon that also reflects patients' mental state and cannot be regarded as determined by a single factor. It is therefore necessary to take multiple confounding factors into account when investigating which factors have the greatest effect on HRQOL after THA.

If a factor that influences a patient's degree of satisfaction can be clarified, an intervention to address it can be developed.

The objective of this study was to perform a retrospective investigation of items reported to affect HRQOL in previous studies, and to perform a multivariate analysis of factors affecting HRQOL after THA.

Methods

Participants

The subject population included 659 patients with diagnosed OA of the hip who underwent initial THA at Eniwa Hospital between April 1, 2007, and January 31, 2009.

Inclusion criteria for subjects were (1) having completed a questionnaire on the day of hospital admission immediately before THA; (2) having undergone follow-up within 1 year of surgery and a subsequent follow-up within the following 3 years; (3) not having undergone any orthopedic surgical procedure on the nonoperated hip during the first year of follow-up; and (4) having no questionnaire answers or other information missing. The exclusion criterion was having undergone an orthopedic surgical procedure on the nonoperated hip between the initial follow-up within the first year and subsequent follow-up.

The questionnaire was not recovered in 521 of 659 persons who underwent initial THA. Thus, 138 subjects met the inclusion criteria within 1 year after surgery, and 108 met them at the subsequent follow-up, after the exclusion of 30 patients who underwent THA for their nonoperated hip because of OA (fig 1). Follow-up times were based on the protocol used at Eniwa Hospital.

The surgical procedure for THA used the posterolateral approach in all patients. Figure 2 shows the postoperative protocol at Eniwa Hospital. Each therapist adjusted and performed postoperative rehabilitation according to the needs of each patient. For example, for sharp pain, cold therapy was performed. In a patient with leg length discrepancy caused by a contracture, range of motion (ROM) practice was performed with thermotherapy. Postoperatively, patients who were regarded as at high risk of posterior dislocation on the basis of intraoperative findings were restricted from using hip flexion movements and complex movements combining hip flexion, adduction, and internal rotation, whereas those regarded as at high risk of anterior dislocation were restricted from complex movements combining hip extension and external rotation. In addition, to prevent dislocation of the hip after THA, all patients were also given guidance about prohibited activities. This guidance was provided by physicians or other medical staff (nurses, physiotherapists, occupational therapists) as an oral explanation and in a pamphlet as behavioral instruction in the rehabilitation clinic. The patients were asked to consider following these instructions for their entire life.

The items surveyed and measured in this study included information required for routine treatment, and no experimental intervention was performed. Subjects were treated in accordance with the Helsinki Declaration, and their consent was obtained on the basis of a full explanation of the purpose and objectives of the study on admission, the voluntary nature of participation in the study and freedom to withdraw consent, and privacy protection (Hirosaki University Graduate School of Medicine Ethics Committee, approval no. 2010-080). Informed consent was obtained at the time of follow-up.

Clinical outcomes

Surveys were carried out on the day of hospitalization immediately before THA, at the first follow-up examination within 1 year after surgery, and at a second follow-up examination.

Parameters investigated were HRQOL preoperatively and at the first and second follow-up examinations, information from preoperative medical records, hip radiographic findings, physical signs, and psychological findings (table 1).

The SF-36, version 2 (SF-36v2) was used as the HRQOL questionnaire.[26-28] The questionnaire was self-administered in the hospital in all patients. The SF-36v2 is a comprehensive scale for measuring HRQOL, expressed in terms of 8 subscales: physical functioning (PF), role-physical (RP), bodily pain (BP), general health perceptions (GH), vitality (VT), social functioning (SF), role-emotional (RE), and MH. In this study, scores for these 8 items were calculated by norm-based scoring (NBS), with 50 as the standard score for each item. The advantage of NBS is that it allows comparison with the results of the 8-item Short-Form Health Survey and SF-36.[28]

Preoperative information from medical records included age, sex, body mass index (BMI), complications, living alone, and working. Complications were determined in terms of whether or not orthopedic complications other than hip disorders had been diagnosed. Living alone was defined in terms of whether other family members were also residing in the patient's living environment before surgery. Working was defined as the intention to return to work after THA.

Radiographic findings including contralateral hip OA were evaluated by an orthopedist at Eniwa Hospital; OA was deemed to be present if the contralateral hip joint space had partly or completely disappeared.

Physical signs included preoperative passive hip joint ROM (hip ROM) and use of walking aids. Hip ROM was measured as the arc values for range of hip flexion and extension. The

List of abbreviations:

BMI	**body mass index**
BP	**bodily pain**
CL	**canonical loading**
GH	**general health perceptions**
HRQOL	**health-related quality of life**
MH	**mental health**
NBS	**norm-based scoring**
OA	**osteoarthritis**
PF	**physical functioning**
QOL	**quality of life**
RE	**role-emotional**
ROM	**range of motion**
RP	**role-physical**
SF	**social functioning**
SF-36	**Medical Outcomes Study 36-Item Short-Form Health Survey**
SF-36v2	**Medical Outcomes Study 36-Item Short-Form Health Survey, version 2**
THA	**total hip arthroplasty**
VT	**vitality**